Distracted Doctoring

Returning to Patient-Centered Care in the Digital Age

Peter J. Papadakos
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To our families, who keep us focused on the important things in life and provide a pillar of support in an ever--busy world;

to our authors for volunteering their time, expertise, and energy;

to our editors Rebekah Collins, Portia Levasseur, Martine Chevry, Asja Parrish, and P. Vijay Shanker for their guidance and technical assistance;

and to Richard Lansing and the Springer Publishing Company for their faith in our project

Foreword: "First, Do No Harm"

As a *New York Times* reporter, I occasionally get a tip that sounds too strange to be true and also too credible – and troubling – to ignore. I got such a tip in November of 2011. It had to do with doctors getting distracted by their devices and included at least one startling anecdote about a surgeon watching a movie on his phone during a major procedure.

The source of this information was the coeditor of this book, Peter J. Papadakos, who has since become a leading authority, if not *the* authority, on the subject.

But I should give you some background before I tell you how the story unfolded and the unfortunately true, and startling, tale of the distracted surgeon.

In 2009, I began a deep journalistic dive into the issue of distracted driving. Over the course of that year, I wrote for the *Times* numerous narratives about the terrible and growing risks to drivers giving their attention to their phones. And taking lives in the process. The series of stories won a Pulitzer Prize in 2010.

In some ways, I confess, the series was merely an entry point to what I see as a much more profound story: the way that our electronic devices co-opt our attention by playing to our deepest, most primitive social and neurological impulses.

Over the next year, I dove deeply again, this time into the neuroscience. The scholarship in the area was embryonic and, at the same time, shocking and obvious in its own way. We are overtaken by the persistent pings from our devices, changes in light and sound, and beckoning from friends, family, bosses, and peers. We experience cascades of dopamine. In the absence of these neurochemical surges, we can feel bored. To the most ardent scientists in the field, the phone becomes virtually irresistible, a kind of drug delivery device.

Whether or not it is addictive, or merely extremely compelling, the phone doesn't look at all like a drug you'd buy on the street corner. It looks like a productivity device. It is sold to us as no less than essential for survival. Marketing and peer pressure turn it into a must-have and must-use, all the time, everywhere.

This was what I'd learned by November of 2011 when my phone rang. It was Dr. Papadakos. He had a story to tell. He explained to me that the problem was showing up in hospitals, in medical schools, in the hallways, and during rounds. He described doctors' and nurses' faces buried in phones as they rounded, sometimes bumping into things, sometimes worse.

“My gut feeling is lives are in danger,” he told me. “We’re not studying the problem and we’re not educating people about the problem, and it’s getting worse.”

On December 14, 2011, I wrote a front-page story for the *Times* about the subject. It was in no small part thanks to Dr. Papadakos, whose picture appeared in the paper. But I don’t write stories like this based on a single source, and, as it turned out, plenty of other people in medicine shared the viewpoint. The research backed it up too: one peer-reviewed study found that half of technicians monitoring bypass machines had checked their phones during surgery.

Then there was the story of the surgeon himself. Allegedly (according to a malpractice lawyer) the surgeon was making *personal calls* on a wireless headset during a procedure, became distracted, and left a patient partly paralyzed.

In another case, a surgeon was said to be watching a movie on his phone during a procedure. The movie: “The 40-Year-Old Virgin.”

These are obviously extreme cases. I mean them not to impugn a profession. In fact, my wife is a neurologist and I know well the deep commitment most doctors have to their patients and the extraordinary attention they pay to safety.

But I want to make one point clear. In the digital era, *doctors are not immune*. Their brains (your brain if you’re a doctor) are not wired differently such that they can resist an electronic signal that has become tantamount to a drug.

That’s what this book is about. With leading thinkers like Dr. Papadakos and his coeditor, Dr. Bertman, at the helm, it is a highly valuable must-read for some of society’s most valuable problem solvers and caregivers.

The New York Times
New York, NY, USA

Matt Richtel

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Chapter 1
Introduction: The Problem of Distracted Doctoring

Peter J. Papadakos and Stephen Bertman

> *Let each hour of the day have its allotted duty, and cultivate that power of concentration which grows with its exercise, so that the attention neither flags nor wavers, but settles with a bull-dog tenacity on the subject before you.* Sir William Osler, "The Master-Word in Medicine" (1903)

The expression "distracted doctoring" was first coined in December 2011 by *New York Times* reporter Matt Richtel, the author of our Foreword, who had won a Pulitzer Prize the previous year for his trailblazing series of articles on the dangers of distracted driving. As Richtel wrote in his 2011 front-page medical exposé [1]:

> Hospitals and doctors' offices, hoping to curb medical error, have invested heavily to put computers, smartphones and other devices into the hands of medical staff for instant access to patient data, drug information and case studies.
>
> But like many cures, this solution has come with an unintended side effect: doctors and nurses can be focused on the screen and not the patient, even during moments of critical care. And they are not always doing work; examples include a neurosurgeon making personal calls during an operation, a nurse checking air-fares during surgery and a poll showing that half of technicians running bypass machines had admitted texting during a procedure.

It was not until the late fifteenth or early sixteenth century that the English word "distraction" was first associated with the idea of absent-mindedness [2, 3]. But it was not until the twenty-first century that it was specifically applied to the field of medicine – a development attributable to the multitude of electronic stimuli and devices that compete today for the attention of health care personnel. The introduction of mandatory electronic medical records (EMRs) has only magnified the issue.

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Two studies, one conducted in 1984 and the other in 1994, had estimated that between 44,000 and 98,000 patients die annually from preventable medical errors [4]. In 2013 a further study concluded that there were more than 400,000 such deaths [5]. And in 2016, a new report set the total at 250,000 – calling medical error the third leading cause of death in the United States, behind only heart disease and cancer [6]. Because medical error is not listed as a cause of death on death certificates, and because the CDC (Centers for Disease Control and Prevention) has no "medical error" category to record such deaths, the accuracy of such estimates has been challenged [7]. Nevertheless, in the words of Dr. John T. James, author of the 2013 study:

> In a sense, it does not matter whether the deaths of 100,000, 200,000, or 400,000 Americans each year are associated with PAEs [preventable adverse events] in hospitals. Any of the estimates demands assertive action on the part of providers, legislators, and people who will one day become patients. [8]

In the light of the causal relationship between being distracted and making mistakes, these mortality figures also demand that distracted doctoring become a central issue in medical education today. To date, however, the subject has not been addressed in major studies on preventing medical error, where the word distraction currently remains absent from tables of contents, glossaries, and indices [4, 9] or is at best discussed for about a page [10]. On a positive note, however, a number of professional organizations such as the Association of periOperative Registered Nurses (AORN), the American College of Surgeons (ACS), the American Academy of Orthopaedic Surgeons (AAOS), the American Society of Anesthesiologists (ASA), the American Association of Respiratory Care (AARC), the American College of Cardiology (ACC), the Society of Critical Care Medicine (SCCM), the American College of Chest Physicians (ACCP), and the Canadian Society of Respiratory Therapists (CSRT) have begun to address this issue at their annual meetings and have disseminated their concerns through the publication of guidelines and recommendations and through podcasts and articles in their journals.

The present anthology attempts to redress this omission by discussing distracted doctoring from a number of professional perspectives. Chapter 2 describes the positive ways medicine has been transformed by the coming of computers, while Chap. 3 examines the potentially negative consequences of this change. Chapter 4 explores the addictive nature of electronic devices.

Chapters 5, 6, 7, 8, and 9 address the challenges such devices pose to the humane practice of medicine, and Chap. 10 examines the toll a high-speed age can exact on medical personnel. Chapters 11, 12, 13, and 14 describe the specific dangers of distraction in surgical settings, while Chap. 15 focuses on the legal issue of malpractice. Lastly, Chaps. 16 and 17 and the Afterword prescribe remedies to prevent distraction and preserve patient-centered care.

We are hopeful that this book will become a core text in the education of health professionals and will lead to the development of programs at professional schools and in orientation programs at health facilities throughout the world, decreasing preventable adverse events by counteracting the breakdown of vigilance among medical personnel in the digital world.

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Chapter 2
Medicine Enters the Computer Age

Lekshmi Santhosh and Raman Khanna

You have to know the past to understand the present. – Carl Sagan, astronomer

The best way to predict the future is to invent it. – Alan Kay, computer scientist

The 1960s and 1970s: The Dawn of Computerization in Health Care

In October of 1960, the *New York Times* reported on a three-day symposium in Endicott, New York, devoted to gathering the "nation's experts in the medical and biological applications of computers [1]." The article temperately warned that the "emphasis… was not on ways of replacing the specialist by a specialized machine, but on ways of using machines to extend and increase the effectiveness of physician and biological scientist alike." Perhaps this decades-long fear of replacing M.D. with machine has subliminally hindered medicine's journey into the digital age. The sponsor of that symposium was none other than IBM, which has now developed Watson Health, a multimillion dollar effort to use "cognitive computing" to diagnose, manage, and treat diseases across populations [2].

The 1960 *Times* article goes on to cite Dr. Joseph E. Schenthal, head of the Hutchinson Memorial Clinic at the Tulane University Medical School, predicting

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that "a person's entire lifetime of 'medical history' can be stored on a few feet of magnetic tape," thus replacing written records of medical patients altogether. Other early conceptualizations of an EHR occurred throughout the 1960s, and one survey reported that at least 73 hospitals had "clinical information projects" and 28 projects for health record storage and retrieval of health records were underway [3]. All across the country, various academic medical centers tried to develop homegrown systems, with Mayo Clinic being one of the early adopters [4]. A film clip from 1966 showcases the limited capabilities of the then-groundbreaking Akron General Hospital's earliest electronic health record, with the narrator exhorting, "It is going to be possible to relieve the nurses and the doctors of some of the paperwork [5]."

Meanwhile, in Boston in the 1960s, collaboration between the government, industry, and academia led to the development of a programming language—the Massachusetts General Hospital Utility Multi-Programming System (MUMPS) [6]. Dr. Jerome H. Grossman and Dr. G. Octo Barnett from the Massachusetts General Hospital's Laboratory of Computer Science used this language to found the Computer-Stored Ambulatory Record (COSTAR), one of the first computer systems that included functions for patient registration, health records management, and practice management. Within 20 years, records from approximately 550,000 patients were generated and tabulated using the COSTAR system, and both MUMPS and COSTAR are currently still in use, albeit in different iterations [7]. Flaws in these systems became obvious at the same time as their benefits, soon after their dissemination to other institutions "in real-life practice." As will be eerily prescient to any physician practicing today, difficulties included customizing the software to their own clinical setting [8].

A few states away in Indiana, the Regenstrief Institute in Indianapolis was already considering how to make the data it collected even more useful. It created the Regenstrief Medical Record System (RMRS) in 1972, which aimed to "make the informational 'gold' in the medical record accessible to clinical, epidemiological, outcomes and management research [9]." The technology was thought to be revolutionary at the time but deemed too expensive to spread too widely outside Indiana. These pockets of innovation such as MUMPS and RMRS were occurring in —and were relatively limited to—stand-alone cities or academic medical centers.

At the same time in the 1970s, the federal government started to get more involved in the creation of its own EHR for the care of veterans. Its initial effort was called the Decentralized Hospital Computer Program (DHCP), launched across 20 Veterans Administration (VA) clinics. This homegrown VA computer system initially struggled to gain internal legitimacy and bureaucratic clearance [10], and it would take decades to become the Computerized Patient Record System (CPRS) physicians and physician trainees across the country continue to use. The VA EHR's well-known limitations—minimal search functionality, minimal attention to billing—have not prevented physicians from reporting high levels of satisfaction with its use nor driving the medication error rate there to a shockingly low 7 per 1 million prescriptions as compared to the national average of 5% of prescriptions [11, 12].

These early EHR successes represented glimmers of hope at the dawn of medicine's computer age. As these innovative tinkerers succeeded locally, the digital

revolution was just getting started, with the invention of the cell phone and the personal computer in the 1970s. Both Epic and Cerner—which today remain two of the largest EHR vendors [13]—were founded in 1979 [14]. Everything seemed poised for a perfect convergence of the medical and digital worlds.

The 1980s and 1990s: Growing Heterogeneity, Lofty Goals, and the Arrival of HIPAA

In the 1980s and 1990s, the explosion of personal computing transformed American homes and workplaces alike. As homegrown EHRs matured and computers became more ubiquitous in doctors' offices and hospitals, the health IT industry started to "commercialize," and the customer base for EHR began to expand rapidly, with vendors focusing on physician-specific workflows and billing [15]. More and more companies, including big corporations such as General Electric, began to throw their hat into the health IT ring.

In 1991, the Institute of Medicine published *The Computer-Based Patient Record: An Essential Technology for Health Care* [16]. The computer-based patient record (CPR) was the term used before "Electronic Health Record" came into vogue. The report advocated for "prompt development and implementation" of EHRs and recommended that public and private sectors join to establish a Computer-based Patient Record Institute to facilitate this. The report recommended congressional funding for this institute, national standards for data and security, and cost-sharing between the public and private sectors. The report went on to systematically delineate the numerous disadvantages of paper records that we all know and take for granted and recommended a goal of 100% adoption of EHRs by physicians by the year 2000. The report noted the minimal technologic requirements for the EHRs on page 101, which we have adapted into Table 2.1.

Although these technological requirements were clearly delineated, the report emphasized that the barriers to EHR implementation were not technology related but were systems-related. Perhaps prophetically, they noted:

> *…Informational, organizational, and behavioral barriers must also be addressed. Barriers to CPR development include development costs and lack of consensus on CPR content. CPR diffusion is adversely affected by the disaggregated health care environment, the complex characteristics of CPR technology, unpredictable user behavior, the high costs of acquiring CPR systems, a lack of adequate networks for transmitting data, a lack of leadership for resolving CPR issues, a lack of training for CPR developers and users, and a variety of legal and social issues.*

As the digitization of the health records began to ramp up nationally, the aforementioned "legal and social issues" began to profoundly influence the development of EHRs as the groundbreaking 1996 Health Insurance Portability and Accountability Act (HIPAA) was passed [17]. Since the act regulated the use and disclosure of protected health information (PHI), comprised of "any information held by a covered entity which concerns health status, provision of health care, or payment for

Table 2.1 1991 IOM report of minimal technological requirements for EHRs

Minimal technological requirements for EHRs
1. Databases and database management systems
2. Workstations
3. Data acquisition and retrieval
4. Text processing
5. Image processing and storage
6. Data exchange and vocabulary standards
7. System communications and network infrastructure
8. System reliability and security
9. Linkages to secondary database

From Dick RS et al. Institute of Medicine. 1997 (revised version), page 101

health care," the interpretation was very broad. In the historical context of the burgeoning HIV/AIDS epidemic in the 1990s, the HIPAA act sought to protect patients' private health information and establish penalties for breaching patient privacy, especially related to sensitive conditions such as mental illness or HIV status [18]. Moreover, with increasing use of consumer technology, HIPAA also aimed to protect against theft of private health information by companies or individuals by eventually levying multi-thousand dollar fines for violations of patient privacy [19].

In his book *The Digital Doctor*, Dr. Robert Wachter interviewed Dr. John Halamka, the CIO of Beth Israel Deaconess Medical Center, who lamented HIPAA thus: "I spend 50 percent of my time on [HIPAA]. Not on, 'How can I create innovative mobile devices for doctors?' Or, 'How can we engage patients and families with new IT tools?' Instead, it's 'How can I prevent your iPhone from downloading a piece of personal health information should you lose your phone?' [20]" Although HIPAA was passed when the Internet was still in its early days, it continues to have profound implications on the development of health IT and to cause anxiety among technology companies entering the health care space. While the 1960s and 1970s were characterized by hope for an emerging technology to cure health care's ails, the 1980s and 1990s showed a more cautious expansion of EHRs despite the IOM's exhortations for progress.

The 2000s and Early 2010s: The Alphabet Soup of ONCHIT, HITECH, and MU

At the turn of the twenty first century, we were very far from achieving the IOM's call for universal EHR adoption; only 18% of office-based physicians used an EHR, according to the CDC [21]. In President George W. Bush's State of the Union address in 2004, there was one line where he mentioned, "By computerizing health

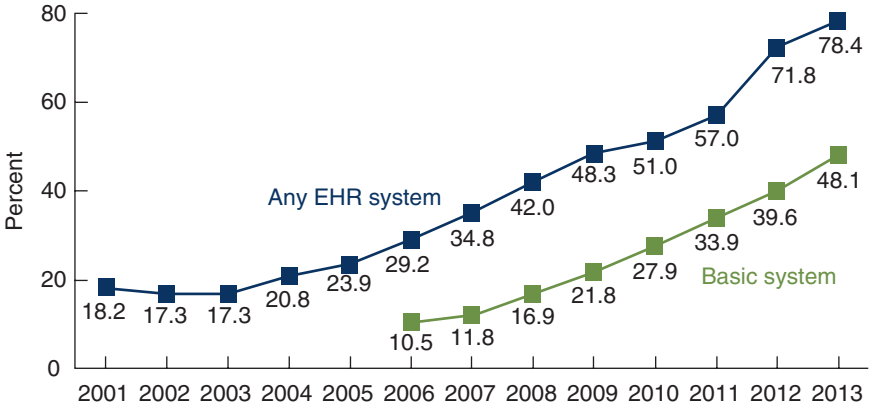
records, we can avoid dangerous medical mistakes, reduce costs, and improve care [22].” Later that year, he called for a comprehensive effort to digitize American health care within the next 10 years and announced the creation of a new Office of the National Coordinator for Health Information Technology (ONCHIT). Initially armed with a relatively small budget of $42 million and headed up by the first “health IT czar” Dr. David Brailer, it strove to set universal EHR standards by ensuring interoperability, that is, the ability for different health care computer systems to talk to each other [23]. In the early years, ONCHIT started to make slow progress toward the goal of interoperability. For example, ONCHIT as well as the Health Level 7 group have been trying to incentivize interoperability by offering developers prize money to improve readability of complex documents (such as discharge summaries) so they can readily be accessed between health systems [24]. However, interoperability between our many health records—even those by the same vendor—remained a challenge.

Despite the establishment of ONCHIT, the EHR adoption rate in hospitals was still vanishingly rare in the late 2000s. One study showed that only 1.5% of hospitals had a comprehensive electronic-record system present in all units, and only 17% of hospitals had computerized provider-order entry (CPOE) for medications by the year 2009 [25]. The Agency for Healthcare Research and Quality described barriers to implementation of CPOE in a detailed report, including staffing and training issues, workflow issues, computerized order set design, interoperability or lack thereof, customizability or lack thereof, technical support issues, and alert fatigue [26].

The transition from the Bush years to the Obama years would coincide with a massive transformation. Along with the economic stimulus bill came the Health Information Technology for Economic and Clinical Health (HITECH) Act, which allocated potentially over $100,000 for each doctor and between $2 and $10 million per hospital to become “meaningful users” of EHRs, ultimately investing more than $36 billion over 10 years to accelerate EHR adoption [27].

Meaningful use (MU) had a very specific meaning—a series of standards that EHRs, doctors, and hospitals had to meet to be eligible for the incentive payments. The meaningful use criteria span multiple appendices and tables that health systems have to decipher, as seen for Stage 1 in Table 2.1 [28].

The law mostly served as a strong incentive to promote adoption of EHRs, both in rewards for early adoption and penalties such as decreased reimbursement for late adopters, including those who could not meet the first MU criteria by 2015. These criteria were perceived to be so onerous that even large health systems such as Intermountain Healthcare in Salt Lake City, Utah and Partners HealthCare in Boston, Massachusetts worried that they would be unable to comply with them [29]. Despite the perceived issues, meaningful use rolled out in 2011–2012 and Stage 2 in 2014–2015. Stage 1 included criteria such as providing discharge summaries to patients within 3 days of hospitalization and transmitting a proportion of prescriptions electronically, which was “precisely how Blumenthal had planned it: to use [MU] to gently raise the bar without having the rules inhibit adoption [30].” Stage 2 was even more ambitious, focusing as it did on health information exchange and interaction between local EHRs and cancer, immunization, and other registries [31].



NOTES: EHR is electronic health record. "Any EHR system" is a medical or health record system that is either all or partially electronic (excluding systems solely for billing). Data for 2001-2007 are from in person National Ambulatory Medical Care Survey (NAMCS) interviews. Data for 2008-2010 are from combined files (in-person NAMCS and mail survey). Estimates for 2011-2013 data are based on the mail survey only. Estimates for a basic system prior to 2006 could not be computed because some items were not collected in the survey. Data include nonfederal, office-based physicians and exclude radiologists, anesthesiologists, and pathologists.
SOURCE: CDN/NCHS, National Ambulatory Medical Care Survey and National Ambulatory Medical Care Survey, Electronic Health Records Survey.

Fig. 2.1 Growth in EHR in primary care practices from 2001–2013 (From Hsiao CJ, Hing E. 2014 Jan)

Indeed, Dr. Blumenthal's goal of incentivizing EHR adoption did achieve its intended effect: adoption of basic EHR systems by office-based physicians increased dramatically between the final passage of HITECH in 2009 and 2013, as shown in Fig. 2.1 [32]. The paradoxically named "basic EHR systems" actually have significant functionality in the data below, including patient history and demographics, patient problem lists, physician clinical notes, comprehensive medication and allergy lists, computerized order entry for medications, and ability to view labs and imaging electronically.

Medicine and Computers Today: Is Waiting for "Disruption" the Only Answer?

Despite, or perhaps because of, the unprecedented adoption of the EHR of the last years, EHRs have yet to live up to the promise of the Endicott Symposium or the IOM report. In our current decade, the average health care consumer is often (but not always—especially in the case of seniors [33]) also an avid personal technology consumer. She or he uses a smartphone for email, music, news, pop culture, and social media. Yet as our personal electronic devices are becoming smaller, faster,

and smarter, our EHRs have not progressed beyond clunky interfaces, numerous extraneous alerts, and onerous demands on physician and patient time. Though Wachter points out examples of EHR "disruptors" that might be forthcoming, such as cloud-based EHRs like athenahealth, the arrival of "medical scribes" to ease the burden of physician paperwork, and OpenNotes software that enables patients to read and even edit their own health records, there is not yet anything on the scale of an Uber, Lyft, Blue Apron, or TaskRabbit [34].

Meanwhile, as physicians, patients, and the country at large await the beneficial disruption that was promised, in clinic rooms and hospital rooms across the country, the not-so-beneficial disruption is all too real. One time-and-motion study following outpatient physicians in four different specialties showed that for every hour physicians spent with patients, nearly two additional hours were spent on documentation in the EHR [35], with other similar studies replicating the burden of constantly "feeding the beast" [36]. Moreover, physicians also have to sort through clinical messages from patients (secure emails or physician-to-patient messaging services) during nonclinical time, spending almost an extra hour a day in one study [37]. Physicians also report that having EHRs with more functionality actually increases stress levels and can contribute to burnout [38]. This phenomenon of decreased time at the patient bedside and increased time at the computer has led to a phenomenon that Dr. Abraham Verghese has coined the "iPatient," where providers obsessively track lab and data trends while spending precious little time with the actual human being the iPatient represents [39].

These changes in the fundamental patient-physician dyad are simultaneously ubiquitous and completely novel and have set us up for distraction and medical errors. Constraints on physician time, coupled with documentation burden, have led to the copy and pasting of vast portions of notes with the propagation of old or even false information and distrust in the very integrity of the record [40]. Moreover, meaningful-use-related requirements for clinical documentation do not always correspond to clinically useful ones. For example, Table 2.2 shows that one requirement is to provide discharge summaries or copies of the EHR within 3 days of discharge. While this seems easy to operationalize, it could come at the cost of leaving out critically important information, such as a pending pathology result, so as to avoid a time-based penalty. Additionally, multiple levels of alerts for medication interactions have led to widespread alert fatigue. One famous study catalogued 2,558,760 unique alarms in a 31-day-study period in the intensive care unit—about one audible alarm per bed every 8 min [41]. The cognitive overload from too much data in the EHR contributes to medical errors of both the diagnostic and treatment variety. The net result of all of the changes of the computer age, arriving in a rush in the last few years, has placed us in a complex transition state where we are documenting more, copy-pasting more, clicking through more alerts, and spending less time with our patients than we would like, all in a haze of constant distraction. This transition state took decades to enter fully; hopefully it will not take decades to exit it into to the land of time-saving, safety-providing, and distraction-free digital health care that computers continue to promise.

Table 2.2 Summary overview of meaningful use (MU) stage I in HITECH

Health outcomes policy priority	Stage 1 objective	Stage 1 measure
Improving quality, safety, efficiency, and reducing health disparities	Use CPOE for medication orders directly entered by any licensed health care professional who can enter orders into the medical record per state, local, and professional guidelines	More than 30% of unique patients with at least one medication in their medication list seen by the EP or admitted to the eligible hospital or CAH have at least one medication entered using CPOE
	Implement drug-drug and drug-allergy interaction checks	The EP/eligible hospital/CAH has enabled this functionality for the entire EHR reporting period
	EP only: Generate and transmit permissible prescriptions electronically (eRx)	More than 40% of all permissible prescriptions written by the EP are transmitted electronically using certified EHR technology
	Record demographics: preferred language, gender, race, ethnicity, date of birth, and date and preliminary cause of death in the event of mortality in the eligible hospital or CAH	More than 50% of all unique patients seen by the EP or admitted to the eligible hospital or CAH have demographics as recorded structured data
	Maintain up-to-date problem list of current and active diagnoses	More than 80% of all unique patients seen by the EP or admitted to the eligible hospital or CAH have at least one entry or an indication that no problems are known for the patient recorded as structured data
	Maintain active medication list	More than 80% of all unique patents seen by the EP or admitted to the eligible hospital or CAH have at least one entry (or an indication that the patient is not currently prescribed any medication) recorded as structured data
	Maintain active medication allergy list	More than 80% of all unique patents seen by the EP or admitted to the eligible hospital or CAH have at least one entry (or an indication that the patient has no known medication allergies) recorded as structured data
	Record and chart vital signs: height, weight, blood pressure, calculate and display BMI, plot and display growth charts for children 2–20 years, including BMI	For more than 50% of all unique patients age 2 and over seen by the EP or admitted to the eligible hospital or CAH, height, weight, and blood pressure are recorded as structured data

(continued)

Table 2.2 (continued)

Health outcomes policy priority	Stage 1 objective	Stage 1 measure
	Record smoking status for patients 13 years old or older	More than 50% of all unique patients 13 years or older seen by the EP or admitted to the eligible hospital or CAH have smoking status recorded as structured data
	Implement one clinical decision support rule and the ability to track compliance with the rule	Implement one clinical decision support rule
	Report clinical quality measures to CMS or the States	For 2011, provide aggregate numerator, denominator, and exclusions through attestation; for 2012, electronically submit clinical quality measures
Engage patients and families in their health care	Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, medication allergies, discharge summary, procedures), upon request	More than 50% of all unique patients of the EP, eligible hospital or CAH who request an electronic copy of their health information are provided it within 3 business days
	Hospitals only: Provide patients with an electronic copy of their discharge instructions at time of discharge, upon request	More than 50% of all patients who are discharged from an eligible hospital or CAH who request an electronic copy of their discharge instructions are provided it
	EPs Only: Provide clinical summaries for each office visit	Clinical summaries provided to patients for more than 50% of all office visits within 3 business days
Improve care coordination	Capability to exchange key clinical information (e.g.: problem list, medication list, medication allergies, diagnostic test results), among providers of care and patient-authorized entities electronically	Performed at least one test of the certified EHR technology's capacity to electronically exchange key clinical information
Ensure adequate privacy and security protections for personal health information	Protect electronic health information created or maintained by certified EHR technology through the implementation of appropriate technical capabilities	Conduct or review a security risk analysis per 45 CFR 164.308(a) [1] and implement updates as necessary and correct identified security deficiencies as part of the EP's, eligible hospital's or CAH's risk management process

Adapted from CMS Meaningful Use Stage 1 Requirements Overview 2010, pp. 11–13

The next chapters will explore different lessons physicians are learning from the perils and promises of technology in other industries and how to apply them to health care. In this era of distracted doctoring, it will take more than a simple technological fix to return physicians' focus from the all-consuming documentation requirements on the computer screen to the heart of the patient-doctor relationship.

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Chapter 3
Electronic Challenges to Patient Safety and Care

Stephen Bertman

Almost a quarter of a century has elapsed since Dr. Lucian L. Leape issued his clarion call, "Error in Medicine" [1], in which he charged that the medical community had for too long underestimated or, worse, deliberately ignored the problem of medical errors and the harm they cause.

"All physicians," he said, "recognize that mistakes are inevitable. Most would like to examine their mistakes and learn from them. From an emotional standpoint, they need the support and understanding of their colleagues and patients when they make mistakes. Yet they are denied both insight and support by misguided concepts of infallibility and by fear: fear of embarrassment by colleagues, fear of patient reaction, and fear of litigation" [1]. As another physician, David Hilfiker, had charged a decade earlier, "The medical profession seems to have no place for its mistakes" [2].

Cognition not Character

Drawing on the behavioral theories of British psychologist James Reason [3], Leape argued that most errors in medicine result not from flaws in individual character (not being careful enough or trying hard enough) but from innate failures in human cognition, from what he termed "aberrations in mental functioning" – whether they be unconscious slips or mistakes in judgment. Hospital workers' slips or mistakes, he continued, were often precipitated and/or facilitated by latent flaws in the design of the systems the workers were a part of, flaws that inadvertently but inevitably set them up to fail.

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Accordingly, Leape urged the redesign of systems and the reorganization of processes to maximize patient safety by making it harder for hospital workers to commit errors, by automatically halting and reversing any errors they might commit and by anticipating and neutralizing those conditions that could serve as the preconditions for such mishaps.

Leape concluded:

> The most fundamental change that will be needed if hospitals are to make meaningful progress in error reduction is a cultural one. Physicians and nurses need to accept the notion that error is an inevitable accompaniment of the human condition, even among conscientious professionals with high standards. Errors must be accepted as evidence of system flaws not character flaws. Until and unless that happens, it is unlikely that any substantial progress will be made in reducing medical errors. [1]

Leape's mission to make error prevention a primary focus of medical practice would have a profound effect upon the way hospitals viewed the problem of adverse events. His contributions helped to shape important later studies [4, 5] and led to the implementation of major reforms [6].

A Cultural Revolution

As Leape strove to transform a dysfunctional health care culture and thereby reduce the frequency of medical error, a different revolution had already begun to transform American culture at large, one that would pose unprecedented future challenges to patient safety and care.

Whereas the Industrial Revolution of the nineteenth and early twentieth centuries was essentially machine driven, the new revolution of the late twentieth century was not mechanical but electronic. The first revolution produced progress mainly in manufacturing (giant factories and assembly lines) and transportation (railroads, automobiles, and airplanes); the second, chiefly in communications (television, cellular phones, and the Internet).

The first word processor would appear in 1970; the first silicon chip, in 1971; and the first personal computer, in 1975. By 1994, the year Leape's article was published, one-third of American homes had a computer, and by the following year, a quarter of them had two. The speed of computers, meanwhile, was doubling every 18 months. And during the mid-1990s, the public use of a newly commercialized, email-equipped Internet was rapidly expanding.

Telephone technology also kept pace. The traditional landline telephone became cordless and cellular in the 1970s. Eventually, deskbound personal computers (PCs) were overtaken by portable, lightweight laptops and sleek tablets. And by 1994, the very year Leape's article appeared, the twin technologies of telephone and computer merged for the first time in the handheld "Simon Personal Communicator," the prototype of today's ubiquitous, Wi-Fi-enhanced smartphone. According to the Pew Research Center, by 2015, smartphones were in the hands of

64% of adult Americans [7] and were being used professionally by more than eight out of ten US physicians [8].

> Yet, more important than the popularity of any one of these technologies is their combination, which radically reinforces and intensifies the accelerative effect that each separate technology would have had alone. It is their electronic linkage that keeps pictures, sounds, and data continually coursing on a nonstop, high-speed track, saturating our environment with instancy. And the more our society depends upon electronic information, the more our everyday lives need to keep up with its speed-of-light pace, since our economic and emotional existence is wired into its circuitry. [9]

During the Industrial Revolution, advanced technology had been mostly confined to factories. Then it moved into people's homes. Today we carry it around in our pockets. With each step, technology's presence and influence became more intimately entwined with our lives.

Hyperculture

Smartphone speed is stimulating and exhilarating. It gives us what we need and want faster than ever before – from breaking news to the latest sales. Through texts and images, it connects us instantly with our friends and reassures us about our own identities, identities that are now defined by our Internet presence and the social networks we belong to. And because our communicational devices are so essential to our existence, our lives have become unthinkable without them.

The speed at which those devices operate and our personal dependence upon them has created a new kind of society, a "hyperculture" [9], an electronic culture governed by speed. Energized by electrons racing around a nonstop track at the speed of light, a hyperculture creates its own peculiar kind of urgency – not a real urgency but an artificial one even more demanding, one that sucks us into its all-consuming vortex. Spun around in that vortex, we become convinced we must always keep up or we will fall hopelessly behind, thereby losing everything life has to offer. That struggle creates stress, a stress that can seem unending because we can never match the speed of our machines [10]. And when such stress temporarily relents, the void created by its absence causes us to hunger for a renewal of its hyperstimulation to end our boredom, not unlike those who, upon entering an empty room, automatically flip on the television set to drive away the silence [9].

Our electronic dependency on our devices has spawned a whole new set of psychological maladies: "nomophobia," the fear of having *no mo*bile *pho*ne handy; [11, 12] "phantom vibration and ringing syndrome," the sensation that a phone has vibrated in your pocket or rung when, in fact, it has not; [13, 14] and, most characteristically of all, the recent Merriam-Webster entry, "fomo," the *f*ear *o*f *m*issing *o*ut [15]. While these ailments may strike us amusing, there's nothing laughable about individuals so addicted [16–22] to their screens that out of negligence they cause harm to themselves and others.

Smartphone Zombies

In 2011, a woman named Cathy Cruz Marrero was making her way across a mall near Reading, Pennsylvania [23]. Failing to see a fountain directly in front of her, she stumbled over its retaining wall and toppled into the fountain's pool. Fortunately, she was only drenched and bruised a bit by her encounter, but her mishap was captured by mall surveillance cameras and later, to her acute embarrassment, broadcast by security guards to millions on YouTube, where it can still be seen today [24]. Mrs. Marrero was texting a friend on her cell phone and was so focused on pecking out the letters on her keyboard that she failed to observe the obstacle that lay in her path.

The following year while walking and texting, another woman named Bonnie Miller fell off the edge of a pier in South Bend, Indiana, and had to be fished out of a river by bystanders [25].

Marrero and Miller are merely stragglers in a relentless army of cell phone users now marching across the urban landscapes of New York, London, Tokyo, and Hong Kong. Dubbed "smartphone zombies," they continually bump into fellow pedestrians, run into trees, and crash into light-poles, like balls in bizarre game of human pinball [26]. Intent on pursuing their electronic lives, notes one Berliner, "they walk in the streets without checking the traffic, they sit silently across from each other in restaurants, whole hordes of them in the subway, and all of them constantly gazing into the screen of their smartphones as if they were staring through a magical looking glass into another dimension, one that seems to be significantly more exciting than the world that surrounds them" [27]. In China, they're called "dai tan juk," the "head-down tribe," and have been assigned special sidewalk lanes to insure the safety of others [28, 29]. And to keep texters from hurting themselves, one British city has even installed experimental shock-absorbent pads on its lampposts [28].

Research shows that staring at a smartphone can narrow your field of vision to 5% [26], and texting while walking can make you deviate as much as 61% from a planned course [30]. In the process, what you lose is called "situational awareness" [31], an ongoing awareness of the physical environment you are in, a quality long valued as a critical component of successful aviation, navigation, and soldiering.

A Deadly Wandering

In civilian life, the loss of situational awareness – whether from talking on a cell phone or texting – has been responsible for deadly car crashes that kill over 3,000 people a year and injure more than 1,000 a day [32]. Talking on the phone while driving increases the risk of a crash fourfold; texting while driving, sixfold [33]. The human toll these crashes take and the efforts to prevent them have been dramatically documented by Pulitzer-Prize-winning reporter Matt Richtel in his book, *A Deadly Wandering: A Tale of Tragedy and Redemption in the Age of the Internet* [33].

Surprisingly, in the 5 s that the average person's eyes are off the road while texting, a car moving at 55 mph can travel the length of a football field [34]. Moreover, according to University of Utah neuroscientist Dr. David Strayer, "depending on the complexity of the driving task, it may take 15 s or more after you've pushed 'send' before you're fully back in an unimpaired state" and recover from what he calls "inattention blindness," not seeing what's going on around you [33, 34]. And while driving and talking on a phone, especially a hands-free phone, may seem safer, your mind is still somewhere else, with a reaction time worse than that of someone legally drunk [33].

Distracted walking and distracted driving are not simply common and potentially dangerous examples of inattention but organically related behaviors symptomatic of the society we have built and inhabit [9, 35–37]. Some inventions – like the motion picture and television screen – long ago showed our eyes distant vistas even as the telephone and radio opened our ears to faraway voices and sounds. But now more than ever, we have become in the words of Thoreau, "the tools of our tools" [38], with the devices we have newly created creating a new kind of us. As a consequence, our latest devices permit us, indeed invite us, to be mentally somewhere other than where we physically are. As we gather around the table for a meal, our remote devices transport us individually to separate universes even though we sit but a couple of feet apart. And with the advent of digital streaming, Neil Postman's three-decades-old premise that Americans are "amusing ourselves to death" [39] is more portably true today than ever before. Like prisoners in Plato's legendary cave, we sit in theaters before the feature begins, fitfully checking the apps on our glowing screens lest we miss some seemingly important but inevitably trivial connection with the outside world or stay at home playing video games that enable us to escape from a seemingly intractable reality into a fulfilling realm of fantasy. Meanwhile, drugs both illegal and legal increasingly insulate us from the issues and challenges of the present that cry out for our attention.

In short, what we have manufactured is an age of *app*sence. And in counseling us to restore a missing sense of "presence" to our lives, many psychologists fail to recognize that our absence from the lives of others, including the lives of those who love and need us, may be less a function of our conscious choice than the consequence of the multiple wired and wireless devices we have eagerly allowed ourselves to become addicted to.

Digital Doctoring

While the upside of digital doctoring, apps included, is indisputable [40–44], its potential downside is undeniable [45].

> One of the biggest challenges with any new device is its potential to distract the clinician and alienate the patient, ultimately emphasizing technology over people. When the clinician becomes too focused on the data collection process, he or she begins to lose the personal connection that lies at the heart of the patient-clinician relationship. [46]

The tendency of clinicians to focus not on the human beings sitting in front of them but on the disembodied data on their EMRs [47–51] – in some cases, about a third of the time [52] – and to thus confuse the real patient with the iPatient [53–59] is not a mere lapse in courtesy but a telling by-product of dwelling in what twentieth century French philosopher Jacques Ellul termed a "technological society." As Ellul wrote: "When technique enters into every area of life, including the human, it ceases to be external to man and becomes his very substance. It is no longer face to face with man but integrated with him, and it progressively absorbs him" [60].

In effect, the radiant device bathes everything else in its own light, coloring the world around it in its own hues until the distinctive identity of the non-device – the human being – fades away.

Rightly revered as a wondrous and portable tool for instantly recording, storing, retrieving, organizing, analyzing, and transmitting medical information [61–63], the computer also sends some powerfully subversive signals that have nothing to do with its intended purposes but everything to do with its inherent nature. And the closer our relationship with a computer becomes, the more its lessons sink into our souls until, like obedient slaves, we learn to speak the language of our masters.

Because the currency of computers is data, computers implicitly teach that what is quantitative is superior to what is qualitative and that what can be expressed in numbers is more important than what cannot [9]. Furthermore, because the best computer is the fastest computer, anything slow is automatically labeled as inferior [9]. Yet think for a moment about the things that best define us as human beings – patience, compassion, dedication, and love – qualities that take time to express and cannot be reduced to numbers. If the values of the computer more and more become the values of medicine, how humane will the practice of that medicine be when a patient is viewed chiefly as a storehouse of data to be summarily and impersonally accessed?

In fact, if our daily interactions are mostly with computers, we may risk losing the skill, or even desire, to communicate face to face. We may not even realize we are losing vital listening skills that could otherwise enable us to hear what a patient is really saying. And we may lose the willingness to take time and listen to a vulnerable patient's narrative in a way that could permit us to better diagnose and heal.

In some cases, the "absence" of physician from patient, even though both are in the same room, is due to the inability to be in more than one place at one time. Forced to choose the focus of his attention, the physician chooses to the machine.

Here Drs. Shelley Ross and Sarah Forgie recount the all-too-familiar story of a busy resident:

> A 39-year-old man suffering from multiple facial contusions and a head injury after a water-skiing accident was seen in the emergency department, accompanied by his spouse. The resident began taking a history, then stopped mid-sentence, pulled out his phone, read the screen and began to text. The spouse of the patient said, "What are you doing?" The resident replied, "I have to answer this. It's about dinner." He turned his back, continued to text, waited for a response, then texted again. Replacing his phone, he started again with the history. When the spouse complained about the interruption, the resident looked at her blankly, and again stated, "I had to answer it. It was about dinner." [64]

Another illustration of the computer's stamp on our behavior is the common term "multitasking," a term originally applied to advanced computers but now applied to people [65]. Emulating machines, people multitask in the mistaken belief that when you do two things simultaneously, neither of them suffer. Researchers at Stanford University, however, have demonstrated just the opposite [66–68]. While multitaskers may delude themselves into thinking they're being more efficient, and have others convinced they are as well, switching from one task to another actually wastes time and interrupts the undivided attention needed to perform a particular task extremely well. Multitaskers, moreover, are more easily distracted than those focused on a single task. Initially believing that habitual multitaskers had a special gift, the Stanford researchers studied them at work and were amazed to discover the exact opposite. In the frank words of one investigator, Prof. Clifford Nass: "Multitaskers were just lousy at everything… They're suckers for irrelevancy… Everything distracts them" [65, 67].

If, however, the defining principle of a hyperculture is its inordinate speed, and if multitasking is our misguided and inept way of trying to cope with its multiple demands, then our attempts to fulfill our professional responsibilities are doomed to fall grievously short.

Unfortunately, the multitasking mentality has entered the operating room, convincing health care personnel that they can enjoy their private lives on their smartphones at the very same time they do justice to their medical obligations to others [69–73].

A hospital, after all, isn't the same as a restaurant or mall. At least, it didn't used to be. But the new reality is an electronic one, a Wi-Fi world that knows no borders, where boundaries that used to separate one place and its accepted behavior from another have ceased to exist.

One shocking study [74, 75], for example, revealed that casual smartphone use was all too common during critical surgeries. In cardiopulmonary bypass procedures, 55.6% of perfusionists admitted using their smartphones for personal business during operations. 49.2% of these sent text messages; 21% accessed email; 15.1% surfed the web; and 3.1% checked and posted on social networking sites. While 78.3% of the perfusionists polled expressed concern about the practice, believing it posed a potentially significant safety risk to patients, over half did it anyway! And in another study [76], 54% of nurse anesthetists and residents admitted accessing their computers in the OR even while they were aware that they were being observed. Most, as it turned out, were checking out vacation cruises on the Internet!

According to Dr. Stephen Luczycki, an anesthesiologist and medical director of a surgical intensive care unit at Yale-New Haven Hospital, his colleagues regularly use their ICU computers for "Amazon, Gmail, I've seen all sorts of shopping, I've seen eBay. You name it, I've seen it" [77]. Texting is also all-too-common and can likewise pose risks [78].

It's no surprise, therefore, that serious adverse events including fatalities have been reported. During one surgery, a patient was left partially paralyzed after the neurosurgeon, while operating, took personal calls on his wireless headset [76, 79, 80].

In another case [81], a 61-year-old woman died during surgery to correct an irregular heartbeat while her anesthesiologist, it is alleged, posted personal messages on Facebook, all the while failing to notice that his patient had low blood-oxygen levels until 15 or 20 min after she had turned blue.

While these latter two examples of negligence are egregious, they exemplify the inherent dangers of digital distraction and its potentially tragic consequences.

Cognition and Character

We live in an age of distraction [36, 82, 83] in which a million electronic stimuli, and the promise of more, continually compete for our attention and keep us from focusing on what is most essential [84].

A quarter of a century ago, when Lucian Leape issued his call to acknowledge the prevalence of medical errors and to reexamine their fundamental origin, the full impact of this environment of distraction had not yet been felt.

To maximize patient safety, Leape had urged the redesign of hospital systems and the reorganization of their processes, believing that the key to error reduction was a cultural one. Medical errors, he argued, reflected system flaws, not character flaws.

What Leape did not yet recognize was that the culture of an entire nation was changing under the pervasive influence of addictive speed-of-light technologies. The "culture" of a particular hospital, and the practice of medicine within it, had henceforth to be understood as part of a wider culture that presented its own unprecedented temptations to and imposed its own unprecedented demands on every person and every institution.

"Hyperculture medicine" would indeed mean that information would flow faster and more abundantly than ever before, creating new chances for effective treatment and cure. But when interposed between physician and patient, computer screens would undermine previous opportunities for therapeutic interpersonal communication. Simultaneously, ever-present smartphones would beckon to doctors and nurses and invite them to escape stress or boredom by turning to the seductive and addictive devices in their pockets, thereby evading the responsibilities of their jobs.

New vulnerabilities of human cognition were thus exposed, and new issues of individual character were unmasked. Human error could no longer be blamed on old systems alone because the systems themselves had been increasingly subverted by a new kind of culture with its own new set of values, values that cared little about duty and sacrifice but more about dataflow and self-gratification.

Henceforth, only tougher regulations to guard against the abuse of technology [85] and an educational system emphasizing personal accountability [86, 87] and self-discipline [88–91] would permit the profession of medicine to meet the extraordinary challenges of the new electronic age.

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Chapter 4
Addiction to Technology and Speed

Stephanie Brown

Introduction

> I don't know about practicing medicine anymore. I felt called to be a physician, to diagnose illness, and to know how to treat it, to offer hope and comfort, and to work with my patients and their families for years. Patient care always came first. But it doesn't work that way today. I am always rushing to do the basics in my 20-min slot. I have less time to connect personally with patients I've known for years. It's in and out, assembly-line work. I'm often behind and short with support staff. I feel constantly distracted by competing demands. I can't remember who I saw last and I feel agitated by mid-day, knowing I can't go fast enough to see everybody. I have nightmares of being swallowed up by a tsunami. Here I am at 11 pm, reading patient emails, and I can't focus.
>
> I feel overwhelmed and distracted all day and all night long. Jerrod H., M.D.

Something is wrong in medicine. Something is wrong for individuals and families everywhere. Something is wrong in American society. The something that is wrong in medicine is in the title of this book: distraction. In any setting and at any level of care, doctors and all health care professionals are suffering from distraction, a blocking, numbing, and loss of ability to focus attention on their patients and their work, which is causing serious problems for everyone.

At first blush, you might think "What's the big deal? Just get over it." But that's not happening. The problem of distraction is getting worse. In this chapter we will look at distraction as a consequence of society's new addiction to technology and to the fast pace of life that goes with it, a relationship that seems counterintuitive. Just as alcohol and prescription medications were long viewed as a treatment and solution for medical ills, technology was supposed to speed up, revolutionize, and improve every aspect of medicine. You could work smarter, faster, longer. But just like every addiction, what starts as a solution becomes the problem. Individuals and

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society as a whole have become addicted to a faster and faster pace of life, expressed through an addiction to technology. And vice versa. Addicted to technology, people speed up [1, 2]. The bottom line: people cannot go any faster and they cannot slow down. Distraction follows, now a rampant and normal part of life in our culture.

What Is Distraction?

Distraction is defined by *Merriam-Webster* [3] as a "diversion of attention." Along with "mental confusion," it has become an increasing problem for all of society since the advent of technology. In the last half of the twentieth century, attention problems gained a psychiatric diagnosis of attention deficit disorder as children, adolescents, and adults began to have problems with focus and concentration. People apologized for their lapses in attention and focus as they jokingly referred to their ADD moments, while at the same time they sought medication for this psychiatric illness. According to Tamara Waters-Wheeler [4], in the past kids could focus for much longer in the classroom. Now, kids cannot filter out extraneous sound. They hear everything and are thus easily distracted.

Nicholas Carr [5] suggests that "the internet seizes our attention only to scatter it," underlining the power of technology to overwhelm, just like that of any addiction. Further linking distraction and addiction, we recognize Robert Colville's [6] comment that "email and web-surfing are technologies of instant gratification, delivering distraction and information on demand," as similar to a drink that promises to provide relief. He also describes the bombardment of information to a "herky-jerky lifestyle" of constant interruption, which creates a "poverty of attention" [7]. Distraction begins to rule, making the art of concentration increasingly difficult. Indeed, it is hard at this point to tell what the source of the addiction is: the need to go fast, the attraction to technology, and/or the power of distraction to overrule any other focus. In fact, these threads become entangled and hard to separate, just like the components of any other addiction.

In "The End of Reflection" [8], Teddy Wayne sounds a compelling alarm, suggesting that we are giving up the practice and the desire for quiet contemplation. Since we are distractible human beings, contemplative thinking has always been a challenge, according to Nicholas Carr [5]. But Carr worries that as we carry around multiple devices, we actively decrease our opportunities to think reflectively to such an extent that we may in actuality be facing the loss of the contemplative mind itself. Just as a drinker can glide into regular use and dependence, without awareness, the technology addict glides into a lifestyle dependent on devices. The Internet rewards speed, which reinforces fast, externalized action, in pursuit of quick answers, discouraging deliberative thought or open-ended discussion. You eventually can't remember what it was like to stop and think or to engage in a process of self-reflection and dialogue to reach a new idea or consensus. The instant answer is now the gold standard, just like the instant internal sigh of relief at the first sip, puff, or tap on the keys.

With the drive for ever-faster results, attention spans are shortening [6]. Advertisers have shrunk their promotions to sound bites, delivering mere 10-s flashes that interrupt the viewer long enough to trigger a craving, and perhaps an instant "buy," but not so long that the viewer deletes the message. When everything is instant, depth is sacrificed. Maggie Jackson [9] is alarmed that "many U.S. high-school students can't synthesize or assess information, express complex thoughts or analyze arguments."

According to the National Academies Keck Futures Initiative Informed Brain Steering Committee [10], "The world now has an attention economy, and the learner has an increasingly fragmented attention…What media users are running out of is time and attention, and the problem occurs when attention is distracted, or users simply have an inability to filter the information." Using the term "digital information overload," this group developed "attention management tools" to promote "self-reflection on attention."

The expectation of instant gratification, and the shrinking of attention spans, also decreases the ability to delay gratification, a milestone for the healthy development of children and adults. Damian Thompson [11] describes the "most far-reaching social development of the 21st century" as "our increasingly insistent habit of rewarding ourselves whenever we feel the need to lift our moods." Calling this addiction, he sees it spreading across society in seemingly innocuous ways, such as a mid-afternoon reward for getting through most of the day. Just like addiction, what starts out as "taking care of ourselves" soon becomes a craving and an unstoppable drive.

Colville spells out other consequences of a flitting, chronically distracted attention. Like previous authors [12, 13], he suggests that concentration, also known as "executive attention," takes mental and physical energy, which are eroded by stress, overwork, or fatigue. "Life immersed in digital distractions creates a near-constant cognitive overload" which wears out self-control. We end up less able to focus because of the distraction and speed of technology and we are worn out by trying.

Vannevar Bush [14] suggested that "information overload" was eroding 'mature' and 'creative' thinking as truly significant attainments become lost in the mass of the inconsequential…." Bush described the irony that instead of having more time to think, absorb, or interpret data, scholars were becoming data managers.

Colville suggests that information overload and the pace of life in general rob us of the time to stop and think, [6] reinforcing a toxic combination of too much information and not enough time to process it. Increasing time pressure creates more stress and nastier, more impatient people, which in turn erode compassion, stemming from what researcher Tori DeAngelis called a "toxic lifestyle" [15]. With all the progress of speed and technology, we've ended up with societal chaos, chronically pressured, stressed, and unhappy people. Brigid Schulte [16] describes "The Overwhelm," a state of mind in which we are constantly scattered, fragmented, and exhausted.

No wonder addiction takes center stage in our society. Alex Soojung-Kim Pang [17] outlined a growing problem of divided attention and the inability of people to concentrate, terming it the "Distraction Addiction." Today, people are caught in a

vicious web of technology addiction, accepting "continuous partial attention" [18] as the new norm for individuals and society, a consequence of multitasking on multiple devices. Recent studies document the problems of multitasking and divided attention [19] and challenge its validity as a presumed contribution to productivity. Nass introduced the idea of the need for a "media budget," as people simply have no time left. Double booking leads to the use of several media simultaneously which leads to chronic multitasking which effects how people store and manage memory.

In a major issue of the *Monitor on Psychology* [20], researchers summarized studies documenting the problematic effects of multitasking. Amy Novotny [21] provided early evidence of the dangers of distraction and driving, while David Meyer [22, 23] noted that young people often believe multitasking boosts efficiency, when it actually takes longer to get things done. "Switching your attention reduces your efficiency and skill… you're not concentrating on either task." Rebecca Clay [24] suggested that "for young people, a tendency to multitask may impoverish learning, productivity and even friendships." Patricia Greenfield [25] described a loss of empathy and the danger of growing superficiality in relationship with decreasing human interaction. And finally, Levitin targets multitasking as an entry portal to addiction: "when we multitask, we unknowingly enter an addiction loop as the brain's novelty centres become rewarded for processing shiny new stimuli" [26].

Despite this fairly early recognition of the problems of multitasking, the reality of its prevalence and its increasing impact on distraction in all aspects of life continues. Why?

What Is the Problem? How Distraction Works

Health care professionals, and most people living in American society today, feel they are too busy [27, 28]. They are burdened by too many demands and not enough time to meet them, and they feel a constant performance pressure to produce faster and bigger bottom-line positive outcomes. The mantra for medicine today is: see more patients, see them faster, shorten visits, keep more detailed records, and document your successes. This is business-model medicine. This is what American culture calls progress. We do more and produce more, never less.

This central organizing principle for many doctors practicing today is also the core of addiction for individuals in our society. Drink more and stay in control. Spend more money, rack up debt, and postpone the reckoning. Deny your limits and deny your loss of control. And while you're at it, don't complain and don't say no.

But, as you work harder to do more and to do it faster, how do you stay calm, pay attention, and maintain your focus and connection with your patient? The answer is you don't. We now know that a major cost of trying to work harder and faster is an increase in psychological disorders of stress and attention with an increase in distraction as both cause and effect [27, 28]. We are not keeping up. We cannot stay engaged; *distraction follows as a consequence of adapting to stress as normal.* Soon, as we get used to being distracted, we actively seek it, reinforcing the

double-bind core of addiction. We start to need more distraction, it becomes automatic, and we lose our awareness and ability to draw ourselves back to attention. Like rats on a spinning wheel, we are falling by the wayside in exhaustion as we strive to keep the vicious cycle going.

Stress is now the buzzword for the fast pace and chronic tensions that characterize normal life. You just live with it and it takes its toll, though "toxic stress" is now viewed as a chief cause of contemporary physical and emotional problems [29]. People suffer from stress that is so intense it impairs their immune systems, speeds up the aging process, and contributes to heart attacks, strokes, and infertility. Stress destroys relationships and contaminates positive work environments. In addition, we know that chronic, long-term stress can rewire the brain, leaving people more vulnerable to anxiety and depression [30, 31].

There is an alarming increase in stress-related disorders of all kinds for all ages, beginning for many young, elementary school-age children who are struggling with obesity, depression, anxiety, attention disorders, and all kinds of learning disabilities. The exhausting fast pace of life promotes over-scheduling and overstimulation, which become chronic childhood stressors. These lead to behavioral, mood, and attention disorders, as well as exhaustion and physical illness [29].

Dr. Marsha Seltzer [32] describes "adrenal fatigue syndrome," a new illness referred to as "chronic fatigue lite," as a depletion syndrome linked to adrenal functioning. But instead of prescribing medication to "fix" the illness, she prescribes a treatment of slowing down: "we must learn to simmer down, unwind, let go – or at least quit obsessing about our 401(k)s." Yet, what kind of medical advice is this? Until recently, advice to slow down has been met with scorn by all sectors of society who believe in speed-driven progress as a fundamental right, the very cause of the stress that is creating the consequences we are now seeing.

Unfortunately, efforts to solve the problems and effects of stress remain in a fix-it mode, which keeps these out-of-control, compulsive cycles going. Just like a core philosophy of medicine – you are working to cure illness; the fix-it mode tells you to keep trying to fix the problem, but it's the wrong problem that we have identified. You're trying to cure the illnesses caused by stress without addressing the stress itself. Similarly with addiction, people want to cure the consequences of their drinking, spending, or eating without changing their behaviors. Society operates on the same skewed premise in its addiction to speed and technology. Try harder to go faster remains the solution instead of being recognized as the problem.

Today, people cannot take in all the information they need to absorb [10, 19]. Nor can they stay in motion endlessly. Trying to do both becomes a chronic stressor, with distraction a chronic consequence. You can't focus, concentrate, or follow a narrative or developmental track. You dart around, briefly landing on quick bites. Then you're off and running again.

But instead of diagnosing stress as a cause of distraction and the focus of intervention, medicine, and all of society have instead multiplied efforts to treat the consequences of stress so that people can keep going faster while they also remain in a perpetual state of chaos. If this continues, the need for distraction will not lessen [2]. Why?

Distraction is more than a problematic consequence of adapting to stress as a normal condition. When you can't pay attention any longer, distraction also becomes a *coping mechanism* to help overloaded people slow things down [2]. For many, it's like pressing a "pause" button, except it's becoming harder and harder to find the start button again. People are dazed and glazed. The level of emotional and cognitive attention required of doctors is not possible to claim or to sustain when pressure to perform and the stress of rushing dominate the environments of medical care. These are the conditions of chronic stress that now shape the atmosphere and tone of "normal" life in a culture of speed.

Maria laughed when she thought about distraction: "As a medical technologist, I am pressed and stressed all day long. One test after another and always, can you do it faster? At the end of the day, I am so worked up, all I can think of is getting online, bingeing on social media and my favorite shows. I need distraction. The last thing I want is to be needed by my family, but there they are. I do try to be present, so I end up online late at night, just so I can unwind and feel like I have some time for myself. It's a no-win, because I'm so tired the next day. What has to go? Distraction and down time for me, but I'm so hooked I can't turn it off. Now, by mid-afternoon every day I'm thinking about the messages I'll get and what I'll send. I'm already mentally hooked up and I know it affects my work."

As distraction becomes a *consequence of stress* and a *method of coping* with stress, it also becomes an *addiction*. Just like the alcoholic may view a drink as a treatment for stress, the individual turns to technology – to escape the feeling of chronic pressure through distraction and to solve the problem of overload [19]. Just as the alcoholic starts to depend on the next drink, and then needs another one, and then cannot stop, the stressed person starts to depend on technology for pressure relief, then needs more action, and cannot stop. The faulty belief that technology will solve the problem of overload creates a need to stay online that intensifies stress instead of reducing it.

Colville [6] suggests that "technologies that push us further and faster also render us less able to cope with their effects." He describes how an accommodation to interruption and distraction crosses a line, moving from things we put up with to something we crave because of the "little dopamine hits they deliver" [6]. This is just like the well-known subtle move that many drinkers and other addicts make from "controlled use" to addiction. You like the effect, you want more, and then you need more [2].

Distraction is a multi-faceted problem related to individual and cultural addiction to technology and speed.

What Is Speed? [33]

Colville calls our fast pace of life *The Great Acceleration* [6], based on his experience that the industries of media and politics he covered as a journalist were newly subject to sudden and convulsive change. "New trends, ideas and crises appeared to

be emerging in the blink of an eye." 'It felt like my friends and I had no time to relax, to unwind, to slow down.'" Touching on the heart of what it feels like to be addicted, Colville added "this acceleration feels like something we cannot control."

Silicon Valley companies are the quickest-moving and the most disruptive, according to Colville. In fact, disruption is their goal. The cultural values of interruption and chaos are now equated with opportunity, endless creativity, and progress. Yet Colville notes that one of the costs of increasing speed is fragility. Because of the fast pace of life, he sees less room to adapt in this era of "permanent revolution," before more disruption brings change again, leading to a greater chance of things going catastrophically wrong [6].

But speed is more than disruption. Speed is a belief, a value, and a mood for the contemporary individual, family, and society. Speed means pace and action: follow your urge to act *NOW*. Get in motion. Speed is emotional tension and pressure, an internal urgency that is translated to a cultural push to move quickly while worshiping efficiency and shortcuts. Pushing toward your goal of faster and faster equals results, instant outcome. There is no time to pause or savor anything. There is only forward motion, only success or failure. There is only *BUSY*! [2, 34]

Speed has settled into our cultural beliefs and language. Tap, tap, tap. Make it quick. Make it action. We don't have time to listen, to think, to feel, to be quiet, or to reflect, all traits we used to value in a positive doctor-patient relationship. Now it's action first; a rush to diagnose and to prescribe. A rush to move on to the next patient. You're too far behind. There is no time to think things through, to accept delay, and to practice patience and endurance. You've got to move it along. As individuals and as a culture, we are now dominated by primitive impulse and an entitled belief in instant gratification. This is addiction.

What Is Addiction?

Addiction – the loss of behavioral, emotional, and cognitive control and the inability to regain control – has been a part of human experience for centuries. At first focused on alcohol, addiction has come to include other drugs and all kinds of behaviors such as gambling, eating, and spending. Now technology provides yet another focus for loss of control: people have become addicted to their smartPhones, their iPads, and all their other tech gadgets, while society has also lost control.

Addiction has long been recognized by medicine as a disease [35, 36], and more recently acknowledged, and better understood, as a brain disease [35]. It has, in addition, been described from a psychological, developmental perspective as an attachment disorder, as I have outlined elsewhere [37]. People get hooked quickly when they discover that alcohol, food, compulsive spending, and Internet gaming instantly make them feel better. Today, they learn that they can treat any discomfort by turning their attention to something else. This is distraction: look away, take something – a pill, a puff, a drink – or check that email. Reach for your gadget,

divert your attention, and check out. Individuals learn quickly that this kind of self-medication works, at least at first, and they immediately form an emotional bond to that action or substance. At the next sign of too much comfort or discomfort, of overwhelming feelings or challenging thoughts, or excessive pressure, they know what to do almost instinctively. Go online. Get "connected." Get distracted. The "turn toward" the new behavior becomes automatic and unstoppable, regardless of the trigger. As recovering alcoholics say, "I drank because the sun came up and I drank because the sun went down." The faulty emotional attachment becomes an unhealthy dependence that slides into addiction. You lose control of your behavior and you cannot get it back. You need to slow down, to focus, but you cannot slow down, even though you tell yourself you must slow down and you will. Then, the sudden buzz in your pocket gets you going, furiously checking your texts, your email, or the newest post on Facebook or Twitter.

As you sink into a compulsion to repeat, and begin to recognize the craving to be online, you can also hear a quiet voice inside you that sounds a warning: "What am I doing?" But you pay it no heed. You need to keep doing what you're doing, at any cost. That too is addiction.

Societal Addiction to Speed, Technology, and Distraction

Individuals, families, and society as a whole are caught in a tangled web of pressure to speed up and do more. The individual is guided by a flawed attachment to an object – the drive for a faster and faster pace and the technology that delivers it – that then distorts and organizes behavior, emotions, and thinking. Soon the attraction turns into dependence and dependence turns into addiction [2].

Society's addictive loss of control works in the same way addiction works for the individual: *behavioral loss of control*; intense, primitive *emotions*; and distorted, illogical *thinking* reinforce each other. People and society are driven by a need to be in motion, always moving forward, always making progress, and always pushing for success. This behavioral loss of control to speed and technology is reinforced by emotions of panic, fear, entitled greed, and grandiosity and an internal sense of chronic urgency, chaos, and confusion, all reinforced by a deep belief that there are no limits on how fast you can go, how much you can do, or how much you can take in. If you can't keep up, it's your problem. Try harder, society seems to say. Add to that a belief that there is no need to ever feel pain, physical or emotional, nor to ever feel anxious, frightened, or worried as long as you stay in motion. So you do try harder. You live in distraction as a consequence of being overstimulated and out of control and as a coping mechanism to give you an emotional time-out. Then your need for distraction develops a life of its own as you and society settle into the defining patterns of societal addiction, organized by four core factors [33].

Loss of Control

The core, organizing principle of any addiction is loss of control. The first level is *behavior*. With technology, you are dominated by impulses, cravings, and anxieties that you translate into automatic action. You can't wait; you can't endure a pause. You need to be online or checking at all times. You and society have regressed to a 4-year-old level of development where impulse dominates. You act first and think later – if ever at all. Instead of valuing learning through engagement with others, through the quieting use of words, and through slow, cumulative trial and error – the paths of normal development – our culture has elevated learning to its most primitive form: a drive for instant solutions and the instant gratification that follows. With a norm of constant interruption, you are primed for ready alert and instant motion. You become just like the rat tapping at the bar for reward. You are primed to act on impulse.

As 36-year-old physician Monica noted: "I am just an acting thing. I stay tuned to my smartphone moving through my rounds and I'm only partly present with patients and staff. I'm distracted in a robotic, mindless repetition, but I can't stop it. As soon as I look away from my phone, I'm nervous, so it's harder to listen. Panic drives me to see what I'm missing on the screen."

Tied to impulse and behavioral loss of control is *emotion*. Just like it is for infants and young children, emotions dominated by impulse remain primitive. Ever vigilant and unable to calm yourself, you feel intense craving and desperate need, with a flood of panic, confusion, and inner chaos. The primitive emotions and impulsive actions you take drive you to distraction, as a means of coping with the aching emptiness of your addiction.

Many people try to think their way through this bog of primal repetition and primitive arrest, a vicious cycle. They tell themselves they should be able to slow down, concentrate, and to quiet the panic of need they feel and fear. Just "get a grip" they say, trying to will themselves back into attention and focus. To be sure, grabbing control can help for a while, but then the more intense pressures of addictive emotion and behavior pull you to reach for the phone in your pocket and take a look. Like the alcoholic who says "I'll just have one glass," and then soon has another, you sneak a peak, put the phone away, get back to work, and soon have to take another look. Sneaking becomes automatic.

Instead of helping individuals get control, their *cognition* becomes distorted and arrested at a young level of development, all tangled up with behavior and emotion. Swamped by primitive feelings of anxiety and urgency, and impulsive actions, your thinking is pushed into regression and defense. You function at best at a concrete level of cognition as you deny your loss of control and justify it at the same time.

Head nurse Bashad noted: "I tell myself I'm not really texting during the shift change, that I'm paying attention, but I know I've been playing my video game for the last hour and haven't heard a thing. I sure don't remember the status report, but then I remind myself that I'm stressed and overworked and I need the escape.

Checking in on my apps helps me cope and make it to the end of the day. Yes, I'm distracted, but I can pull myself back to attention."

Hooked on societal values of speed and success, everything becomes a contest. You are a winner or a loser. Full of confusion, you tell yourself if you're not moving, not in motion, and not keeping up on your mail feed and games, you're failing. Higher-level cognitive and attention skills of concentration and contemplation are thus sacrificed to impulse.

A Belief in No Limits

Beginning long ago a belief in no limits formed the foundation of American culture and identity. Anchored in the creed of Manifest Destiny, American settlers believed they were an exceptional, chosen people who were entitled to move west and take the land in the name of progress. These beliefs, emphasizing the absence of limits, eventually translated into competitive, aggressive behavior with corresponding intense emotion reinforced by the grandiosity of identifying as a chosen people. This cultural identity of exceptionalism and entitlement shaped the growth of the nation. You can do anything you want, we're told, have anything you want, and take anything you want. Just be sure you're in control.

By the late twentieth century, cyberspace became the new frontier to conquer. With endless space and no limits, Manifest Destiny was given a new birth. Destined for material progress and success, society became driven to speed up even more. Sunday had long been held as a day of slowing down, but that value and practice soon disappeared in the wild drive for nonstop action. Today, slowing down is a bad idea. Yet at the same time, people spend hours lost in distraction, unable to focus their attention on the tasks at hand. It's a classic double bind: distraction rules. Addiction to technology rules. Your belief in endless speed with no limits keeps you hooked.

A Belief in the Omnipotence of Human Power

The realities of societal loss of control and a deep cultural belief in no limits push individuals to strengthen their determination and their efforts to succeed. You tell yourself there is nothing you can't do if you put your mind to it. You are entitled to control your own destiny and your own life and you will figure out how to do it. You are not addicted to anything, you tell yourself, for addiction is a moral failure, and the need for limits proves you're weak.

Jorge, a surgery resident, had two write-ups for lapses in clinical judgment in the operating room. Angry and defensive, he maintained that he was not distracted, he was not checking his phone, and he was fully present in the OR. He was in control, he was convinced, and if he occasionally checked his phone, it was only because he

had determined it was safe to do so. “Stop bugging me,” he growled at his supervisor. “I am not slipping up. I am in control.”

Jorge has learned to try harder to simultaneously check his mail and pay attention in the operating room without making a mistake or getting caught, and like a defensive drinker, gambler, or prescription drug addict, Jorge believes he is in control. In reality, however, Jorge is in trouble, but he can’t see it yet.

As a culture we maintain our unfounded confidence in human power in a limitless world, which drives us to try harder to deny and defy our limits. This grandiosity fuels our entangled addiction to technology, speed, and distraction as individuals and society as a whole begin to rack up terrible mistakes, accidents, and losses without any idea what’s causing the trouble. Just as the addict keeps trying to get control, while chalking up increasingly bad consequences from a failure of self-control, society keeps doing the same thing. We are baffled to know what is wrong; we can’t see how we are causing our own cultural loss of control as we come crashing face-to-face with the reality of our limits, while a reliance on will reinforces a compulsion to try harder.

Dichotomous Thinking.

Part of the heritage of American will power and exceptionality is a cultural belief in certainty. We believe it’s essential and possible to know the right answer, even if our illusion of certainty holds us hostage at a young concrete level of cognitive maturation, a small price to pay if uncertainty and quiet reflection are viewed as signs of weakness and failure.

Dividing the world into good or bad, winning or losing, and right or wrong has long provided a simple map for grading success. In a binary world, there is only progress, only forward movement. If you are not in motion, headed toward your goal, you are falling behind and losing ground. That is the underdeveloped yardstick by which people and society grade themselves in a world of speed and chronic distraction. Moving upward developmentally from simplistic, dichotomous thinking to a higher level of abstract conception can be fraught with fear. In our fast world of instant wins and instant losses, greater complexity, uncertainty, and ambiguity signal to many a backward step.

Society is trapped in the illusions of addiction. The pressure is to always be moving forward, always winning, and the demand is to keep nonstop action going. Like the proverbial rat in the cage, spinning on its wheel going nowhere, you too eventually can collapse from exhaustion. But you keep moving, living in a state of constant distraction to ward off the collapse you sense is coming. Distraction becomes a consequence of your fast pace and a defense against feeling overwhelmed and wildly anxious, while distraction becomes its own addiction, wedded to your need for speed. You keep peddling, telling yourself you’re a winner and this is success.

Indira lived by the clock, which reminded her every day, all day, that she would never finish. There were not enough hours to take care of her kids, her parents, and

her job in the blood lab. Indira repeated the mantra she'd heard all her life. "Just try harder. Keep working. You will be a winner. You will succeed. You know what to do, so do it." Indira harbored a deep sense that she was really a loser because she couldn't do it all perfectly. There must be a problem with her drive. She had to try even harder. Was she ever distracted? Indira thought not, though she could easily get lost on her iPad at any time of day or night, working on schemes to improve her efficiency. Did she ever think she had a problem with technology? Not a chance. Technology helped her do it all. The fact that it also provided an escape from her chronic stress was just a lucky bonus.

Facing Society's Addiction to Speed, Technology, and Distraction

How does the medical world confront a no-end, no-exit state of addiction and loss of control, the consequences of chronic speed and chronic distraction, when it is part of an academic, business, and social world that values these very conditions? It's like growing up in a family dominated by your parents' "functional" alcoholism: nobody ever said there was a problem. This was just how life was. You'll drink too when you grow up, even if it causes you problems.

Awareness

No, it is time to be aware, to name, and to talk about what could never be acknowledged. It is time to say that society, including the people and the professions in society, have lost control. What looks like progress and success has become a vicious rat race of endless pursuit that leads to a loss of focus, concentration, and a steady state of distraction. This is the meaning of addiction.

When does awareness take place? It's already underway, as individuals hit their human limits and can't keep going any longer. In the world of addiction, this is called "hitting bottom." You realize, slowly or suddenly, that you have lost control and you can't keep going any longer. It is the end of the line for you. In society, there are already too many mistakes and too much growing danger of mistakes. People can't keep up, and health care personnel are more vulnerable to disabilities and chronic illnesses caused by their stressful lives [31].

In the medical world, distraction carries a potentially disastrous price, yet the entangled web of addiction to speed and technology continues. For people hooked on a faster and faster pace, with its cultural meaning of success, slowing down looks and feels like failure. It is hard to see it any other way and it feels impossible to change in a binary culture.

Accepting Loss of Control and the Need for Limits

Remember that voice inside that whispered "What are you doing?" and you ignored it? That voice, asking that same question, now rises again, and this time you listen. We all listen. Individuals, families, and society. We begin to let in the reality that we have turned a deep founding belief in no limits into chronic chaos and an ever-faster pace of life. Society has lost control. We need to slow down, but we cannot slow down. We have cut off every possible way out of this societal addiction. We stay distracted to give us a time-out when we cannot change the reality.

In this culture that values disruption, we have muted and even lost hierarchies that reliably provided structure and boundaries, key ingredients for healthy development [38]. Authorities – parents, teachers, bosses, medical standards – established structures and set limits. Yet society, feeding its addictive thinking, is increasingly guided by the belief that success will flourish by dismantling structures and limits. It is time to pause, reflect, and become aware of the cultural chaos we have set in motion by pursuing this belief.

This same reckoning is taking place with organizations and society as job requirements and value systems are seen to be collapsing. Hitting a cultural bottom allows people and systems to ask "what are we doing?" and to pay attention to the answer. We can't do it all. We can't keep going till we drop and then try harder to do it again. Society must begin to say no and refuse to accept the limit of "no" as a failure. Relying on paradox, just like people in addiction recovery do, society invents a new mantra, "failure is the new success," and comes to believe it. Paradox opens the way out of the double bind of addiction. Returning to a value of structure over chronic disruption, new limits will open up new opportunities for quiet reflection, moving us back to deeper personal engagement and interaction. Instead of remaining the gold standard for living, disruption is seen as part of development, part of all creative processes that are held and contained by structure and limits.

As a society, we must move up a developmental ladder, shifting from a dominance of impulse fueled by primitive, wild emotions and equally primitive behavior to an elevation of thinking. We will regain a valued ability to pause, reflect, and stop first to think. Cognition will resume its role in human development as a source of reflection and control. We will be able to tolerate uncertainty as part of a process, and we will learn that complexity and ambiguity add value, instead of interfering with creativity and stopping progress.

Small Steps

Change in society, just like change for individuals recovering from addiction, does not occur as "the next big thing." We can't see gradual societal change coming, and we can't support it, because in this society of more, better, faster, and bigger, we only value the big blast: the IPO, the patent, and the cure for epidemics. We no

longer see that discovery and change unfold in incremental, small steps, even though an "aha" moment may also herald a miracle. *BIG* rules, reinforcing grandiosity and active addiction.

According to many psychological theorists, the process of human development involves a combination of small changes, proceeding slowly, forward and backward, coupled with bigger bursts of growth and change, also moving forward and backward. Piaget famously described the process of normal cognitive development [39] as an interaction between assimilation, incremental changes within the same cognitive structure, and accommodation, movement that changes the structure itself. No theory of development involves only small steps and no theory includes only big change. Yet, as a society, we have come to demean small steps and changes as insignificant and even as failure.

We now challenge the very idea of *BIG*. We learn that small steps get you started and they accumulate. As you work to slow down, set one small limit, adjust to it, and then set another one.

Conclusion

In this chapter we have explored "distraction" as a consequence of a pressured, speeded-up individual experience and as a consequence of a culture that is also speeded up and out of control. Distraction also becomes a defense, a way to cope with internal and societal pressures to try harder with a mantra of "more, better, faster." Finally, we explored "distraction" as an addiction, a compulsion to keep moving, keep checking tech objects, keep switching focus, and the inability to slow down or stop.

We explored four factors that maintain cultural addiction including a societal loss of control, a belief in no limits, a belief in the omnipotence of human power, and a belief in the rightness of dichotomous thinking.

Finally, we explored what might constitute a process of cultural recovery. Like so much of what happens in addiction and recovery within the framework of Alcoholics Anonymous, the process is paradoxical and counterintuitive. First, individuals – in our focus, we are talking about doctors and all of health care – must become aware that there is a problem of distraction. We must face the reality that individuals and health care as a whole are out of control and cannot try any harder, go any faster, or produce any more. This first step involves a paradoxical acceptance of failure, an acknowledgment that distraction has become an out of control addiction.

As we accept the reality of individual and societal loss of control, we also accept the need for limits and the necessity of structure, both key changes necessary for a process of healthy recovery to develop.

Finally, we challenge society's current grandiose value of *BIG* and accept the value of small steps as a behavioral, emotional, and cognitive map for positive change. We will encourage and model a return to focus in our doctor-patient interactions, self-reflection, and a slowed-down pace of internal and external experience.

As we chip away at the addictive dominance of distraction in our lives, we will learn to cope with anxiety and cravings and to stay on a path of small steps to reclaim our focus, just like any other addicted individual in recovery proceeds one step at a time.

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Chapter 5
A Note to My Doctor: Lessons from Fifty Years of Distracted Driving Research

Paul Atchley

The Attention Economy

Attention is a limited resource. Some researchers have suggested that a resource account is too simple to be useful for deriving theory, but as a way to understand the impact of distraction on human performance, it works well. Imagine the brain of a doctor or nurse, driver, or pedestrian as a processing system with specialized processors for all of the tasks it can perform such as vision, audition, speaking, remembering, and decision-making. Performing those tasks requires that the underlying neuronal systems receive the metabolic resources needed to function. It is this "resource pool" that determine the quality (speed and accuracy) of the tasks to be performed. When all resources are focused on one task, it is done with a high degree of quality. When resources are spread across multiple tasks, quality suffers.

The efficiency of the use of the resource pool can be increased to a small degree by training [1, 2]. Tasks that seem effortful, such as driving a manual transmission, can become more automatic and require less processing power to perform well. And the ability to coordinate multiple tasks can also be improved to some small degree by training [3]. But these improvements generally only help with a process that can be made automatic. Processes that require higher order processing or conscious thought (sometimes referred to as controlled processes), such as speaking or anticipating hazards, are generally not amenable to automatization. For example, while vehicle control can be automatized, the process of actively scanning a roadway for threats requires attention to changing road conditions. Relying solely on automatic processes while driving, for example, might help you navigate along a familiar route while simultaneously listening to your favorite radio program, but it is also what

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causes you to make an error [4, 5], such as driving home while listening to the radio, but failing to stop at the store as your spouse requested.

To understand what distracted driving can tell us about distracted doctoring, it is important to emphasize that both driving and doctoring are skills that require cognitive resources to perform, which are done best when we are attentive, but that have aspects that can be done safely automatically *some of the time*. In other words, when tasks become more routine, we fool ourselves into thinking that we can do additional tasks without cost. And that's true as long as the task remains routine. But in those moments when the routine task becomes effortful, such as when an unexpected hazard appears on the roadway or an unexpected situation occurs in a medical setting, sharing our attention results in missing information, misappraisal, mistakes, and fatal consequences.

Early information processing models of human cognition [6, 7] helped cognitive science map out the various processes of human cognition and guide early research programs by encouraging focus on understanding each aspect in isolation. More recent versions of human cognition using an information processing approach [8] still provide valuable insights into the interaction of the various cognitive processes. Undoubtedly, as brain science progresses, we will better appreciate that these models do not fully capture the massive interactivity of brain systems, but they still provide a useful framework to help us understand the effect of distractions.

Most accounts of human cognition make room for a common set of basic processes. There are sensory processes that support gathering information from the environment, processes that store and retrieve memory, processes that use this information in combination with sensory data to turn sensations into meaningful perception, decision-making functions that use goals to determine what choices to make given our perception of the environment, and systems to execute our chosen responses. Attention influences all of these components. Limited attention can reduce our sensory inputs by changing eye movements and limiting activation of brain regions responsible for processing basic sensory information (discussed in the next section). Inattention can limit memory storage and subsequent access to memory (for an interesting example, see Henkel's work on memory in museums [9]) with downstream effects on perception and decision-making. And when attention is divided between multiple tasks, executing appropriate responses accurately and quickly becomes more difficult as the brain tries to coordinate multiple options. These effects can produce consequences across a wide variety of tasks (see "Cognition in the Attention Economy" [10]) for a more complete treatment of the costs of inattention). But there is probably no more serious consequence than the loss to our safety we experience when we try to do two things at the same time, both which seem simple but which in combination can produce deadly results: talking on a phone and driving.

This Is Not a New Research Problem

The phenomenon of cellular phones and driving is one that most people think is a relatively recent one. But research on the effects of phones on is already one-half of a century old. The first study of the effect of in-car phone calls on driving was

conducted near the middle of the 1960s and published in the *Journal of Applied Psychology* in 1969 under the title "Interference between concurrent tasks of driving and telephoning" [11]. The authors concluded that phoning did not affect the more automatic aspects of driving but that controlled processes can be negatively affected. This one early study nicely captures the next 50 years of research. And it certainly serves as a warning for those concerned about the effect of distractions on the delivery of medical services.

Since 1969, there have been a large number of additional studies on the effect of phones on the cognitive aspects that support driving, driving performance, and crash rates. The studies have used a range of methods. For example, there have been two large-scale epidemiological case-crossover studies that examined phone records of drivers following a crash [12, 13]. In one study, the crashes led to a hospital visit. In the other, no significant injury was recorded. Both studies were conducted by different research groups and at different locations. The conclusions were the same: The chance of being in a crash increases over four times whether the phone is in use minutes prior to the crash. The increase in risk is regardless of whether then phone was used handheld or hands-free. As one of the studies noted, this increase in risk is similar to the increase in risk associated with driving drunk.

In fact, in a study directly comparing driving performance of sober drivers conversing via a hands-free phone and drivers who were near the legal limit for driving while intoxicated by alcohol, using a driving simulator the drunk, drivers tended to drive more aggressively and closely to a lead vehicle, but they braked harder in the event of an unexpected stop [14]. Drivers on the phone tended to be slower to brake and missed more events, having more crashes than the drunk drivers. In other words, the drunk drivers were safer. The drunk drivers were slower and drove more aggressively, but the data suggests that they were more attentive to the roadway than the drivers on the phone.

The suggestion that attention plays a critical role is supported by measurements of the effect of listening and talking on visual attention. One study using a device designed to measure the visual attention of older drivers found that when younger adults engaged in a hands-free verbal task, their ability to identify visual information declined fourfold [15]. Using the useful field of view task [16], the researchers showed that the visual attention profile of a healthy younger adult engaging in a hands-free verbal task looks like that of an older adult with pre-dementia symptoms. Other researchers have shown that this loss in visual attention occurs even for items that have been fixated by the eyes [17]. Using a combination of eye tracking and electrophysiological measurements, these researchers showed a 50% decrease in an electrophysiological signal associated with attention even when an object had been fixated by the eyes, if the driver was engaged with a hands-free conversation.

And not only is visual attention impaired, but even eye movements are affected. When a driver engages in a hands-free cellular conversation, their eyes tend to focus more on the roadway directly in front of them, with fewer glances toward the periphery [18, 19]. One way to visualize this is to think of a driver, driving down a residential street. The attentive driver is scanning for hazards, and they look as far down the roadway as they can, to the periphery at oncoming traffic in case someone crosses into their lane and on the sidewalk where children might be playing. The driver

using a hands-free phone scans a region that is about the width of the steering wheel and about as far away as just in front of car. While a conversation with a passenger can also occupy a driver's brain, those conversations tend to ebb and flow as a function of driving demands [20], and the passenger can serve as a second set of eyes to spot hazards [21].

The effects covered by this range of research can by understood using the resource allocation model discussed at the outset of this chapter. Studies using functional magnetic resonance imaging (fMRI) techniques to measure cerebral blood flow, which is associated with regions of the brain that are the most active, show that when a driver is required to listen and speak as well as drive, cognitive resources shift from areas of the brain required to see the road and make decisions, to regions associated with listening and speaking. When asked to listen for comprehension to sentences, for example, fMRI reveals that activity in visual processing areas of the occipital cortex declines by about 40% as resources shift to auditory processing regions [22]. Other research [23] showed that the decrease in posterior visual processing areas was also associated with increases in activity in prefrontal areas which are associated with task coordination regions. In other words, you need your brain to drive, and the distraction of a conversation can limit what your brain can accomplish.

Summary It is not about holding onto an object that produces the problem; it is about the cognitive resources that are taken away from the primary task, resulting in behaviors becoming less controlled and relying more on automatic patterns, inadequate attention for the tasks at hand, and reduced speed and accuracy. After 50 years of work on distracted driving, we know this to be true based on more than a handful of studies. Between 1969 and 2016 there were about 350 studies of the effect of various types of distraction on driving performance, with over 1600 measurements of performance, with about 20,000 participants. In a review of these data [24], we found that 81.6% of the 147 measurements of the effect of hand-held phone use on performance variables related to driving showed a decrement for phone use. For the 270 measurements based on hands-free phone use, 81.1% showed a performance decrement. The implication for distracted doctoring is that if doctoring requires as much of your brain as driving a car does, a cognitive distraction is going to make performance worse.

The Problem Will Get Worse

Many in the distracted driving research community have long argued that it was only a matter of time before the epidemic of distracted driving became worse enough to be seen as the primary threat to safety on our roads. The year for that may be 2016, when the National Highway Traffic Safety Administration released their 2015 crash data, showing the largest increase in deaths (7.2%) from automobile crashes in 50 years [25]. It is important to keep in mind that this spike comes in an era with better automotive design and safety, better road design and engineering and ever improving odds of survival with increased emergency service efficiency and capacity to keep a driver alive following a crash.

The issue of distracted doctoring has not had as much press as the issue of distracted driving, but there are reasons to believe that it is only a matter of time before it is recognized as one of the most significant threats to patient safety and well-being. First, the presence of ubiquitous portable internet portals, also called smart phones, is increasing rapidly. Second, people value information in a way that encourages bad decision-making even in the riskiest circumstances. Third, our brain fools us multiple ways, both by underestimating risk and by failing to keep us aware of what we miss when we are distracted.

Changes in Demographics Indicate Increased Distraction

In a *New York Times* article [26] on the increase in crashes in 2015, an executive from the insurance industry notes about the increase in electronic devices in cars: "We are all trying to figure out to what extent this is the new normal." Changes in phone use over time are well documented by organizations such as the Pew Research Center [27]. Those studies and studies like them show that adoption rates for smart phones trend younger and more deeply every year. This means that when someone begins to drive or when they enter the hospital environment to work, they already have a long-established pattern of smart phone use and that they have been using it for functions that are very important to them, such as staying in contact with their peers.

A snapshot of the current state of demand for smartphones conducted using Amazon's Mechanical Turk (mTurk) revealed that the devices are ubiquitous and deeply used by a cross section of Americans surveyed [28]. The survey of 500 people (55% were female, with an average age of 34.7 years, 80% reported their ethnicity as white, 9% had a high school level of education, 26% had some college, 49% had a 2- or 4-year college degree, and ~16% had a postgraduate degree or professional certification, and most (78.2%) were employed) found 497 or 99.4% reported owning a cellular phone. They reported spending an average of 96 min per day using their phone, including 3 calls and 40 texts per day. When asked "Evaluate your level of dependence on your cellular phone, keeping in mind that the larger the percentage, the higher the level of dependence," the average level of perceived dependence was 53%. Since these averages include participants as old as 74 years, the numbers are actually underestimates of use and dependence for younger users. In the future, we can expect these numbers to continue to rise.

Information Is Perceived as Having Immediate Value

The term "addiction" is sometimes used in popular media to describe how over-connected some people are with their phones. Putting that term aside, it is safe to say that we have a special relationship with information. Unlike many other things

that one can become "addicted" to, information loses value over time. A text from a significant other, for example, may be worthless to read if you wait a day before looking at it. Failing to attend to it may even have negative consequences. Understanding the value of immediate access to information can help us understand why the phone sometimes appears to have more importance than other things going on around a driver or a health-care professional. Using a technique from behavioral economics called delay discounting, researchers showed that people were willing to endure long delays (days or weeks) to get larger monetary rewards instead of smaller, immediate ones but only willing to wait minutes or hours for the same reward if they also had the opportunity to respond to a text from someone close to them [29]. In other words, information has great immediate value, but it is perceived as losing that value rapidly over time.

The value of this immediacy can also be seen in responses to a texting dependency scale based on the American Psychological Association's Diagnostic and Statistical Manual of Mental Disorders [30] criteria for "gambling use disorder" included the mTurk study noted previously. Significant numbers of those surveyed said it was "Somewhat True" or "Completely True" when responding to a number of questions (See Table 5.1) that indicate dependence. The scale also correlated well with other measures of dependence, and answers were a significant predictor of self-reported automobile crashes [31]. And the one question that most significantly predicted higher scores on the overall measure was answering "I text in dangerous circumstances" in the affirmative.

Our Brain Fools Us

One would hope that we could protect ourselves from an increasing dependence on phones but understanding the risks, seeing what we are missing, and acting accordingly. But, unfortunately, the human brain is poor at risk perception and good at fooling itself by disguising from awareness all of the things it fails to see. For example, the parents of a 16-year-old are probably nervous about sending their child out on the roads when they get their license, but they aren't deathly afraid, despite the fact that we could run a headline like "Seven teen drivers killed in a car crash" every day in the United States. Risks like that seem abstract and they don't translate well to behavioral change.

In the world of distracted driving, it has been clearly established that drivers know the risks of distraction but that it fails to change their behavior. College-aged drivers indicate making calls is a significant risk, yet that does not reduce their chance of making a call if they think the call is important [32]. The same pattern holds true for texting, with 97% of respondents indicating they text and drive (which includes reading, responding, or initiating a text message while moving or in traffic at a stoplight or stop sign), even though they indicate texting and driving is more dangerous than driving drunk [33]. The disconnect between knowing risk and attitude change is so strong that in one study when asked to choose who was more

Table 5.1. Texting addictions questionnaire ordered by the most common "somewhat true" and "completely true" responses

Question	% Answering "Somewhat True" or "Completely True" (%)
6. I often text when I feel distressed (e.g., bored, restless, lonely, worried, anxious, depressed).	31
11. I text when it is socially inappropriate to do so (e.g., while talking to other people).	24
10. I text in dangerous or illegal circumstances (e.g., while driving).	20
2. Over time I have felt the need to greatly increase the frequency of my texting.	17
7. If I can't text for some reason, I feel the need to catch up by texting more as soon as I am able.	11
1. Sometimes it bothers me that I text so much.	10
5. I have become preoccupied with texting, often thinking about my next opportunity to text.	7
3. I have repeatedly made unsuccessful attempts to cut down or stop texting.	6
8. On occasions I have lied to conceal the amount of texting I do.	5
4. When I have tried to cut down or stop texting I have become restless or irritable, like I am going through withdrawals.	5
9. I have jeopardized or lost a significant relationship, job, or educational/career opportunity because of texting.	4

responsible for a crash, a drunk driver or a texting driver, participants chose the texting driver, but they assigned harsher punishments to the drunk driver even when the legal penalties were supposed to be equivalent [34].

The ability of the brain to fool itself can lead us to change our perception of risk when we engage in risky behavior. In the study of texting drivers mentioned above [33], for example, participants were asked to rate the riskiness of different driving conditions (calm conditions, moderately challenging conditions like driving on a highway, or very challenging conditions like driving in bad weather) as a function of whether they were reading a text, responding to a text that someone sent them, or making a choice to initiate a text, unprompted by an incoming text. The key is that when thinking about the two cases where they were sending a text, in the latter case, the driver is completely responsible for the choice to text. When reading a text, highway driving groups with driving in bad weather. When responding to a text, something the driver knows is risky, the risk of driving on a highway is between driving in bad weather and driving in calm conditions. But when the driver is forced to reconcile the knowledge that they are engaged in a risky behavior (texting and driving) completely by their own choice (initiating a text), they now see driving on a highway as equivalent in risk to driving in calm conditions. In other words, our

brain reconciles engaging in a risky behavior by downplaying the risk of the environment it is in.

One might hope that reality would intrude and inform us about how the world around us is much more dangerous than we think, but perception scientists call perception "the grand illusion" [35] because despite the feeling that vision is a 180 degree, full color, high definition, three-dimensional, moving panorama available to us at all times, we only "see" a relatively small amount of that information at any one time. Our perception when we drive down a busy city street (Fig. 5.1, left) is that we see the woman on the right getting ready to step into traffic, the car on the left ready

Fig. 5.1 The *top* figure represents what we think we see. The *bottom* represents what we actually see at any one moment

to drive into the intersection, and all of the cars in front of us slowing down. But the reality is closer to the image on the right. Our visual system only processes with clarity a region about the size of our fist held at arm's length at any one time. We move this window of attention around the world and build a representation of it very rapidly, but we only track about four objects in that representation at any one time.

Summary Our brain is limited in the amount of information it can process, even for something like vision which seems rich and detailed. We are largely unware of what we miss, just like we are unaware of the world disappearing from view for up to a quarter of a second every time we blink our eyes. It seems to be a function of our brain to protect us from understanding the true risks we are exposed to, even to the point of making the world seem safer than it is when we engage in behaviors that we know are risky. Given the increasing availability of internet-connected smartphones and all of the interesting information the internet brings, the trend of earlier and deeper use of the devices, and how highly we value the immediacy of information, there is reason to be concerned that distraction will continue to be an increasing threat to safety.

Solving the Problem

Digital distractions lead to increased risk for error. The trends point toward increasing use of the devices that encourage distraction. And the behavior is supported by a lack of awareness of the risk that being incurred. So, the question remains, "What can we do to stop this problem?" The answer is that education is a part of the solution, but perhaps by itself education is not enough unless we include enforcement of rules and leverage the power of social norms.

The Role of Education, Legislation, Enforcement, and Norms

One of the more popular theories of behavior change is known as the theory of planned behavior (TPB) [36]. TPB states that behaviors are a result of the intention to engage in them. Intention is a result of three factors: behavioral attitudes, subjective norms and perceived behavioral control (which also directly influences behaviors themselves). TPB is typical of a class of behavior models which more generally propose that changing attitudes toward a behavior through education can produce changes in the behavior. For example, these approaches would state that if attitudes toward smoking can be changed with education to make smoking seem riskier, then smoking rates (behavior) should decline.

Education about risks always has a role to play in behavior change, but it is questionable whether or not risk education plays a primary role in behavior change. The history of education-only appeals to reduce risky health behaviors like smoking

similarly demonstrate that education alone is not enough to produce widespread changes in behavior. In the realm of distracted driving, there appears to be little to no relationship between knowing risk and changing behavior. Traffic safety more generally is full of examples such as seat belt adoption or drunk driving that show education alone is ineffective and that approaches like "appeals to fear"/"mass–media campaigns" can produce unintended behavioral consequences [37]. Finally, education mass media campaigns can be very expensive [38].

Creating rules and laws is also an important component, but, like education, by itself it isn't enough to invoke widespread change. A good example is the use of seat belts. Before seat belts were first mandated, and drivers were required to use them, adoption rates were very low (around 17 %) despite education on their effectiveness at reducing traffic fatalities [39]. Putting laws into place increased adoption to about 50 % [40]. The current nationwide average rate of adoption is well over 80%. The difference is due to differences in enforcement of the laws.

The additional effect of enforcement of the rules was best understood by looking at outcomes produced by two types of seat belt laws. Primary seat belt laws allow law enforcement to pull over a driver if they see they are not belted in. A secondary seat belt law only allows for enforcement of the law through the issuing of a violation if a driver is stopped for another offense. This difference in enforcement of the laws accounts for a 14 % difference in seat belt use, with states primary laws showing higher rates of seat belt use and lower fatality rates in crashes [41].

Like education, rules by themselves are not enough to change behaviors. Enforcement of the rules is also critical. In fact, the role of enforcing rules cannot be understated because the presence of rules without enforcement may also serve as a signal that the rules are unimportant. One example of this is found in data produced by the Network of Employers for Traffic Safety (NETS; trafficsafety.org) in their traffic safety benchmarking study. They examine the various fleet safety components their member companies have and look at how those relate to fleet safety outcomes such as the number of crashes per million miles driven. In the area of distracted driving, companies with rules against distracted driving have lower crash rates than those that do not. This effect is increased when those rules are enforced. In companies that leave formal policies up to the discretion of their business units, safety is actually worse. One interpretation is that when the signal is sent that a distracted driving policy is important but not important enough to be mandatory company wide, drivers may take distracted driving less seriously.

This outcome from the NETS benchmarking work reveals the final piece of the safety puzzle: the role of norms. In the TPB model, norms are listed as one antecedent component for the intention to engage in a behavior. The most common conception of a norm is modeling our actions based on what we feel others around us are commonly doing. For example, when a student is asked why they text and drive even though they report it as dangerous, they might reply "Everyone is doing it." Another term for this is a descriptive norm. But the NETS data reveal the power of a different type of norm: injunctive norms. An injunctive norm is what the group says is acceptable or right.

A powerful illustration of the effect of these two types of norms can be found in a study done to examine the role of norms on power consumption by home consumers [42]. In an effort to use the power of descriptive norms to lower power consumption, consumers were provided with meters that monitored power consumption and provided information about their consumption relative to neighborhood peers. The descriptive norms did reduce power consumption for those that were using more energy than their peers, but the norms also produced an unintended consequence: consumers that were using less energy than their peer group, a desirable outcome, began to use more energy. This is a cautionary tale about using norms. Fortunately, injunctive norms also guide behavior. In the aforementioned study, researchers added an icon to the energy display to indicate if the consumer was doing well or doing poorly. Consumers that were doing well, by lowering energy consumption in the short term or using less energy over the long term, were given a smiley face icon. Those that failed in these goals received a frowny face icon. This icon served to indicate the expectation, and it produced the desired outcome. Energy consumption still declined for users that used too much relative to their peer group, and energy use in the better-than-peer group remained low.

Putting It All Together

Norms are powerful cues for behavior. Given the data mentioned in Part III, combating the threat of electronic distraction must overcome some powerful descriptive norms. Everyone *is* doing it, to paraphrase the texting college student driver who knows how unsafe the practice is. To overcome these powerful cues and the powerful desire for people to stay constantly connected, the relatively weak effects of education and unenforced injunctive norms must be supported by enforcement of established rules or laws.

The secret to behavior change is to change behaviors. Attitudes will follow. Consider the example of seat belt use mentioned previously. Education and rules alone were not enough to move adoption must past one-half of drivers. However, when paired with enforcement, behaviors changed dramatically. And with a change in behavior, cam a shift in attitude. One explanation for this may be understood using the classic psychological concept of cognitive dissonance [43]. When someone who doesn't want to use a seat-belt puts one on because they are worried about getting a ticket, they must reconcile their behavior with their attitude that seat belts aren't useful. The easiest thing for the human brain to do in this instance is to reclassify themselves as a driver who is safe ("I am a safe driver and I wear a seat belt because it improves my safety and it's the right thing to do.") rather than a driver who is responding to the fear of a ticket ("I only comply with laws under threat of enforcement and I still think seat belts are dumb.") Despite the suggestion of TPB that shifting attitudes is a precedent for shifting behaviors, cognitive dissonance tells us that changing the behavior can change the attitude.

There is considerable evidence that using enforcement of established rules can lead to both behavioral and attitude shifts. In the 1970s, drunk driving laws were only weakly enforced. Research about drunk driving attitudes showed that when crash scenarios presented a crash involving a drunk driver driving in poor weather, participants considered the weather to be the cause of the crash, not the drunk driver [44]. With increased enforcement of drunk driving laws starting the 1980s, drunk driving began to decline, and attitudes toward drunk driving shifted. When the same scenario was recently presented to a sample of younger drivers, they blamed the drunk driver, and not the weather [34]. This shows that enforcement of laws that leads to a shift in behaviors can also produce a shift in attitudes.

However, that study also had a cautionary tale similar to the one found in the NETS data. Crash scenarios in the study also included a texting version. The same participants that rated drunk driving as the cause of a crash said that texting crashes were more preventable and thus texting drivers were more responsible for a crash than drunk drivers. But, when asked to punish the drivers in terms of fines and jail time, even when told that a law required a distracted driver to be treated the same as a drunk driver, they punished the drunk driver more. In other words, the participants knew the risks of distracted driving. Education would not have had any additional effect on them. But because texting and driving is currently illegal in most states but those laws are not as strongly enforced as drunk driving laws, the signal to drivers is that the rules are not important.

To reach the goal of improved safety, it is important to emphasize that education has value, but enforced rules that change behaviors are more important. Education by itself will not change behavior. Rules without education are unlikely to lead to attitude changes that influence safety beyond the situation covered by the rules or in the absence of enforcement. And, those rules must be followed by everyone in an organization to make both the injunctive and descriptive norms clear. When all of these components come together, a culture of safety can develop that can help people make safe decisions even when there are powerful forces pushing them to make a poor decision.

Applying the Lessons of Distracted Driving Research to Safe Doctoring

The human brain is sometimes described as the universe's most complex supercomputer, with billions of neurons and trillions of connections. There are areas dedicated to processing language, vision, emotions, and capable of amazing feats of creativity, to reason and accomplish feats that no other organism can do, as far as we know. It is difficult, then, for us to embrace the idea that our brain is far more limited than our experience indicates. It seems unbelievable that trying to do two things at the same time, like talking and driving, both which seem simple, can nevertheless together produce deadly consequences. And yet, that is the fact that is supported by decades of study across multiple labs and with multiple methods.

The fact is that our brain fools us by thinking it can do more than it really can. And when it comes to accessing information, our brain places a premium on that activity that serves to further blind us to what we are missing around us. The consequences for driving are clear. The consequences for health care will be the same: distraction will lead to unnecessary errors, which will result in unnecessary deaths. All for the benefit of a tweet, a website, a text, an email, or a phone call that could have waited 10 min.

The path toward avoiding this is clear and presaged by a history of safety compliance in other domains. We must recognize the problem and alert others to it. We must put rules into place to make the behaviors unacceptable, and we must enforce those rules so they are followed. And, we must all adhere to those rules so the normative expectation becomes one of safe decisions in lieu of momentary desires. The portal to the internet in our pocket is not going away. Smart people are finding new ways to make it more pervasive and more attractive. The only thing we can change is us.

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Chapter 6
Distraction, Disengagement, and the Purpose of Medicine

David Loxterkamp

Belonging to society requires sacrifice, and that sacrifice gives back way more than it costs.
Sebastian Junger, *Tribe*

Introduction

When I entered family medicine in 1984, my office looked a lot like that of my father's. Ed Loxterkamp was a GP who worked with a single receptionist/nurse; together they met most of their patients' needs. Only a generation later, I joined another family physician in a small group practice. We shared two RNs, an office manager, billing clerk, and record keeper. Now – three decades later – our ratio of staff to clinicians is five to one. And we added behavioral therapists, care managers, physical therapists, and pharmacists to the burgeoning health care team.

It is little wonder, then, that patients have trouble navigating our health care system or that their doctors feel constrained and defeated by it. Distraction and disengagement have reached epic proportions among my colleagues. Researchers estimate that two-thirds of practicing clinicians experience one or more symptoms of burnout. We live in a distracted society where drivers and pedestrians, teachers and students, parents and their children are paying so little attention that they are really focusing on nothing at all.

It is tempting to regard my first decade in medical practice as "the best years of my life," but honestly, parts of it were. I opened an office, started a family, and purchased a home. There was no electronic medical record and very little oversight of my clinical activities. I worked long hours, but these were acknowledged and appreciated by my patients. The anguish of a patient's decline and death was balanced by

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the joy of new birth. It was a time of intense interrelationships and getting to know the needs of my patients.

It was a time, too, when I could have been seen as abandoning my family, working through a smoldering depression, and ignoring my retirement portfolio. I had few people to talk to, let alone call a friend. While I was caring for this blue-collar community, I never once asked who would care for me. Likewise, I began to encounter colleagues and patients who had fallen asleep at the wheel, who were dead to the possibility of change and growth in their marriages, their work, or their personal development. Had I become them? I was forced to acknowledge my own shift from overstimulation to loss of interest in the world around me – and the world *inside* me.

Then one day I came across a quote by Howard Thurman, a theologian, civil rights leader, and contemporary of Martin Luther King. "Don't ask what the world needs," he challenged me. "Ask what makes you come alive and go do it. Because what the world needs is people who have come alive." A gong went off, and I set about to answer that essential question.

The physicians in our practice began to meet weekly and share stories from their private lives and clinical experience. Though the group lacked a formal structure, it was facilitated by a social worker and subscribed to the fundamental belief of Michael Balint, a Hungarian-born psychoanalyst: that the doctor is the essential drug (catalyst) in the healing process. As such, it must not be allowed to expire.

It remains to be seen if the profession of medicine can continue to be a purposeful, humbling and charitable endeavor, where the gratitude of patients remains our most coveted reward. Can the simple act of serving others be enough to challenge and fulfill us?

Distraction

I am sitting in a Boston amphitheater as we await the start of a day-long continuing medical education course. The room fills with activity and chatter; I open my laptop to check e-mail, morning news, and the dreaded inbox.

The inbox is the repository of every laboratory report, imaging study, hospital discharge summary, consultation note, portal e-mail, medical assistant update, and special form that requires my acknowledgement or signature. Like death and taxes, it is one constant in the life of a physician. I took great pride in scrubbing it clean when I left the office yesterday, but there are now 63 documents for me to review, and by the second lecture, the number has doubled.

I am not alone on the treadmill. In 2008, a year-long analysis [1] of one general internal medicine practice showed a daily volume of 24 telephone calls, 17 e-mails, 12 requests for prescription refills, 20 laboratory reports, 11 imaging studies, and 14 consultation reports per physician each day. Their staffing ratio was 3.5 full-time staff per full-time physician.

Attending to this virtual paperwork takes time – time away from patients. A recent time and motion study [2] of 57 physicians across 4 specialties showed that doctors

spend only 27% of their office time on direct face-to-face clinical encounters. Even here, the computer triangulates the doctor-patient relationship. Nearly half of physicians' time was allocated to the electronic medical record (EHR) and desk work. For the 21 physicians who completed after-hours diaries, another hour or two was spent at the computer after they arrived home.

The EHR is more than just a distraction. Doctors need access to the complete set of office notes, test results, refills, and referrals, and the EHR serves us more efficiently than did the paper chart. The burden lies in the sheer volume of data and its demand on our attention. Even in the exam room, we turn to the computer more often than the patient in front of us. Who are we listening to as we draw out the HPI, conduct a brief exam, and choose an order set? The CEO who sets our productivity goals, the quality assurance director who grades our performance, the coding specialist who reviews our charges, the knocks on the door that remind us we are running behind, or the technicians and assistants who clamor for our attention between patients?

It is even more disturbing when patients themselves become the distraction. Their vague complaints and unwieldy lists often defy conventional solutions. They fail to realize that doctors are required to practice at the top of their license and address only one problem per visit. Our laptops and craniums are filled with checklists, surveys, health maintenance requirements, and so-called best practices that have little to do with why patients scheduled their appointment. We dare not ask an open-ended question or stray off-topic for fear of running farther behind. And for that eventuality, we have mastered the writing of a prescription, test order, or referral requisition for our strategic exit.

Sendhil Mullainathan and Eldar Shafir [3] studied the problem of task overload in their book,"Scarcity: Why Having Too Little Means So Much." The authors begin with the example of poverty. Numerous lab experiments and field studies have shown that the poor stay poor because of the way they make financial decisions: when faced with a fiscal crisis, their choices become shortsighted and impulsive. Doctors who are "time-poor" act identically. Thought processes begin to "tunnel"; we ignore everything but the pressing need. Such a coping mechanism has been shown to shave up to 14 points off an IQ test. Under the tick of the merciless clock, our processing speed slows and our RAM shrinks. We work less efficiently, less creatively, and less comprehensively. Ultimately we give short shrift to what the patient needs most – our patience, compassion, understanding, objectivity, and friendship [4].

One remedy is a workflow adaptation known as "slack" – where scheduled breaks serve as buffers for unexpected but predictable crises that upset our routine. Other solutions: clinicians could demand that streams of data be packaged in manageable chunks or that our EHRs force us to make evidence-based choices by default. We need an array of new contractual arrangements (e.g., direct patient care) that that will allow fewer patients to have greater access to their primary care provider.

But we should also recognize that distractedness is part of our cultural milieu and the human condition. Many of my colleagues fall somewhere along the spectrum of

attention deficit disorder (ADD) and have accommodated to it by career choice. Moreover, distraction serves a positive good as entertainment – a temporary relief from boredom or distress. Much of primary care involves treatment of the chronically ill, where little progress and slow decline are the expected course. We grieve for our patients' loss of mobility, eyesight, independence, companionship, identity, and self-worth. Our attempt to ease their chronic distress with narcotic pain relievers led to the nationwide epidemic of opioid abuse. We see in the downward drift of elderly patients our own parents' decline – and ours. How much easier it is to focus on the numbers – vital signs, A1C, eGFR, and T-scores– than sit with the suffering of others for which there is little to offer other than companionship. How much easier it is to manipulate a colorful, organized electronic record than to attempt to disentangle the cluttered, chaotic lives of our patients.

The important question, then, is this: if distraction is an escape from boredom and pain, why has patient care become so boring and painful?

Disengagement

Over a third of practicing physicians in the United States report that they have lost enthusiasm for their work, often regard patients as objects, and feel their work is no longer meaningful [5]. These feelings constitute the condition known as burnout. Maslach and Leither aptly define it as "the index of dislocation between what people are and what they have to do. It represents an erosion in values, dignity, spirit, and will—and erosion of the human soul." [6] The prevalence of burnout among physicians is higher than that in any other comparable profession and twice the rate of the general population [7]. Surveys over the last three decades have shown that the problem is worsening even as doctors work fewer hours [8] for more money.

The consequences of burnout are legion: decreased job satisfaction, empathy, patient satisfaction, and adherence to treatment plans, and higher levels of medical error, substance misuse, workforce attrition, and suicide [9]. Physicians are more than twice as likely to kill themselves as nonphysicians; female physicians are three times more likely than their male counterparts [10]. Physicians at mid-career (10–20 years in practice) report the highest rates of burnout. Compared to other colleagues within their specialty, they work more hours, take more overnight calls, report the lowest job satisfaction ratings, and experience the worst work-life balance [11].

It is not surprising, then, that health care leaders and researchers are paying more attention to the causes and remedies of burnout. In one study, mindfulness and self-awareness training was offered over the course of a year through a 52-h curriculum. Participating primary care physicians had large and immediate increases in their mindfulness skills and orientation, and these changes were sustained for more than a year. They also had large, durable improvements in burnout, mood disturbance, and empathy [12].

In another study, an employee stress reduction program was instituted across 22 hospitals. Over the following year, malpractice claims were reduced by 70% at intervention hospitals compared with a 3% reduction at control hospitals [13].

A third study established a link between career fulfillment and the percentage of work time that physicians devoted to activities they identified as most meaningful to them. When more than 20% of total work time was devoted to highly meaningful tasks, the risk of burnout was reduced by half [14].

Rather than treat burnout, we might ask why it occurs. And the causes seem obvious: In a society that prides itself on long work days, short vacations, and unpaid leave, American doctors work even longer and harder. Increasingly, both partners in a committed relationship are employed, so it is not surprising that work is where they find a sense of accomplishment, social connection, and personal identity. Medicine is serious business; mistakes come at great cost to our patients' health, their pocketbooks, and our relationship with them. Doctors are expected to recharge their batteries at home, whenever they get home, because at work the needs of the patient (and now, the organization) come first.

Moreover, the doctor's job description keeps expanding: we are expected to document thoroughly, code correctly, complete checklists and surveys, review an unrelenting stream of documents, and lead the medical team. But the better parts of the job – those that involve patient care – are whittled away. No health care professional can escape sporadic moments of exhaustion, frustration, and regret. But burnout is something else again: it turns us against the patients we serve, the commitments we've made, and the future we strive for.

I don't believe that we should *ever* accept burnout as an acceptable cost of doing business. Nor do I believe that the repair of our workplace will ever be undertaken by those outside the examining room. For them, the current system is manageable, even profitable. It is really up to us – those on the inside whose challenge is to grasp and redress the ordinary needs of our patients – to rewrite the rules of patient engagement. As one experienced observer of doctor burnout notes, "Physicians continue to control the most sacred and meaningful aspect of medical practice—the encounter with the patient and the reward that comes from restoring health and relieving suffering. Reminding physicians of their place, and helping them to protect it, may mitigate against burnout and promote patient-centered care for the benefit of both physicians and their patients" [15].

Perhaps this is the place to begin. Is it possible to create or protect a work environment where physicians feed their souls through clinical care? Can we minimize our distractions from data/task overload and maximize our engagement in patients' lives? Should we ask, first and foremost, what constitutes a great day in the office, or, with a nod to Howard Thurman, what makes us come alive?

The Purpose of Medicine

I am never disappointed in the second-year medical students who train in our rural office. They uniformly demonstrate a desire to help others and credit this desire for their career choice. Income potential, job security, and social status are spoken of as perquisites of the job. As students face the challenges of coursework, long hours on

the ward, and their newfound proximity to life and death, holding on to that sense of purpose becomes critical to their survival.

Once in practice, the doctor's sense of purpose begins to fade. New physicians take responsibility for a multitude of incurable conditions, symptoms that defy diagnosis, and treatments that cause irreparable harm. They care for patients who prefer disability over rehabilitation or cling to their self-destructive habits. The demands of meeting others' needs begin to impinge upon their own.

Reinforcing a sense of purpose is a lifelong challenge, as the novelist Dame Hilary Mantel remarked about her own profession: "Do you write every day," she is often asked, "or do you just wait for inspiration to strike? I understand the question is really about the central mystery — what is inspiration? Eternal vigilance, in my opinion. Being on the watch for your material, day or night, asleep or awake" [16].

What, then, inspires the doctor? What grace redeems the drudgery of the routine? Where will it lead us and at what peril? The answers vary among physicians but always arise from a deeply personal place. That place for me is spiritually connected to Rutherford, New Jersey, where William Carlos Williams cared for a working-class clientele and wrote about it with uncommon humility and beauty: "They're in trouble; and that's when you're eager to look into things deep, real deep. I wouldn't walk away from those kind of talks for anything; I come away from them so damn stirred myself- I've needed to walk around the block once or twice to settle down, or drive out of the way for a block or two so I can stop and think" [17].

Williams saw both of his endeavors – doctoring and writing– as inseparable; each fueled and instructed the other. Both dealt with his deep desire to know his neighbors – his patients and readers – sacrifice for them, and so forge deep personal connections with them. Our fundamental desire as human beings is to be close to others. We have personal questions and needs that will be worked out in the public space. That is why we are professionals; it lies in the nature of our vows. Unfortunately, most of us lack the skill to explore these questions while protecting the integrity of the public space. "To write prescriptions is easy," Franz Kafka once warned us, "but to come to an understanding with people is hard" [18]. The most important of these understandings will concern us personally and involve the reasons we chose to enter a life in medicine.

The Public Space

In 2009 Daniel Pink gave a TED Talk [19] called "The Science of Motivation." It became wildly popular and to date has received over 16 million views. Pink outlined what he felt was wrong with business: when it came to providing incentives for improved performance, it was out of synch with motivational research. Pink described several experiments where subjects were offered a financial reward for the performance of a task. Researchers were surprised to find an inverse relationship between the size of the reward and level of performance. They concluded the following: when a job has a simple set of rules and a clear objective, bonuses operate

as they should: the larger the monetary incentive, the better the performance. However, in jobs where even rudimentary cognitive skills are required, financial incentives don't work and can often do harm. Here, intrinsic rather than extrinsic rewards provide the necessary nudge.

Pink identified autonomy, mastery, and purpose as the foundation for professional motivation. Autonomy refers to self-direction and a sense of control over one's working conditions; mastery is the result of our desire for self-improvement; purpose reflects an innate desire to belong something bigger than ourselves. High-quality primary care – focused as it is on patients and their complex needs – depends on intrinsic reward, malleable skills, comfort with uncertainty, and continuity over time in order to fully flower and bear fruit.

When doctors are free and motivated to follow their humanitarian instincts, interesting things can happen. Ten years ago a long-standing patient of mine, an old Mainer by the name of Leroy Banks [20], came to see me about his diabetes. We shook hands, and I asked him how he'd been since our last encounter. "Great," he observed. "Just back from a hunting trip with my son. But I wasn't much help in getting the moose out of the woods." Upon uttering these last words, Roy looked away, and tears flowed down his cheeks. Despite my careful cajoling, he could not explain this uncharacteristic show of emotion. Our 15 min together had long since expired, and I had yet to broach the diabetic checklist. So I asked Roy to return in a week so we could complete his exam. To my surprise, he obliged.

A week later, Roy was more composed but no more in touch with the emotions that his moose hunt had triggered. This time I checked his heart and lungs, examined his feet, inquired about his last eye exam, and ordered the requisite blood tests. And invited Roy to an upcoming gathering of men, similar in age, all dealing with the challenges of infirmity and aging. Roy was an old scout leader and Sunday school teacher; his guidance and perspective would be an invaluable asset for others.

Over the next 2 weeks, I asked every older patient of mine if they would be interested in joining such a group. Thankfully, 12 did. This became the nucleus for the elderly support groups that continue to this day (and the model for our recovery and chronic care groups that came later).

During our very first meeting, the men shared stories of their upbringing, travels, and careers. So many common threads were exposed that one participant insisted on asking, "How did you find twelve men with so much in common."

"Easily," I replied. "You were the first twelve men I asked."

A primary care practice works best when it cultivates self-determination among members of the team; when they begin to assume personal responsibility, follow their curiosity, and celebrate their loyalty to patients and their colleagues; and when they are free to respond to "the better angels of our nature" [21], as Lincoln inspired us to do. Sebastian Junger, in his book *Tribe,* reminds us that the fundamental desire of every human being – even the aging men in Roy's support group – is to feel connected and useful. Sometimes it falls to a doctor to reconnect them, even when doing so is inefficient and unprofitable. For it must still be said that a doctor's professional identity derives more from what is sacrificed for others than from what is accumulated and achieved for himself.

Questions of Purpose

I recently attended a health leadership conference where participants were shown a documentary on the art of Andy Goldsworthy. Mr. Goldsworthy is a British sculptor and photographer who assembles natural objects (e.g., stones, twigs, pinecones) into geographic forms, often set in their found environment. His work is painstaking, ephemeral, and stunningly beautiful.

Some saw in the artist's sculpture a metaphor for dealing with the social conditions of the workplace. Others condemned it as self-indulgent and frivolous. I saw only beauty and the artist's dedication to its creation.

Later, on the drive home, I recalled the biblical phrase, "It is written: man shall not live on bread alone, but on every word that comes from the mouth of God" [22] and applied it to my own profession. Bread and its production can be seen as the immediate and tangible solution to the problem of hunger. Bakers know they are "doing something" because their products fill empty stomachs – if only briefly and inequitably. Doctors work in an industry of blood tests, imaging studies, prescriptions, billing codes, and productivity reports. We take pride in meeting the palpable need for symptom relief. But what we live on is the beauty we find in the patients we serve – their resilience, their gratitude, and the trust that they place in the therapeutic relationship. We share a deep and abiding faith in the value of that relationship; while immeasurable, it sustains us in the face of complexity, injustice, and death.

In medicine, patients come to us with inscrutable problems, where illness and its root cause often lie beyond our capacity to help, let alone cure. Patients need food, shelter, heating oil, and transportation; they need parenting, friendship, and self-esteem. But what we are trained to provide them is pills and procedures. So the gift must come from the human heart, a heart that stands in witness to their suffering. We can offer them recognition and respect. We can listen to them carefully, caress their wounds, and nurture whatever hope flickers inside. We can love them because they are alive and because they have chosen us to reveal their burden.

I know how quickly this can be forgotten. How easily it is trampled underfoot by the needs and demands of an all-consuming day. That is why, in our medical practice, we brought original artwork into the office. Flower gardens brighten our entry way and music plays in the waiting room. We have invested in architecture, well-appointed furniture, and new equipment – all reminders of the beauty of this world and of the potential to find it everywhere. And I hear other words coming from the mouth of God – connection, inclusion, and acceptance. These are served in simple ways that benefit both the doctor and patient: through eye contact and firm handshakes, an unhurried history, and conversations that slide to where our lives intersect.

I am keenly aware that this is not enough. We need more resources at our disposal, especially time. We need fewer proscripted tasks and measures; we need to look beyond the computer screen. We must take care of ourselves in order to begin each day with less distraction, resentment, and apathy.

Many of us entered medicine as a calling or had an inkling that our fulfillment would come from caring for others. Practice would always be more than a job and a paycheck. A well-organized chart could not compare to a well-understood life. Joy sprang not from a clever diagnosis or perfected technique but in the gratitude of our patients and our connection to them, which connects us to a purposeful life.

We cannot quickly turn around the drudgery in our work, the clutter of the electronic workspace, or the weakened workforce in primary care. Still, we can choose to be present for every encounter. Like a Goldsworthy sculpture on a barren beach, we can find the beauty in it, always and everywhere. And offer the kind of connection we all seek, if ever so briefly, in the ephemeral space and moment that we – doctor and patient – have created for one another.

Conclusion

There are things we do in our lives and careers that define us; indeed, have the power to change us. Initially, we may be drawn to them as a matter of curiosity or feel wed to them by obligation or duty. Seldom grand in gesture, they are often small, symbolic, and personal acts of redemption. Yet they carry such import that a failure to deliver on them can diminish us, and a pattern of failures will destroy us. My invitation to Roy and his support group was such an example: an attempt to create for my patient (and others like him) a setting whereby he might reconnect to his own self-worth through the experience of belonging and brotherhood.

Knowing our purpose in medicine cannot guarantee freedom in the workplace, nor will it motivate us to constantly improve. It is no substitute for familial love, loyal friendship, or the pursuit of one's passions. It will not pay the bills. But it can buoy us during turbulent times and keep our gaze fixed on the needs of those who suffer and come to us for care. The purpose of medicine will always have a human and personal face because it connects us to our desire to help others *on their terms* – something that enriches us all.

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Chapter 7
Taking Time to Truly Listen to Our Patients

Deepthiman Gowda

Visit to a Country Doctor

In a 1947 Norman Rockwell painting called "Norman Rockwell Visits a Country Doctor," Dr. George Russell, a family physician in Arlington, Vermont, is pictured with a family in his office [1]. The viewer's gaze is drawn to the left side of the painting, where a pool of light focuses attention on the doctor, who sits with stethoscope in hand while leaning forward to speak to a mother holding an infant. A father stands protectively behind the mother and child. The main act depicted in the setting is that of delicate listening and of thoughtful telling – scene of care, a scene of healing Fig. 7.1.

The work carefully contextualizes the scene where the care is being given. The doctor's dog, Bozo, rests lazily on a chair. At the far right of the scene sits an older boy, perhaps the infant's brother, as an onlooker. A fireplace is seen in the center of the painting, giving physical and emotional warmth to the scene. And secured to the wall over the mantle is a hunting rifle, resting horizontally just underneath a mounted deer head. The shaft of the weapon, occupying the near center of the painting, is directed at the head of the father, like a sword of Damocles. This unsettling compositional decision juxtaposes the safety and intimacy of exchange between a doctor and family with the precarious nature of illness and the ever-present shadow of death. The viewer is reminded of what is at stake for patients and families in spaces of care.

In framing this whole scene, the painting sets up another tension as well: located on either side of the image are electronic devices tethered to wires, which appear to be early office radiography devices. Despite this presence of technology at the peripheries of the image, the heart of the painting remains the connection between

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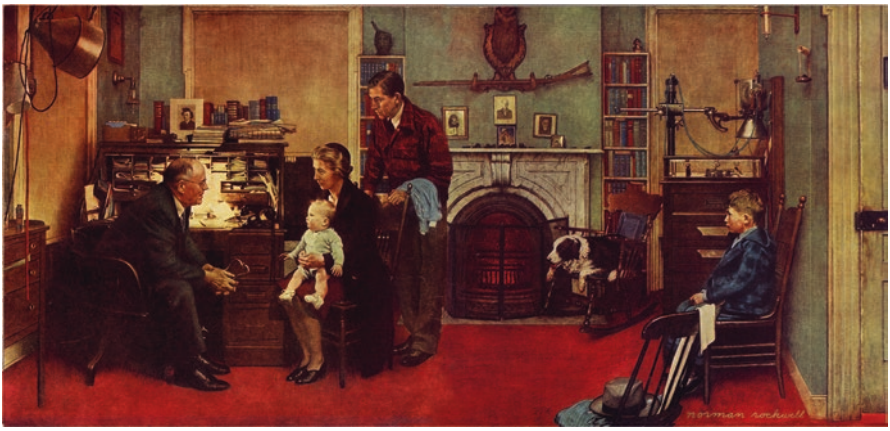

Fig. 7.1 Norman Rockwell visits a country doctor

the doctor and the family, which is unmediated by those technologies. The presence of the technology is felt in several ways in the image. On one hand it frames the image, producing stability to the scene, as if pillars holding up the image and in some ways protecting the intimate scene within. The technology can also be read as a looming presence, or interference. Wires and cables and the objects' cold metallic colors and temperatures are in contrast to the warmth at the center of the image. We don't know in this image whether the representations of technology will support the care that is taking place in the scene or will intrude on the scene and unsettle the intimacy of the image.

In the ensuing decades since this painting was created, the forces depicted in this image have remained the same: the healing power of the intimacy between physician, patient, and family, the specter of sickness and death, and the potential of technology to support and instruct or interrupt and disrupt. In this essay, I will explore the healing power of the clinical relationship and will posit that listening is a primary facilitator of that agency. I will also explore the barriers for listening in the current clinical environment, reflect on the value of authentic listening, and consider how we might arrive at practices of deep listening as clinicians and as co-creators of our medical environments.

Technology, Listening, and Distraction

The electronic health record (EHR) has been one of the most powerful forces shaping the clinical encounter over the past 20 years. One source estimates that clinicians spend over one-third of a typical primary care visit interacting with the electronic medical record [2]; for some physicians, this may even seem like an underestimate. Though EHRs have promise to improve safety and quality, better capture dollars in competitive health care marketplaces, and meet regulatory requirements, the adverse

impact of EHR implementation on the dynamics of the clinical encounter can be profound. EHRs in widespread use are not designed with the primary purpose of facilitating communication or enhancing the patient-doctor relationship; rather, they are often designed so that safety, billing, and regulatory needs are met. From the perspective of institutional leadership, the impact on communication, on attention, and on the relationship between patient and doctor may go unknown, unnoticed, or be met with indifference.

Devoting time to the EHR during the encounter affects how clinical time is apportioned, leaving less time for engagement with the patient. In addition to spending time on the EHR, the use of such platforms may interrupt the flow of a conversation. Indeed, there are costs to switching one's attention back and forth from the patient to the computer. Such multitasking and cognitive switching may result in reduced understanding of both what the patient is saying as well as what is being learned from the electronic chart. Such compromised information may lead to medical errors and patient harm [3]. Furthermore, the patient, recognizing a division of the physician's attention, may not feel fully listened to. A physician's split attention is partly communicated through interruptions in dialogue, and perhaps even more powerfully, though nonverbal communication as the physician's body and gaze may be turned away from patient and toward a screen [4].

A few years ago in an essay on the patient history and physical exam, a student of mine wrote, "Why value the history or physical exam when the truth can be found in the CT scan?" Although the student was an early learner with little clinical experience, the question identifies the culturally hegemonic power of technology.

The student was likely using the word "truth" to refer to a biological or diagnostic truth and not a narrative truth. If we remain focused on a diagnostic objective and follow the student's argument that imaging tests contain diagnostic truth, one could argue that there is little reason to take a detailed history or perform a careful physical exam. One may surmise that there is little diagnostic value in listening carefully.

Yet from perspective of probabilistic clinical reasoning, the early learner fails to recognize that there is no isolated truth in a laboratory test or a diagnostic image; the meaning of such information is understood only in relation to the pretest probability – i.e., history, physical, and population prevalence [5]. The truth of the CT scan is always tied to the story, or patient narrative. The radiology report might read, "Recommend clinical correlation." Finding a clinical correlation implores the clinician to know the context of the problem through careful listening and thoughtful examination.

Furthermore, if laboratory testing and diagnostic imaging are ordered in lieu of employing these foundational clinical skills, the physician will be presented with test results that he or she will be unprepared to properly interpret. In fact, physicians themselves report a problem of over-testing [6]. Such testing may be unnecessary if skillful listening and examination has been employed in the setting of trusting relationships. The excessive and unnecessary generation of data can be confusing and add cognitive noise to a clinical encounter that may sap both time and attention. Though more research is needed in this area, such diagnostic confusion may have several consequences, including increased medical errors, paradoxically increased testing (additional testing to help sort out confusing results obtained from the first

unnecessary test), increased health care costs, and erosion of connectedness between patient and doctor.

The student's essay also points to another misguided notion sometimes encountered among trainees and clinicians: that diagnostic acts and provision of therapies by way of drugs and surgeries are the sole activities of the physician. What is left out of this viewpoint is the value of providing emotional support, problem-solving with the patient, and bearing witness to the patient's experience. Interestingly, none of these later activities of the clinician requires technology, but does require the physicians' presence and careful listening. These are the elements of care that come closest to the healing presence that was depicted in the Rockwell painting.

Diagnosis-centric and intervention-centric models of health care, of course, are not the learner's fault. They are a consequence of environments in which practice and training takes place: reimbursement models that do not properly reward problem-solving, emotional support, and witnessing. These limited notions of the role of the doctor are also the product of the structures of medical education. In medical training and, in particular, in the assessment of trainees, the value of listening is primarily conceptualized as a means of data collection in the service of making diagnoses. In written national licensing and certification examinations, case histories are provided so that they might be used for diagnostic thinking. There is evidence that assessment drives learning and reinforces values [7, 8]. So if the value of listening is limited to the collection of information for diagnostic decision-making, then this is what trainees and even those recertifying will learn. It is also possible that the skills of listening as a way to establish support, build relationships, and bear witness are not easy to assess in testing environments outside of simulation. Perhaps we simply need more innovation in this area. Still, the clinical assessment of trainees should be designed so that the broader set of benefits of careful listening and interviewing can be assessed and thus reinforced. Such shifts in assessment would advance skills in listening while offering a more holistic notion of what it means to give medical care.

Value of Listening

In this section, I wish to explore the issue of why listening matters. How does it impact the care of the patient? And how does it impact healing that may take place within the relationship between patient and doctor?

Careful Listening Leads to Better Diagnoses

In 2015, the Institute of Medicine published "Improving Diagnosis in Health Care," a report that explores the harms of diagnostic errors on patient outcomes. The committee defines diagnostic error as "the failure to (a) establish an accurate and timely explanation of the patient's health problems (s) or (b) communicate that explanation

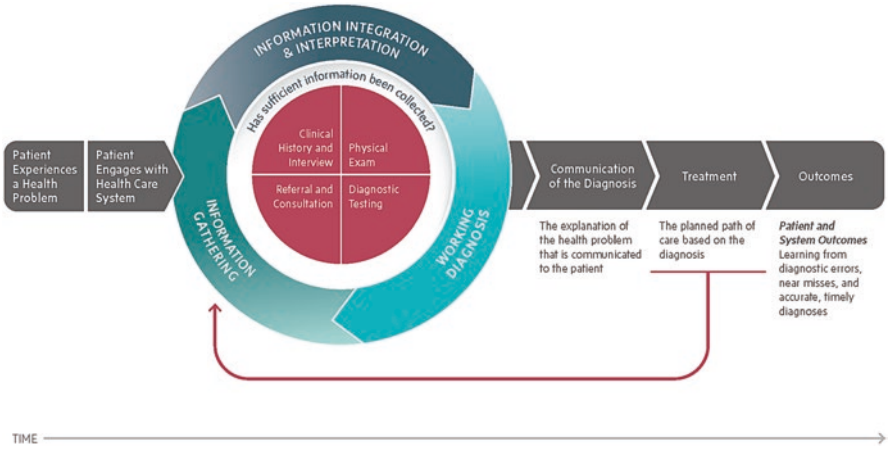

Fig. 7.2 Image from IOM report on diagnostic errors

to the patient." In a diagrammatic model of the diagnostic process produced by the committee, they note that the gathering and interpreting of data alongside the creation of a working diagnosis is driven by a core set of skills that includes history and physical examination. The central feature of the diagram, which looks like a mechanical engine powering the diagnostic process, is the interview and physical examination [9]. These clinical skills, of course, are products of close listening and being present with the patient Fig. 7.2.

Close Listening Allows Patients' Self-Narration

Phenomenologists have argued that our lived experiences are often comprised of unrelated memories, physical sensations, and emotions that are often not organized in any particular narrative. A fundamental human activity is to attend to those unrelated fragments and organize them – to narrate those events. Through narration, or telling the stories of our lives, we confer sequence, order, and form upon those experiences and, through that process, also imbue the narrative, and thereby our lives, with meaning [10].

The fragmentary nature of lived experience may be particularly pronounced in times of trauma or emotional turmoil. For instance, Dori Laub writes about the fragmented and distorted memories of holocaust survivors. Some were unable to tell their stories due to a distressing loss of language, memory, and comprehension required to tell of their traumas. Additionally, postwar social conditions often did not encourage such testimony. Traumatic life experiences were left fractured and unexamined, and the inability to tell of one's experiences did not allow the opportunity to make sense of those experiences [11].

Likewise, illness itself may be conceptualized as a trauma visited upon one's life and upon one's previously envisioned life narrative. In times of illness, bodies are

invaded, changed against one's will, and become sites of pain. Suffering may arise when illness disrupts prior narratives of how life is supposed to be. Persons who are sick experience the trauma of otherness, where the body and the life that is lived become unrecognizable to the self. The sick and the traumatized see that they have in fact become Kafka's roach [12].

Arthur Frank writes, "The voices of the ill are easy to ignore, because these voices are often faltering in tone and mixed in message, particularly in their spoken form before some editor has rendered them fit for reading by the healthy [13]." The structure of the illness narrative is complex, often lacking coherent narrative form. This too may be affected by the sick body that is doing the telling. The neuropsychological state known as delirium, where the sick person has a waxing and waning state of consciousness and depressed levels of cognition, is one example of the effect that illness can have on the telling body. We can see how the work of the listener, who must remain present and available even through convoluted or complex narratives, is particularly challenging.

An attentive and trustworthy listener can help create a space that allows tellers to order the events of their lives. Through telling, the sick and suffering may be able to sequence, to find form, to narrate their experiences. And in doing so, they might be able to find meaning and alleviate their suffering through that process. Ultimately, narrating through the witness allows some restoration of a fractured self to take place.

Because the clinical encounter is a reflexive space, where the listener participates in creating the conditions in which a story is told and the patient creates the conditions for how a story is received, the entire process of telling and receiving a narrative is a co-creation between the patient and physician. The physician's attentiveness, desire to learn about the experience of the other, mood, background, and proclivities, as well as skill in receiving and interpreting the story will affect the manner and content of the telling and the nature of the story itself. The patient does not deliver a static, immutable story; rather a story lives in the moment of the telling, actively shaped in real time through the dynamic engagement between patient and physician.

Many in Laub's work had a deep desire to simply tell of their experience, of wanting to survive just so that they could tell the story of what they knew to be true. This too has a correlate in illness, for those who are sick and have been ravaged by diseases may also have a deep desire to just tell so that there is an acknowledgment of their experience. The acknowledgment is recognition by another that what occurred was true and was experienced by, in Juracic's words, "their very eyes, their very bodies" [14].

Close Listening Allows Bearing Witness

Elaine Scarry in her book, *The Body in Pain*, argues that those who experience severe pain often lack the capacity to describe this quintessentially embodied experience. And that loss for language, argues Scarry, has a social as well as political

cost. The person in pain suffers a social isolation, having no language to bridge his or her experience with others. The person in pain suffers a political injury as well, for the inability to give words to one's lived experience renders ineffective attempts to have a political voice. Though scholars have argued that those in pain have more agency through language than what Scarry describes, Scarry's work represents an important exploration of the isolating effects of illness and, more generally, of suffering [15].

When I taught the Scarry text in a class a few years ago, a graduate student told the class that she, too, had suffered from chronic pain for much of her adult life. She noted that when she visited a pain clinic, it was immediately evident to her whether a clinician was listening to her deeply and authentically or listening superficially and mechanically. When she visited pain specialists, she said that she did not go with the hope of being cured with new, breakthrough therapies. She was seeking the management of a condition that one needed to learn to live with. However, the student went on to tell us, if she went to an appointment and the clinicians she encountered acknowledged and listened to her authentically, the experience of her pain, including her sense of alienation, was diminished. The converse was also true. She told us that if care providers elicited a history in a perfunctory manner and did not seem present, it deepened her isolation. Her suffering worsened. The authenticity of the physician's listening had impact, leading to the possibility of either alleviating or deepening suffering.

Even in situations where there appears to no remaining options for therapeutic intervention, there are things that can be done. And that thing that often needs most doing is the authentic witnessing of another's situation. This is particularly important to convey to students in training who might feel that they lack agency, being unable to prescribe or operate. Regardless of stage of training, bearing witness to the patient's experience provides an avenue for healing.

In a qualitative study with patients on their perceptions of the value of listening, three themes were identified. Patients noted the value in data collection, the importance of listening as a healing modality, and the role of listening in strengthening the patient-doctor relationship [16]. These values of listening align remarkably well with what educators might teach in medical school courses. The study itself is testament to the importance of eliciting patients' perspectives on their own health, illness, and care.

Creating Practices of Listening

Arthur Frank argues that listening is not only a physician's duty but also one of our most difficult duties [13]. In a discussion of modern health care, we often underestimate the skill and effort required for deep listening. I wish to now explore how can we bring about the capacity for deep listening and create the conditions where this might be possible.

Attention Is at the Heart of Listening

Perhaps the most fundamental resource needed for careful listening is attention. Effective listening begins with the ability to direct one's attention to a given task. Secondly, the physician must be able to direct attention to the thing that is needed despite the other competing demands on that finite attention. If attention can be harnessed and applied to careful listening during the interview, the clinician can be fully receptive to the patient's story. An understanding of the patient's story requires gathering the information needed for clinical diagnosis and management. Additionally, the physician gathers information to appreciate the effect of the illness on the patient. A nuanced understanding of the patient experience requires openness to the narrative and to the emotional features of the patient's situation. When the physician brings about deep presence and authentically listens for the patient narrative, the patient may feel heard and acknowledged; meanwhile, the listener is also nourished and left feeling connected and moved by the experience. For many, this moment may be described as a moment of healing.

Lessons from the Mindfulness Tradition

Jon Kabat-Zinn writes in *Wherever You Go, There You Are*:

> Mindfulness means paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally. This kind of attention nurtures greater awareness, clarity, and acceptance of present-moment reality [17].

The capacity to be present and to direct one's attention so that deep listening might occur has been explored in the practice of mindfulness, which draws from many religious and secular traditions from around the world. Mindfulness practices bring the practitioner back to his or her body and present moment. Practices include activities such as breathing meditation, mindful walking, mindful eating, and mindful movement. These practices may be extended to mindful clinical work as well. The practice of grounding asks practitioners to sequentially pay attention to one's senses: feel the ground beneath your feet right now, identify and focus on something that you can hear, and visually focus on one object in your environment. These practices seek to gently guide the practitioner away from distracting thoughts about the past or future and back to their bodies and present moment.

These varied activities and habits have great applicability to the practice of medicine. As evident in the passage by Zinn, there is a purposeful strengthening and direction of attention that is at the core of mindfulness. These are the same capacities that one must have in careful listening. The nonjudgmental presence that Zinn describes is in harmony with what is needed for the careful delivery of patient care.

Kabat-Zin goes on to write:

> Concentration is the cornerstone of mindfulness practice. Your mindfulness will only be as robust as the capacity of your mind to be calm and stable. Without calmness, the mirror of mindfulness will have an agitated and choppy surface, and will not be able to reflect things with any accuracy [17].

Research shows that efforts to train health care providers in mindful communication practices improved attitudes associated with patient-centered care, burnout, and other metrics of physician well-being [18]. Thus, mindfulness not only facilitates skillful listening for clinical care but also improves the experience for physicians. This powerfully highlights the relational nature of the clinical encounter. What occurs in the clinical space for patients occurs in relation to what is occurring for the care providers. As argued earlier in this chapter, patients co-construct their illness narratives with an attentive clinical listener. We might consider the possibility that patients receive the best clinical care when physicians are also caring for themselves.

Narrative Medicine as a Path to Narrative Competence

Narrative medicine is an interdisciplinary field that is influenced by several academic traditions, including philosophy, literary criticism, and narrative studies. Though at times academic discourse can feel abstract, the objectives of the interdisciplinary field of narrative medicine are very practical. Narrative medicine was developed as a way to develop narrative competence in clinicians. Narrative competence can be thought of as the capacity to skillfully receive and interpret stories of illness. If this takes place, the patient may feel that their situation is recognized by another and feel that their suffering is lessened. Likewise, if deep listening occurs, the listener, appreciating the moral dimensions of the story, may be moved to take action in the service of the patient [19].

The methodologies of narrative medicine typically involve work done in groups and include close reading of “texts” (e.g., poems, short stories, films, and/or paintings), discussing texts with colleagues, writing reflectively in the shadow of those texts, and sharing one’s writing with colleagues. By engaging in conversations about texts with a skilled facilitator, be they short stories, poetry, or illness narratives, participants begin to develop sensibilities for how stories work and how stories work on them. Formal dimensions of the work that are appropriate to the medium (e.g., mood, metaphor, and point of view for a written text) are explored. Meanwhile, the group may discuss the narratives of the characters of the text and may reflect on their own lives. Furthermore, the participant in narrative medicine work is looking closely and directing his or her attention at the text. Though the methods are different, like mindfulness practices, narrative medicine seeks to develop the capacity for attention in its practitioners.

Narrative medicine employs reflective writing as one of its core methods. The reflective writing typically follows the discussion of a text. The reflective writing may be related to ideas raised in the text, but the subject matter is the writer's own life. The sessions offer a great amount of freedom to the writer, who may choose to write about a patient's illness, an act of collaboration with a colleague, or about one's own experience. These writings then are shared with others in the group, and the group responds to what has been read in a way similar to how one might respond to a text that was read by the group. What form did the text take? What was said? What was not said? What was the mood? What can we know about the writer through the text? Through this process of writing and sharing, the writers may discover things about themselves and their own lives, while colleagues learn things about one another that they did not know previously. The process requires close attention to the text and a close listening to the writings that are shared verbally with the group.

The dividends of narrative medicine work include the capacity to devote attention to something or someone, awareness for language, and knowledge of how stories work, and the application of close and purposeful listening to others. There are clinical implications to these activities, for the capacities that are developed in this work can be employed at the bedside with patients to allow deep listening, nuanced appreciation of stories, and witnessing another's experience. For the patient, the application of these capacities may bring about a sense of being seen and the possibility of alleviating suffering [20]. Our team at Columbia University's Program in Narrative Medicine has articulated the theoretical foundations of the work of narrative medicine, and the literature on the outcomes of narrative medicine work is growing. We are currently engaged in the implementation and evaluation of narrative medicine programs in primary care clinics in New York City.

Listening with One's Whole Body

The phenomenologist philosopher Maurice Merleau-Ponty wrote, "The flesh is at the heart of the world" [21]. Mindfulness training, in what may be seen as a practical application of this philosophical view, reinforces the notion that one's presence in the world is achieved with the whole body. Similarly, I find it useful to expand the notion of deep listening from being an aural phenomenon to something that is achieved with the whole body. Listening to another's account of illness is accomplished through one's presence, engaging all of one's body and senses, and not merely through a pair of ears. At the medical school at Columbia University, I direct a course called Foundations of Clinical Medicine Tutorials, where students learn to interview and examine patients. In the course, for the first time, the first year student places her hands on patient's abdomen to feel the liver's edge, and for the first time, the student hears a patient's heart sounds through a stethoscope. Students are enlivened by the experience. For the first time, many students sense what it feels like to be a doctor.

The word "feel" is revealing. The word "feel" connotes something emotional because the young clinician is moved emotionally by the moment. The word "feel" also conveys that something physical is taking place. With their hands, students literally *feel* the patients they are caring for. The clinical enterprise, which was once relegated to textbooks, enters the physical world, enacted by and between physical selves. For the students, medicine goes from being something theoretical to something concrete – an act occurring between persons in a point in time and space that will never occur again in that same way.

To touch the patient's body for the first time is a rite of passage for the young doctor. But the feeling of aliveness achieved is not just because these are new experiences for the early learner. Rather, I contend that there is a fundamental awakening to the moment that occurs when we inhabit our bodies and senses to make authentic contact with another. This is true for the early learner as well as for the seasoned practitioner.

We can thus recast careful listening as an expanded attentiveness to spoken language as well as to unspoken communication through touch and through all of the senses of the body. The messages exchanged through such embodied listening may be at times less explicit but can carry deep, subtle meanings.

Creating Spaces that Nurture Listening

Gaston Bachelard in *The Poetics of Space* writes about our relationship with the spaces we inhabit and how the features of those structures affect our deepest selves, influencing how we interact, who we become, and what is possible for us. He writes, "The house shelters day-dreaming, the house protects the dreamer, the house allows one to dream in peace" [22]. By describing a house as a shelter, Bachelard casts the house as a place of safety and peace, where we escape dangers and find solace. Our hospitals and clinics are the houses of our clinical work. Our clinical spaces, where the sick seek alleviation of suffering, must be conceptualized as shelters, like calm waters during a storm. Only in such a sanctuary can people, patients and physicians alike, be vulnerable and open to deep telling and listening. Bachelard states that shelters allow dreamers to dream. Thus we can consider that such safety in a clinical space might allow for a healing of suffering so that our most creative and generative selves might flourish.

And yet we know that our hospitals are massive, complex and serpentine. Materials used to build environments are often cold and unwelcoming. Colors on walls may be bland and nondescript or garish. Aural environments in clinical settings have become increasingly toxic, from unanswered phones in nurses stations to beeping IV poles having exhausted their drips to unattended beepers left on counters. Many hospital rooms and bays in emergency departments lack chairs so that physicians are left standing and looming over patients. Such environments can hardly be described as shelters. Communication must be conducted over interrupting activities and sounds, while patients and physicians are arranged in physical

relationships with one another that fail to create the conditions needed for deep listening and authentic telling.

We get it right sometimes. A few years ago, we remodeled the clinic rooms in our community-based general medicine clinic at Columbia University Medical Center. In the redesigned clinic room, the desk separating the physician and patient is thinner than before, collapsing the space between the patient and physician. The monitor is placed on one end of this table, so that if turned slightly perpendicular to the physician, both parties can look at it at once. The desk is not too wide, and the edges rounded, so that it is easy and natural to roll one's chair around the side of the desk, allowing a physician to talk with the patient directly, unimpeded by table or computer. This represents thoughtful design that begins with valuing the relationship between doctor and patient.

There is a growing literature on how architectural spaces impact our health. Health is improved in clinical spaces that have views of nature, that allow sunlight, and that are quieter. Our spaces also affect how well physicians and health care teams can employ our attention or how much we are distracted. Our spaces impact how we physically facilitate communication and relationships with our patients [23]. And they impact how well we are able to listen and how openly and trustingly the patient is able to speak. This knowledge of how our architectural spaces impact our relationships with patients should encourage us to consciously design those environments with these considerations in mind. And equally as important, this understanding can help us more purposefully engage with the environments that we currently inhabit. Do we pull the curtain in the Emergency Room bay? Do we ask to turn down the volume on the patient's television? Do we search for a chair to pull up to the hospitalized patient so that we might communicate with the patient on an equal level instead of standing over them? Should we arrange a meeting with the unit supervisor so we can understand the causes of and help find solutions to the problem of unanswered phones in nursing stations? Can we arrange a system of communication with staff during clinic sessions that minimizes interruptions to patient engagement?

Desire to Know the Patient's Story

Even if the methods of mindfulness and embodied listening are employed, the patient's narrative will not be fully elicited without the clinician's desire. The clinician must have a desire to know more about the patient's experience and a desire to want to alleviate suffering. Like the artist who has an insatiable curiosity to explore a given topic and to "get it right" in the artistic representation, the effective clinician needs a burning desire to understand the patient and to effectively represent his or her story to others caring for the patient. Without this desire to want to understand and witness the patient's experience, clinical listening may achieve heights of technical skill while lacking heart.

In the words of Henri Matisse, "There is nothing more difficult for a truly creative painter than to paint a rose. Because before he can do so, he has to forget all the roses that were ever painted" [24]. Matisse's quotation is a powerful reminder of the singularity of the moment. Deep listening occurs when the clinician recognizes that each moment occurs once in time. Thus, even if the clinician sees Ms. Ahmed ten times this year, each visit can be approached anew, with the clinician open to the challenges and possibilities unique to that visit. Similarly, even if ten patients with hypertension are seen in a given day, each patient can be understood as unique and different from all the others seen that day. Such awareness of the singularity of experience allows the physician to honor each visit with the attention it deserves.

Conclusion: Listening as a Relational Act

Close listening not only confers value to patients; clinicians, too, are impacted by the experience. If clinicians are able to arrive at a state of presence and mindfulness with the patient, the experience of clinical care can be pleasurable and even transformational.

Mihaly Csikszentmihalyi has studied states of optimal experience that he calls "flow". Others may call it "being in the moment" or "being in the zone." A person in a state of flow is focused on and is excelling in the performance of a particular activity. And while in a state of flow, an activity may be experienced as deeply enjoyable even though it might be challenging.

> Contrary to what we usually believe, moments like these, the best moments in our lives, are not the passive, receptive, relaxing times—although such experiences can also be enjoyable, if we have worked hard to attain them. The best moments usually occur when a person's body or mind is stretched to its limits in a voluntary effort to accomplish something difficult and worthwhile. Optimal experience is thus something that we make happen. For a child, it could be placing with trembling fingers the last block on a tower she has built, higher than any she has built so far; for a swimmer, it could be trying to beat his own record; for a violinist, mastering an intricate musical passage. For each person there are thousands of opportunities, challenges to expand ourselves [25].

We can imagine that for the clinician, one such opportunity to expand oneself might be to focus one's attention and listen carefully to a patient's story. Furthermore, when listening is challenging and requires overcoming barriers, we might derive an even richer sense of satisfaction knowing that something difficult has been accomplished.

People who become clinicians are driven by a desire to help others, to solve problems, and to provide comfort to the suffering. One needs only read entrance essays to medical schools to glimpse the foundational role that service has in the choice to become a physician. Values of service and contribution run deep in the traditions of health care and in the long lineage of healers that is seen across human societies. If these ideals are not realized in the daily work of health care, a loss is experienced. Sometimes these losses can be small, and almost imperceptible, and can be attributed to unavoidable realities of modern health care. But they add up.

Richard Gunderman writes that "Professional burnout is the sum total of hundred and thousands of tiny betrayals of purpose, each one so minute that it hardly attracts notice" [26].

Rates of burnout for health care workers and even trainees are rising [27, 28]. A paucity of connection with patients and healing moments in clinical work may be one reason for professional burnout and patients' dissatisfaction with clinical care. When authentic listening and witnessing of the patient's experience occurs, both the patient and physician are impacted. A moment of healing is an experience that occurs *between* patient and clinician, and it is a transformative moment for both. The patient's alienation and suffering abates, while the clinician experiences a connection with the patient. And these are the very moments, transcendent as they are, that nurture the physician's desire for service and bolster a sense of purpose so desperately needed in health care today.

The emotional core of the Norman Rockwell painting of the country doctor is the intimate space created by the communication between the doctor, patient, and family. Such a relationship is founded on a sincere concern for the patient and is facilitated by skilled, close listening. In the painting, that relationship is supported by technology but not defined by it. When we reflect on the modern clinical environment, however, this narrative is not yet finished. Whether our patients' stories are honored is up to us. Whether our environments are optimized for listening and connection is up to us. Whether we design our clinical practices for professional fulfillment for clinicians is up to us. One thing is certain though: like the family in the Rockwell painting, our patients are also vulnerable in the face of the illness and are hoping that they will enter clinical spaces that feel like shelters, and where they might be patiently and authentically seen and listened to.

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Chapter 8
When It Comes to the Physician-Patient-Computer Relationship, the "Eyes" Have It

Richard M. Frankel

Introduction

In his book, *From Memory to Written Record: England From 1066–1307*, the medieval historian Michael Clanchy describes the development and spread of record making and how written documents were produced and preserved for the next 250 years [1]. It is a fascinating study of the introduction of handwriting and record keeping into English culture and its steady growth as a form of literacy. Following a similar thread, the cognitive behavioral psychologist, David Olson, argues in a paper entitled "From Utterance to Text: The Bias of Language in Speech and Writing" [2] that with the rise of written records comes a shift in canons of evidence and trustworthiness from utterances, the spoken word, which derive meaning contextually, to text, the written word, which has meaning independent of context. The consequences of this shift can be seen in many areas of contemporary society and especially in the ways that the written word is enshrined in the "learned" professions, the law, education, and medicine [1].

In medicine, written records play a key role in documenting the quality, completeness, and ultimately the cost of care that is delivered to patients. While scholars have pointed to the shift from the spoken to the written word as an emerging sign of literacy, and the rise of the professions, these developments have been viewed as parallel intellectual achievements over hundreds of years. What is unique about the medical encounter, and other service interactions, is that they often involve the *intersection* of speaking and writing in real time and thus represent a complex problem of engaging in a meaningful social relationship and documenting it at the same time. From this perspective, there is an inevitable tension between the human

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dimension of caring for and about patients and the task(s) of written documentation, interacting with the so-called I-patient [3]. As it is played out in today's medical visits, the tension comes down to a competition for attention between the physician, the patient, and the exam room computer. When it works well, it creates the conditions for "engaged doctoring," and visits are satisfying on both ends of the stethoscope. When it doesn't work well, it creates the conditions for "distracted doctoring" which can become a source of distress in the relationship.

A Brief History of Medical Record Keeping

In the late nineteenth and early twentieth century, medical records were quite simply "notes to self" and neither held much interest or authority beyond the individual practitioner and the individual patient. In 1902, Richard Cabot, a Boston physician, published a book entitled *Exercises in Differential Diagnosis* [4]. In it, Cabot included copies of his handwritten patient records which he used to demonstrate how individual records could be used to draw generalized conclusions, an early form of population-based medicine. A copy of one of Cabot's written records appears below in Fig. 8.1.

Cabot's genius was to systematize the data he collected on his patients and look for recognizable patterns of signs and symptoms which he was able to fashion into a table listing the most to least probable causes of the patient's condition, what we today call differential diagnosis. What is striking about Cabot's records is the fact that they literally elevated the medical record from informal "notes to self" to a tool that could be generalized for himself and others in medical practice.

More than a half century would pass before medical record keeping would undergo its next major transformation. In 1968 Lawrence (Larry) Weed published a paper in the New England Journal of Medicine in which he described the problem-oriented medical record (POMR) and the SOAP note (Subjective, Objective, Assessment, and Plan), both primarily envisaged as teaching and evaluation tools for trainees. A singular benefit of having a standardized method for assessing physicians' thought processes and actions was the potential for third parties (teachers, peers, and later insurance companies) to use the record of care to judge its accuracy, completeness, and quality. Medical records had gone from the province of the individual physician's "notes to self" to the status of a legal document on which multiple external metrics could be applied by multiple stakeholders including: peers, insurers, regulators, researchers, and the federal government.

The next important shift in record keeping came on the heels of the "digital revolution." Where records had been handwritten and were physically stored and used in a single location, computers allowed them to be shared instantaneously and without the traditional limitations of paper. In 1972, the Regenstrief Institute in Indianapolis introduced the first electronic record system that allowed all the hospitals in that city to operate on the same software platform. A treating physician at hospital A's emergency room could access records from hospital B, C, or D and base treatment, in part, on the results. The technological advantages of such a system, aside from its

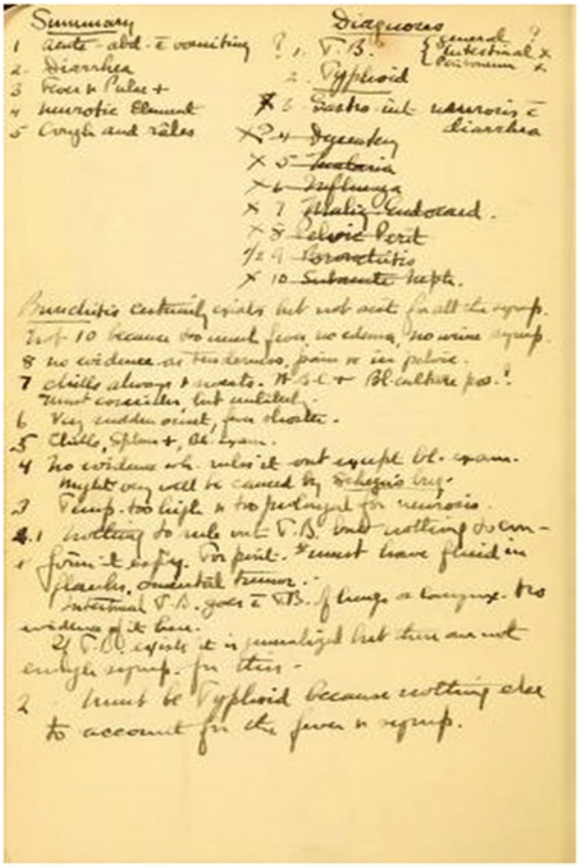
Summary
1 acute abd. c vomiting
2. Diarrhea
3 Fever & Pulse +
4 neurotic Element
5 Cough and râles
Diagnosis
1. T.B.
2. Typhoid
4 Dysentery
5 Malaria
6 Influenza
7 Malig. Endocard.
8 Pelvic Perit
9 Bronchitis
10 Subacute Sept.
2 must be Typhoid because nothing else to account for the fever & symp.

Fig. 8.1 An unnumbered page from *Exercises in Differential Diagnosis* [4]

expense, were immediately obvious in terms of the timeliness and quality of care. Another advantage, which no doubt would have pleased Dr. Cabot, was that the type and amount of data EHR systems could generate was enormous. It was possible, for example, to study all patients in a large metropolitan area who presented in an emergency department with chest pain. Epidemiologists, health services researchers, and other stakeholders could ask questions about what was true for entire populations, not just a sole physician or hospital's panel of patients. Figure 8.2 depicts a generic electronic medical record which contains a wealth of information that is of use to multiple stakeholders.

By the early 1990s, the Institute of Medicine recommended that by year 2000 all physicians should be using computers in their practice [5]. By January of 2015, 83% of office-based physicians in the United States had adopted an electronic health records (EHR) (http://dashboard.healthit.gov/quickstats/pages/physician-ehr-adoption-trends.php). Statistics on the use of computer-enabled EHRs in physicians' exam rooms are more difficult to come by, but the number is significant. Of interest, there are no national standards for where a computer and monitor should be placed for optimal patient-centered care nor is there much guidance in the

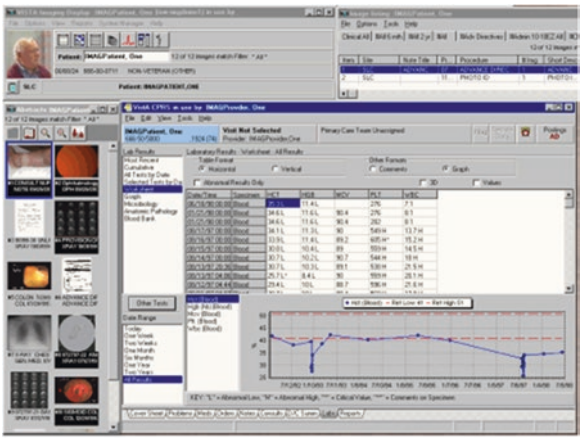

Fig. 8.2 Contemporary electronic medical record

complexities introduced into the physician-patient relationship by having an EHR as a "third presence" in the exam room.

High Tech Versus High Touch in the Exam Room

> *One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient* [6]. Francis Peabody

A 2012 editorial in the Journal of the American Medical Association features a drawing sent by a 7-year-old patient to her pediatrician after her visit. In it, the patient is seated on the examining table; to her right is a nurse who is looking at her, and next to the nurse is the mother, also facing the patient and holding an infant in her arms. The doctor is seated to the left, his back to the patient, entering data into the EHR on his computer [7]. The point of the editorial is to draw attention to the fact that high-touch humanistic practice, while still a cornerstone of the physician-patient relationship, is threatened when technology is an active ingredient and source of attention in the exam room.

We arrive now at a crossroads because it is clear that there are competing priorities and goals of care in the modern medical visit. On the one hand, there is mounting evidence that patient-centered care, defined by the Institute of Medicine as one of six domains of quality and positive outcomes, should be the singular focus of the medical encounter [8]. On the other hand, real-time documentation of the visit necessarily alters work flow and attention in the delivery of care. We are back, in an interesting and challenging way, to the problem of the intersection of speaking and writing as it occurs moment to moment in the medical visit. Put another way, the problem of exam room computing is one of resolving the tension between instrumental activities (documentation) and interpersonal relationships (cocreating a history and biography together).

You and Me and the Computer Make Three

In dyadic conversation brief episodes of eye gaze are used by humans, and some other mammals, to engage in and regulate attention. For example, mutual eye gaze has been shown to relate to power, (less powerful people tend to look at more powerful people than the reverse), affiliation and liking (mutual eye gaze especially across gender in adults may be understood to communicate attraction, mutual affection, and interest), and successful task performance [9–11]. For tasks that require coordinated action such as flying a jet aircraft, directing traffic, or conducting a medical interview desired outcomes are best accomplished by creating or engineering what human factors engineers refer to as "joint focus of attention" [12].

Aviation is a good case in point. Although the cockpit of a jet looks quite complex, it is only half as complex as it looks. This is because the instruments on the left-hand side of the cockpit are exactly the same as the right-hand side. Joint focus of attention is engineered into the cockpit and achieved by providing the pilot and first officer with redundant information "at a glance," assuming, of course, that the one of the pilots is looking at his or her instruments as the fly [12] Fig. 8.3.

In a NASA-funded study of cockpit crew communication that was designed, in part, to look at the effects of distraction on coordinated action,16 three-man crews went through a 2.5 h simulated flight in a full motion simulator [13]. At a specific point in the simulation, a warning light illuminated, indicating that the landing gear had potentially failed to open correctly. Aviation protocol requires that a crew member, typically the flight engineer, visually inspect the landing gear to determine if it is a true malfunction of the landing gear or a failure of the warning system. Upon returning from his visual inspection, the flight engineer states, "It's bullshit. The nose gear is down. It's the indicator light." As he utters the expletive, both the pilot and first officer turn around to see what the flight engineer is talking about and are distracted from actually flying the aircraft since, at this point, neither of them is looking at their instrument panel or out the cockpit window. In reviewing a videotape of the simulation, both the pilot and first officer independently stopped the tape

Fig. 8.3 Photo of a Boeing 777 Cockpit

at exactly the same point and commented on the effect(s) of being distracted from their primary task, flying the airplane. Their comments appear below:

Captain	That's something I really don't like to see. Everybody was distracted and looking backwards there. And I think it should be pounded into a guy's head you know, if he's flying, he should be flying period… You know, when everybody turned around and looked back even if it's just for a little while something [bad] could happen.
First officer	You see me looking around there? I shouldn't be doing that. I got distracted for a minute. I'm flying the airplane and there's been a lot of people killed in aviation accidents just for crap like that. I've got two very competent people handling the problem, and I shouldn't be looking around like that. Once in a while you do it. Human error.

Like the cockpit, in which coordinated action requires joint focus of attention, computer-enabled exam rooms create the potential for distraction from the primary task of the medical visit, caring directly for patients' needs. Communication researchers have long pointed to the fact that interviewing older adults when there is a third party in the exam room (e.g., an adult child or caregiver) frequently shifts verbal and visual attention from the patient to the third party who may be more able and succinct to provide information [14]. While this may be more efficient, it also runs the risk of leaving the patient feeling uncared for and dissatisfied, both of which are associated with the patient's experience of care, and in extreme cases becomes a cause for bringing a suit for medical malpractices in the event of an adverse outcome [15].

So it is that time spent typing on the computer shifts attention away from interacting with the patient to a task with a separate and competing focus. From a patient-centered perspective, exam room computing is a potentially significant (see Fig. 8.4) source of distraction from direct patient care. One key question in this domain is to what extent does time spent looking at the computer screen (defined here as one form of distraction) vary from visit to visit and from physician to physician. A second question is, what are the effect (s) of distracted doctoring on patients' experience of the visit?

Fig. 8.4 Exam room computer as a competing focus of attention

Distracted Doctoring

Our research team recently conducted a video-based study of primary care physicians' exam room computer use in three regions of the country (East Coast, South and Midwest). While we did not find any regional differences in attention patterns, we did find significant individual variation in the amount of time physicians spent looking at the computer screen (distracted) versus looking at the patient (engaged) as a measure of distracted doctoring. Figure 8.5 is a visualization of one study physician's pattern of eye contact with a patient returning to the clinic for a follow-up visit. The X-axis represents the frequency with which the physician looked at the patient (*green bars*) versus the computer (*blue bars*), while the Y-axis represents the duration of each episode of looking at the patient or the computer screen.

As can be seen from the eye gaze tracking in Fig. 8.5, Physician 1's time (more than 70%) was spent looking at the patient, while looking away and interacting with the computer occurred in short bursts of 10–15 s. By contrast, the gaze pattern of Physician 2 (Fig. 8.6) is almost the reverse of Physician 1. Here we can see that Physician 2, who was seeing a chronically ill return patient similar to Physician 1,

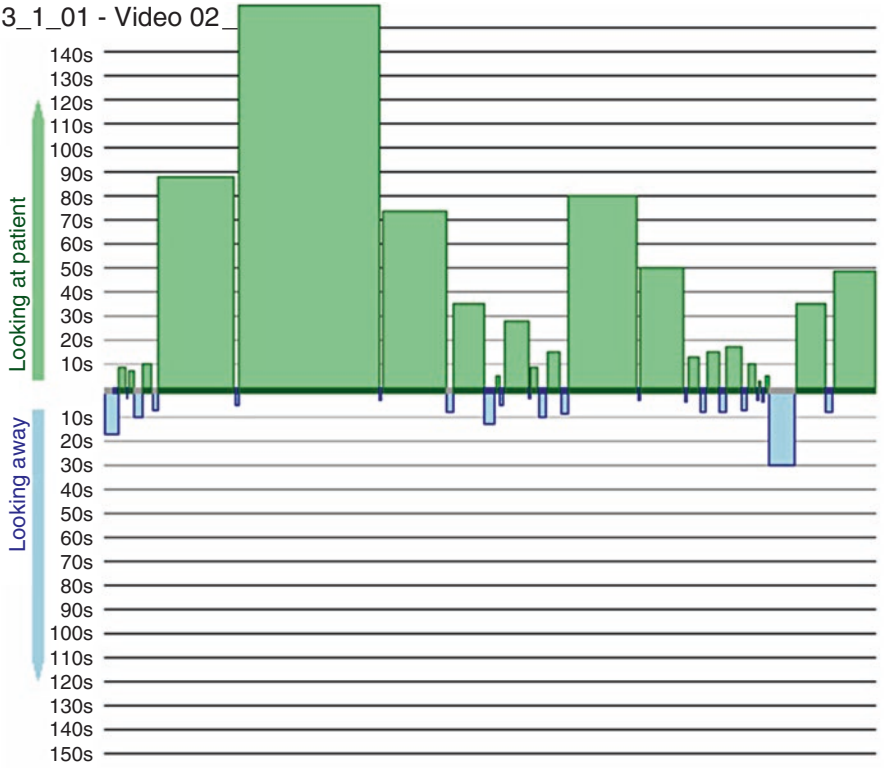

Fig. 8.5 Physician 1: high engagement low distraction

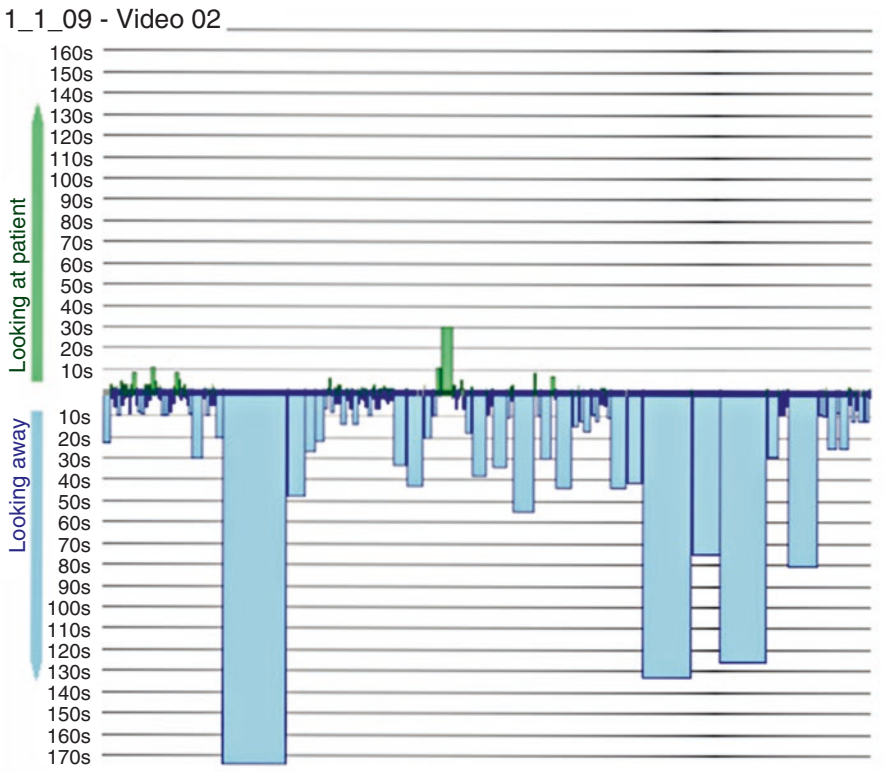

Fig. 8.6 Physician 2: high distraction, low engagement

spent the majority of his time looking away from the patient and interacting with the computer screen for periods of up to 3 min at a time. Relatively few episodes of looking away lasted less than 10–15 s. From these data we can conclude that physician 2 was highly distracted from interacting directly with the patient given the fact that almost two-thirds of the visit time were taken up in interactions with the computer screen.

In terms of variation within physician, our team found a pattern in which physicians were consistently more patient focused, (engaged), or more computer focused, (distracted), although the differences were not as extreme as that between Physician 1 and Physician 2. At the same time, the striking contrast between Physician 1 and Physician 2 is worth commenting on for a number of reasons. First, distracted doctoring affects patients' *experience* of care. Using a validated coding scheme for measuring patient centeredness [16] as a proxy for patient experience, Physician 1 scored significantly higher than Physician 2. This generally held true for more engaged physicians when compared with those who were distracted. Second, a recent study of exam room computing in safety net hospitals revealed that physicians who spent more time interacting with the computer had patients

who had poorer *outcomes* of care than more directly engaged physicians [17]. Third, distracted doctoring is a barrier to patient-centered *relationships,* which have been identified *as* critical to quality and safety [8].

From the available literature and research on exam room computing, it seems clear that patient-centered communication and the pressure to document in real time are fundamentally different types of activities, both of which require visual attention. In cases where the computer screen is turned away from the patient, physician documentation activities are likely to be experienced by patients as a distraction from the primary goal of the visit. Where joint focus of attention can shift from the computer screen to facing and interacting with one another, speaking and typing can be framed in partnership terms as necessary tasks to be accomplished and managed. I offer some recommendations for best exam room computing practices below.

Recommendations

Exam room computing is here to stay, and its use in the exam room is likely to increase in the foreseeable future. While the computer represents a source of distraction for some physicians, it is also possible to incorporate patients into the interaction with the computer in a way that is inclusive and sets up the computer screen and EHR as a joint focus of attention. Figure 8.7 illustrates a configuration that incorporates the patient as a partner in a three-way interaction. As might be true if there was a third person in the room, the computer is positioned in a way that allows it to become a site for joint attention and joint activity (e.g., discussing blood pressure readings), the physician's attention alone (typing out and ordering a prescription), or to be a silent partner (present, by not utilized).

Fig. 8.7 Inclusive use of the computer

There is growing consensus about best communication practices for using computers in the exam room [18]. Below, I summarize some of these practices in the form of a mnemonic, POISED, published recently in the literature [19].

Prepare In the era of paper records, it was typical for the physician to spend a minute or two reviewing the chart *before* entering the exam room. This is akin to the preflight checklist that pilots go through to prepare for takeoff and the rest of their flight. In the era of the electronic health record, reviewing patients' records prior to entering the room requires having a computer available and the time to review the record. When this step is overlooked, several precious minutes in the room may be spent silently reviewing the chart. In aviation, this would amount to having taken off and then remembering to do a preflight check! This is both inefficient and can sometimes put additional stress on the relationship. Preparation for the visit is key to reducing distracted doctoring and improving patient experience and trust.

Orient Much of what is done in clinical practice is the product of years of training such that the process becomes routine and taken for granted. Being explicit about what you are doing either before or during an activity is a form of partnership that allows the other to locate themselves on the map of care processes. This applies to computer use as well. Introducing the computer and stating how you intend to use it goes a long way to creating a welcoming partner-like atmosphere that patients generally appreciate. Spending the first 1–2 min of the visit engaged in dialog without using the computer at all is another practice that establishes the preminence of the patient as the focus of the encounter.

Information gathering Recent scholarship suggests that there are parts of the encounter that are naturally physician-centered, for example, in doing a review of systems [20]. Computer use during these portions of the encounter is likely to be focused on the physician and the computer exclusively. Using an orientation statement that provides a rationale for these portions of the visit, e.g., "I'm going to be asking you a lot of brief questions and taking some notes," alerts the patient to your intention and reduces the likelihood that patients will feel ignored and experience you as being distracted by typing into the computer.

Share The computer is a wonderful source of information and is a useful audiovisual aid. Where possible, (see Fig. 8.7)

	turning the screen so patients can see what you are typing has the double benefit of partnership and also a way to check that what is being typed is accurate. An equilateral triangle between the patient, physician, and computer is ideal, but not always possible. Where the computer forces the physician to have her or his back to the patient rearranging the furniture, where possible, and explaining the challenges of typing, talking, and listening in such a suboptimal situation can help.
Educate	The computer screen is also useful as a teaching tool and allows the physician to track symptoms and other health-related aspect of care over time. For example, it is possible to visualize weight gain or loss, blood pressure, blood sugar, and a host of other factors with the click of a mouse. Some people learn best when they have an accompanying picture or diagram in front of them, and the EHR is one convenient way to provide visual reinforcement to what is being said.
Debrief	In a routine primary care visit, patients retain about 50% of the information they are given by their physician [21]. Although research has not been done to determine the effect (s) of engagement and distraction on retention of information, the finding of poorer outcomes for patients whose physicians who spend more time on the computer overall suggests that distracted doctoring may well be a barrier to information retention by patients. Using a teach-back or talk-back reinforced with joint focus of attention on the computer screen is one strategy for optimizing patient retention of medical information [22].

Conclusion

In 1816, the French physician Rene Lannec was asked to see a female patient who was having difficulty breathing. Prior to Lannec, physicians listened to breath and heart sounds by placing an ear directly on the patient's chest. Lannec, a devout Catholic, was uncomfortable with the idea of listening to the patient's lungs through direct skin to skin contact. Instead of placing his ear directly on the patient's chest, he rolled up a piece of paper into a tube and listened. In that moment, the stethoscope was born, and, importantly, a piece of communication technology was interposed between the patient and the physician, to great effect, one might add.

Today, the task of talking, listening, and documenting elements of the medical encounter is challenging physicians to maintain their focus on relating to patients in a caring, humane, and meaningful way at the same time that they are making accu-

rate and complete notes about what they are doing. It is little wonder that exam room computing has become the number one concern of physicians attempting to serve and document their patients' needs simultaneously. There are, as yet, no national standards for patient-centered exam room computing placement and activities which, in my view, accounts, at least in part, for the large variations we see in computer-related behavior. At the same time, burnout and physician resilience are frequent topics for discussion. One hypothesis that would be of interest to pursue is that burnout and resilience are directly related to patterns of distracted and engaged exam room computing. It is not too much of a stretch to imagine that chronic anxiety over timely documentation, especially if it is during the encounter, is a source of burnout and loss of resilience. While satisfying and effective doctor-patient relationships are worthy aspirations, today's complex heatlhcare environment, (including mounting pressure to document at the point of care, in the exam room), may be fundamentally restructuring the basis on which care is conceived and delivered. Increasing reliance on technology to make care more efficient comes at a price, however. In this case, it may be our very human need for connection as a source of relief from suffering on both sides of the stethoscope.

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Chapter 9
The Impact of EMRs on Communication Within the Doctor-Patient Relationship

Wei Wei Lee and Maria Lolita Alkureishi

Introduction

Electronic medical record (EMR) use in clinical care is now the norm [1]. Worldwide, EMR adoption is near universal in many developed countries with primary care doctors reporting EMR utilization rates of over 97% in the United Kingdom, Norway, and the Netherlands [2]. In the United States, adoption rates have not yet reached this level; however, federal incentives and mandates like the Affordable Care Act (ACA) have resulted in significantly increased EMR utilization, with office-based EMR adoption nearly doubling from 42% to 83% between 2008 and 2014 [3]. As physicians increasingly integrate EMRs into clinical practice, it is important to understand the impact on patient–doctor communication and develop strategies to maintain patient-centered interactions in the digital age.

Physicians practicing medicine today need to maintain meaningful interactions with patients while managing the demands of the EMR. Concerns have been raised about the potential of the EMR to distract providers from focusing on patients, which may in turn have a negative impact on the patient–doctor relationship [4–6]. However, EMR use also has the potential to improve patient-centered care by facilitating communication and enhancing understanding and shared decision making [7–10]. It is critical therefore to minimize negative aspects of EMR use and seek ways to use it as a positive patient education and engagement tool.

Insight into this field comes from research examining the impact of EMR use from both patient and physician perspectives. Combining these findings with obser-

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vational studies measuring objective changes in physicians' communication behaviors provides the foundation for understanding best practices to promote patient-centered EMR integration. Translating principles of patient-centered communication from the traditional patient–doctor interaction into the new triad of patient–doctor–computer interaction is essential to preserving the benefits of patient-centered care in the computerized setting. Moreover, using evidence-based best practices to develop and implement patient-centered EMR use curricula helps promote an EMR culture that enhances meaningful patient–doctor communication.

This chapter describes the impact of EMR use on clinical care and patient–doctor communication. We will explore research that examines physician behaviors thought to both impede and enhance patient-centered communication, elucidate patient perspectives on physician EMR utilization, and identify best practices for patient-centered EMR use. Lastly, we will introduce curricular strategies to teach patient-centered EMR use to students, resident trainees and faculty to promote and reinforce optimal patient–doctor–computer engagement across the continuum.

Impact of EMR Use on Patient-Centered Care

The Institute of Medicine (IOM) defines patient-centered care as "care that is respectful of and responsive to individual patient preferences, needs, and values and ensures that patient values guide all clinical decisions" [11]. Moreover, the IOM has identified patient centeredness as one of the six domains that define quality care. The Picker Institute has further expanded the definition of patient-centered care to encompass the provision of high-quality patient education, emotional support, and coordination of care [12].

Integrating patient-centered care strategies has clear benefits for both patient and provider and can be a powerful instrument in the clinician's toolbox to provide effective and meaningful care. Research has found patient-centered care to be associated with fewer malpractice complaints [13], hospitalizations, tests and specialty referrals, and overall lower medical costs [14], which has significant bearing on quality metrics for healthcare systems. In addition, studies have found that patient-centered care is associated with higher patient and physician satisfaction [15, 16].

As clinicians integrate EMRs into clinical practice, the patient–doctor communication dynamic has to adapt to accommodate the computer as the third party in the room. In this new environment, it is important to understand how EMR use impacts efforts to provide patient-centered care. Interestingly, EMR adoption has sometimes been heralded as an initial step toward providing patient-centered care [17, 18]. However, integrating EMRs into clinical practice can only be considered patient-centered if it helps to enhance patient education, foster patient–doctor relationships and communication, and promote coordination of care. Conversely, when EMR use is not integrated well by practitioners, it can have a negative impact on the patient–doctor relationship.

Today's physicians should be taught what pitfalls to avoid and how to incorporate key EMR communication skills into their practice to promote patient-centered

communication. It is important for practitioners to routinely elicit, reflect upon, and respond to feedback on their patient–doctor–computer communication skills as part of their professional development and dedication to lifelong learning [19].

Additionally, in order to promote a culture of positive EMR use, providers need to advocate for improved EMR design from the standpoint of the patient and providers, call for national standards on EMR education, and work to implement curricula to help physicians focus on the patient instead of the EMR [20]. By doing so, medical educators can better prepare learners for the realities of practicing medicine today and pave the way to an era of truly meaningful EMR use.

Treating the iPatient Versus the Real Patient

Dr. Abraham Verghese has drawn attention to the unfortunate practice of treating the "iPatient," the virtual patient who exists only on the computer screen as a set of labs and studies, while ignoring the real patient seated in the exam room or left alone in their hospital bed [21, 22]. The iPatient plays a prominent role in the modern day practice of medicine. As the time spent caring for the iPatient accelerates due to increasingly complex billing and documentation requirements, physicians may be inclined to make clinical decisions without meaningful direct conversation or input from actual patients [23]. For example, in the hospital setting, physician teams often gather in closed-off work rooms or stand outside patient rooms rounding on their iPatients, reviewing data on computers or mobile devices without involving the actual patient themselves [24, 25, 41]. Unfortunately, when patient care decisions are implemented without meaningful interaction or communication between caregiver and physician, adverse patient outcomes may arise [21].

The situation in the outpatient setting is not dissimilar, and physicians may be apt to prioritize the iPatient over the patient in the exam [4–6]. Unfortunately, the current state of EMR utilization presents several challenges and frustrations for the physician user. EMR use often entails cumbersome and time-consuming data retrieval and entry. For example, a time motion study examining how clinic doctors spend their time found that for every hour spent providing direct patient care, two additional hours were spent on EMR and desk work during the clinic day and an additional 1–2 h were spent after clinic hours [26]. Interestingly, while in the exam room with patients, physicians spent 53% of their time on direct face to face time and 37% on EMR and desk work [26].

The National Ambulatory Medical Care Survey (NAMCS) is an annual survey administered by the Centers for Disease Control about the provision and use of ambulatory care services in the United States. In 2010, the NAMCS survey found that the average primary care visit was 20 min long [27]. If physicians spend a third of this precious time using the EMR, quality of care may suffer if they do not actively use the EMR to engage patients and enhance communication. In an attempt to be more efficient and seemingly patient centered, some physicians may choose not to use the EMR in exam rooms with patients. This however has its drawbacks by pushing EMR documentation and other work to after visit or after clinic hours,

which creates the potential for key information to be forgotten and eliminates the opportunity to use the EMR to engage patients in their care.

It is not surprising that EMR use has been found to negatively impact physicians' professional satisfaction and contributes to increased rates of physician burnout [28, 29]. Outpatient physicians are feeling increasingly torn between the need to attend to the tasks of the EMR while focusing on patients in the twenty minutes of face time they have with patients. Understanding the challenges and opportunities that EMR integration presents to patient–doctor interactions can help physicians improve their computer-side manner. Additionally, integrating patient-centered EMR strategies into practice may help to improve the quality of patient–doctor communication and has the potential to help physicians reconnect with patients.

Computing in real time in the presence of patients presents several unique challenges. Physicians who cannot touch-type often feel they are unable to pay adequate attention to or maintain enough eye contact with their patients as they document the encounter [30]. In addition, studies demonstrate that increased keyboarding can negatively impact patient-centered communication and may alter the content and style of providers' and patients' speech patterns [30–34]. Even physicians who are tech savvy can struggle with the cognitive overload of trying to be fully present and engaged with the patient while simultaneously trying to review their chart and enter orders [35, 36]. However, rather than choose one of two extremes, either focusing on the iPatient at the sake of the real patient or ignoring the technology and deferring documentation until after the visit, physicians should incorporate patient-centered EMR communication skills to allow them to remain focused on their patients while integrating key EMR tasks. In so doing, physicians can potentially improve their own satisfaction by minimizing after-hours EMR work in addition to creating opportunities to meaningfully engage and educate their patients with the EMR.

It goes without saying that the EMR and the iPatient are not surrogates for the real patient. Physicians must remain committed to making their patients feel heard, allow patients to drive the agenda, and continue to encourage questions and meaningful discussions. At the same time, providers must recognize the need to engage with the EMR and patient in real time to promote accurate documentation, minimize cognitive load, and reduce the burdens of afterhours EMR work. More importantly, if used well, the EMR can be used as a powerful communication-enhancing tool to allow patients to better understand their care, engage in their treatment, and feel more connected with their doctors.

Multitasking and the Perils of Distracted Doctoring

Paying more attention to the iPatient than to the real patient can lead to adverse patient outcomes and result in what is known as "distracted doctoring" [36]. For most physicians, interruptions in clinical care (i.e., returning pages or tending to urgent phone calls) are not a new phenomenon. However, providers today are contending with the constant pull to interact with their ever present smartphones and tablet computers [37]. These mobile devices are commonplace among medical

students, residents, and attending clinicians and may even be provided by medical schools and residency programs in an effort to increase provider efficiency and facilitate team communication [38, 39]. These mobile devices can enhance clinical care, and surveys have shown that providers are using these smart devices to enter orders, view test results, and document in the EMR to improve clinical efficiency [40, 41].

Mobile technologies have the potential to improve connectivity to clinical systems and EMRs, enhance efficiency, promote quality and safety, and improve access to patient information and the medical literature. However, while increased technological connectivity can help clinicians [42], it also introduces the risk of multitasking and resultant errors related to distraction [43].

The idea of multitasking centers around the belief that doing more than one task at a time is not only possible but promotes efficiency and saves time [43, 44]. Unfortunately, when dealing with the inherent complexities of patient care, studies have found that providers are unsuccessful at concentrating on complicated computer interactions while attending to the patient simultaneously [32, 45]. Moreover, multitasking can prevent providers from being fully present in the moment when caring for patients, interfere with concentration, and distract providers from the task on hand which can result in medical errors.

Adverse patient outcomes as a result of technology-related multitasking and distracted doctoring have been reported and can have serious consequences. For example, when physicians have multiple patient charts open while working on progress notes and order entry, medical errors related to inadvertently placing orders into the wrong patient's chart have been documented [43, 46]. In another case report, a physician was in the midst of entering an order to stop a blood thinner on an EMR-enabled smartphone when the task was interrupted by a personal text message. The physician responded to the text message and did not complete the order to stop the medication, which resulted in a significant bleeding complication for the patient [47].

The root causes of the errors described above are distraction and interruptions while trying to complete several complicated tasks at once. These examples describe real clinical errors in practice and illustrate how easily multitasking errors can occur. As physicians struggle with the task of processing a patient's concerns, reviewing data in the EMR, placing orders, and documenting the visit in real time, the potential for an oversight or multitasking error looms large. To mitigate these risks, it is important for physicians to accept that true multitasking for complex activities is in fact a myth and work to align their EMR actions with patient-care activities, thus reducing the potential for medical errors.

Research on EMR Use and the Patient–Doctor Communication

In the United States, federal incentives were introduced to promote meaningful use of EMRs with the goals of enhancing patient safety, improving quality, and increasing efficiency. While studies show that EMR use can contribute to these goals, it also introduced new risks and challenges [48]. Among these challenges, the effect

of EMR use on how well patients are able to connect and communicate with their doctors must be considered.

The research on the impact of EMR use on the patient–doctor relationship and communication is mixed. Some studies have found that EMR use can prevent doctors from focusing on patients, impede communication, and be detrimental to providing patient-centered care [5, 49, 50]. Other research has demonstrated a more positive outlook and found that EMR use can enhance communication and improve patient education and engagement [7–10]. In fact, there is tremendous variability in how individual providers use the EMR, and it is important to take these differences into account [33, 51–53]. Researchers have found that a provider's baseline communication skills can either augment or detract from how well the EMR is integrated into clinical care. Interestingly, adding an EMR into the visit for a provider with poor baseline communication skills can worsen that interaction, while conversely providers who have excellent communication skills at baseline can thrive while integrating the EMR to enhance their patient encounter [6]. This points to the need to tailor specific EMR communication interventions to a provider's individual skills.

Given the rise in EMR adoption globally, it is important to examine the current literature on the impact of EMR use on patient–doctor communication. Several recent literature reviews have looked at this question, and a summary of the research, lessons learned, and best practices is summarized below [54–57]. These findings can be used to develop curricula to enhance EMR-based communication, promote patient education, and empower patients to be more involved in their care.

Objectively Measured Physician Communication Behaviors

Several studies have utilized behavioral analysis to objectively describe physician communication while using the EMR [55]. These studies examined video-taped patient–doctor–computer interactions or analyzed data from directly observed encounters to identify EMR-related communication behaviors that may positively or negatively impact patient–doctor communication. We will summarize both sets of positive and negative physician behaviors in detail below.

These observational studies also help us understand how physicians and patients spend their time when an EMR is used in clinical care. For example, studies found that physicians devoted on average a third of the clinical interaction to EMR use, with considerable variability ranging from providers who spent as little as 12% to as much as 55% of the time using the computer [30, 46, 51, 58–60]. The amount of time spent using the EMR, however, may not give full representation as to how well the EMR was integrated into the encounter. For example, providers may have used the EMR together with patients to review medications, explain diagnosis or results, and provide patient education resources which in turn can enhance the quality of care. However, if a provider is all-consumed by the computer, fixated on the screen, and unable to maintain a meaningful conversation during the interaction, the patient may feel frus-

trated and disconnected. Thus, it is necessary to explore what specific behaviors are observed and *how* providers use their EMR time during the encounter in order to gain a better understanding of what behaviors should be adopted as best practices.

Potentially Negative Behaviors

Observational studies utilizing behavioral analysis of physician EMR use have helped to identify communication behaviors that were perceived by researchers to be negative. For example, as physicians navigate the EMR to review data, they may be prone to ignoring their patients as they engage with the computer. This can result in periods of awkward silence during the clinical interaction, which may leave patients feeling dissatisfied with the quality of communication with their doctors. In addition, researchers reported intermittent periods of silence as physicians engaged with the EMR, and in one study, silence accounted for 12% of the total interaction, with each silent spell lasting an average of 15.7 seconds [61]. From the patient's perspective, these intermittent periods of silence can interrupt the flow of conversation and lead to a disjointed experience.

Studies have also found that EMR use impacts how providers and patients speak to one another. When using EMRs, physicians were found to abruptly change topics, which detracts from the natural style of conversation, making it difficult for patients to maintain their physician's attention and may prevent them from addressing their concerns in depth [32, 46, 51]. Patients were also found to alter their speech patterns by synchronizing their speech with pauses in their physicians' typing, as they tried to modulate their narrative to accommodate their physician's EMR use [32, 62].

The amount of keyboarding, timing of typing and physicians' attitudes toward real-time documentation can also impact patient–doctor communication. Interestingly, some doctors prefer to type when the patient is not looking at the screen and do not allow them to follow along as they navigate the visit [45]. Patients may pick up on this behavior and assume that their doctors are not transparent in their documentation and EMR actions because they have something to hide, which can in turn discourage patients from meaningfully engaging with their doctors or the EMR. In terms of quantifying how much typing is done during clinical interactions, one study found that doctors engage in heavy typing a quarter of the time, which may discourage patients from speaking during these periods [30].

Another important behavior to quantify and understand is the amount of time the physician spends screen gazing versus maintaining eye contact with the patient. Research has shown that the amount of eye contact a provider displays is the most important determinant of a patient's perception of clinician connectedness and empathy, which is essential to building a trusting patient–doctor relationship [63]. Studies found that doctors focus on the screen for 25–55% of the clinical interaction and this behavior can adversely affect the patient–doctor relationship [46]. Not surprisingly, low rates of eye contact are associated with prolonged screen gazing and can result in perceptions of low connectedness from the patient's perspective [59].

In addition to screen gazing, screen positioning can also impact patient–doctor communication. When the screen is not positioned to allow for shared viewing by both patient and physician, lack of transparency and concerns about what is contained in the medical record may arise [64]. Beyond screen visibility, *active* screen sharing involves physicians purposefully inviting patients to view the screen and asking them to follow along as they navigate the chart, which may promote patient engagement and understanding of their health conditions [65, 66]. Unfortunately, studies found that providers share the screen only about 8–10% of the time [59, 66]. Since research has shown that patients have a more positive attitude toward the EMR when they are shown the screen, this easy but critically important act should be a prime target for education to promote patient-centered EMR use [66].

There is considerable variation in the amount of time and manner by which physicians use the EMR with patients. For example, some physicians use the EMR only at the end of the interaction to summarize the encounter, and some use the EMR continuously, while others are very minimal users overall and reserve EMR use for before or after the encounter [52]. Despite this variation, most physicians will start documenting the note in real time in front of patients, and they should in turn be mindful of how this keyboarding may interrupt the flow of conversation [51].

In summary, objective behavioral analysis of physicians and patients has found that increases in provider screen gazing, poor eye contact, heavy keyboarding, and disjointed speech patterns may negatively impact patient–doctor communication [67, 68] (Table 9.1). Equipping providers with the knowledge of some of these potentially negative behaviors can help inform them of what not to do when using the EMR with patients.

Potentially Positive Behaviors

Several physician communication behaviors have been thought to promote communication between patients and physicians. When physicians use EMRs well, they can be powerful tools to clarify diagnosis and treatment plans and can be used to engage patients in meaningful discussions to encourage true partnerships [69–72]. Specific behaviors that seem to facilitate patient-centered interactions included engaging patients to actively screen share by showing them their recent labs, reviewing radiographic images, using decision aids to assist in shared decision making, and inviting patients to engage with EMR data to promote healthy behaviors (e.g., reviewing cholesterol trends to discuss diet changes) [9, 36, 54, 64, 70, 73, 74].

Other potentially positive behaviors include “signposting” computer use by letting the patients know when the computer will be engaged and trying to maximize eye contact throughout the encounter by touch typing or establishing periodic eye contact during prolonged periods of screen use [46, 54, 64, 66, 70, 73]. Additionally, cessation of computer use when patients discuss sensitive or important topics is thought to be important in establishing rapport as it assures the patient that they are the focus of their provider’s attention [75]. Exhibiting verbal and nonverbal cues of listening, reading aloud, using empathetic language [46], and sharing information on the screen to allow the patient to follow along can all enhance communication

Table 9.1 Summary of negative and positive physician EMR behaviors

Negative EMR communication behaviors	Positive EMR communication behaviors
Long periods of silence while engaging with EMR [61]	Read information on screen aloud to allow patient to follow along and signpost to let the patient know when you will use the EMR [46, 64, 66, 70, 73]
Long periods of typing during visit leading to interruptions in conversation [30, 32, 51, 62]	Talk aloud while typing to promote patient engagement in note writing and accurate documentation [93]
Prolonged screen gazing resulting in poor eye contact [59, 93]	Maximize eye contact by touch-typing and engaging in periodic eye contact during long periods of screen gazing [46, 64, 66, 70, 73]
Screen positioned to allow only the provider to see the screen which leads to lack of transparency [93]	Screen positioned to allow patient and provider to see screen at same time to allow for active screen sharing [9, 46, 64, 70, 73, 74]
Closed body positioning, with provider facing the EMR and having back to patient [93]	Open body positioning (with provider's head, upper, and lower body oriented towards the patient) to promote unspoken and continued engagement [57, 63, 100–102]
Lack of patient engagement with EMR [93]	Use EMR to provide patient education, clarify diagnosis, encourage patients to ask follow-up questions, review studies and radiographic images, integrate decision aids to assist in shared decision making [6, 30, 45, 46, 52, 64, 66, 69–73]
Focus on the EMR during sensitive discussions [93]	Disengage from the EMR during sensitive discussions to focus full attention on the patient [75]
Abrupt topic changes while navigating the EMR, leading to disjointed conversation and visit [32, 46, 51]	Promote natural conversational flow by addressing the patient's concerns, actively sharing the screen to review relevant information, encouraging follow-up questions, probing for understanding, and engaging in shared documentation to summarize assessments and plans together [9, 46, 64, 70, 73, 74]

and promote patient-centered EMR use [46, 54, 64, 66, 70, 73]. Other potentially positive EMR behaviors relate to trying to make computer use unobtrusive by typing softly or speaking aloud while typing to maximize transparency of what is being recorded in the chart [32]. Interestingly, despite variations in physicians' individual styles of EMR use (i.e., heavily technology focused as opposed to more human focus), one study found that patients had high levels of trust and satisfaction with their physician's EMR use regardless of style [33], which may be related to the importance of continuity and the strength of the patient–doctor relationship prior to EMR implementation.

Furthermore, several studies show that when EMRs are used well, integration of this technology has the potential to enhance the patient–doctor interaction by encouraging physicians to clarify diagnoses and encouraging patients to ask follow-

up questions [69, 72]. Given the tremendous potential of the EMR to augment patient engagement, it is important to highlight these positive behaviors when looking to develop effective educational interventions (Table 9.1).

Patient Perceptions of Physician EMR Use

Observational studies identified physician behaviors with potentially positive and negative effects on patient–doctor communication. Interestingly, these studies were based on investigators' interpretations and it is important to correlate these findings with patients' actual perceptions of these behaviors through survey-based and qualitative studies.

Of eleven studies that used cross-sectional patient surveys (i.e., asking patients at one time point) to assess patient perceptions of the EMR, eight studies found no change in overall impact of EMR use on patient satisfaction, patient–doctor communication, or the patient–doctor relationship [76–83]. Interestingly, two of these eleven studies showed positive impacts on patient satisfaction as a result of EMR use [74, 84], and the last study demonstrated mixed patient perceptions [85].

When researchers surveyed patients pre- and post-EMR integration, most patients reported no change in overall patient satisfaction, communication, and the patient–doctor relationship as a result of EMR implementation [7, 8, 31, 86–89]. Importantly however, three of these pre-post studies found increased satisfaction with communication and the patient–doctor relationship, as well as an improved perception in the quality of care with EMR use [7, 8, 86].

Beyond general satisfaction measures, patients expressed mixed perceptions when surveyed about what they liked and disliked about their physicians' EMR use. Overall, most of these patient perceptions were concordant with findings from the observation studies, and, not surprisingly, patients disliked it when their doctors displayed poor eye contact, looked at the screen more than at them, and used closed body language (i.e., having back toward patients) [33, 66–68, 90–92]. Patients reported that extensive typing during the encounter was disruptive and they disliked long periods of silence [67, 68]. On the positive side, patients liked when providers were transparent about what they were doing on the EMR and actively shared the screen to promote open communication [30]. Importantly, some studies found that EMR use improved patient understanding of their conditions, increased perceptions of empowerment, and promoted informed decision-making [7–10].

Qualitative Studies of Patient Perceptions

While survey studies allow insight into the patient perspective, qualitative analysis of patient interviews allows for a deeper exploration of patient experiences with EMR use. Two early qualitative studies showed a mix of positive, negative, and neutral patient responses; however, these studies were conducted before Affordable

Care Act (ACA) implementation and widespread use of EMRs [66, 91]. In a post-ACA telephone interview study, the majority of patients reported high levels of satisfaction with their physicians' overall use of the computer one year after EMR implementation [93], and patient quotes from this study will be used in the section below to illustrate pros and cons of EMR use from the patient perspective.

Patients liked that EMR use allowed doctors to improve clinical efficiency ("It makes the visit go smoother…they take notes and pull up my record…they don't have to flip through a huge chart"), promoted easy access to health information ("He can go back and look at important test results – he had it at his fingertips"), and enhanced teamwork among physicians ("They refer to each other's notes and communicate about what's going on with me. It makes me comfortable with the care I'm getting"). Patients reported that the EMR helped to promote accurate documentation in real time ("I like that he repeats and recaps what we talked about while he types it in. I am confident he captured what we discussed"), which should encourage providers to engage patients as they write notes in the exam room and use this as an opportunity to review the plan and provide further education.

Patients reported that, when used well, the EMR could be effectively used as a tool to facilitate communication and promoted better understanding of their medical problems and treatment plans ("I had a question …and he went online and looked it up and gave me the answer' and 'We talked about a condition he thought I had … he used the computer, pulled up information and printed it out for me"). One patient stated that when their doctor used the EMR with them, they were able to better understand their results and clinical progress ("We talked and looked at results together in the computer…we had an intelligent conversation about my progress"). Patients also liked it when their doctors used images, diagrams, and pictures to help explain their care ("They used diagrams and pictures in the computer to explain my medical condition, they also printed it out so I could take it home to my family").

In the same study, negative perceptions of EMR use was rooted in poor EMR-based communication skills. Patients were frustrated when physicians did not screen share and were not transparent with EMR use, as one patient put it, "I mean I know they're not on Facebook but I don't know what they are doing." Patients identified closed body positioning ("Some [doctors] come in and stare right at the screen, hunkered down…their back to you, it's not patient friendly") and poor eye contact ("He was talking and looking at the computer the whole time. I don't get the human connection") as factors contributing to decreased quality of care. Overall, patients disliked it when physicians were more focused on the computer than on them and when providers did not take advantage of the EMR to discuss their health or provide education. In one patient's words, "I just want my doctor's undivided attention …the computer takes them away from focusing on you."

The collective findings from these observational, patient survey and qualitative interview studies establish the basis for evidence-based best practices and serve as the foundation for patient-centered EMR use curricula. In addition, the body of research identifying potentially negative EMR behaviors can be particularly instructive for physicians as they work towards improving patient–doctor–EMR communication by highlighting which behavioral pitfalls to avoid.

Improving Computer-Side Manner: Teaching Patient-Centered EMR Use Skills

In the EMR era, a physicians' computer-side manner can be thought of as the modern equivalent of the age-old bedside manner concept. Just as poor bedside manner can leave the patient feeling dissatisfied, frightened, or alone, poor computer-side manner can leave patients feeling ignored or disengaged. In our high-tech times, providers need to be trained to improve their computer-side manner. Doctors should be taught to use the EMR as a communication tool to cultivate relationships with patients and ensure that the computer is not seen as a shield or barrier to high-quality communication or care.

Based on the findings from the studies discussed above, a collection of best practices for patient-centered EMR use is summarized by the mnemonic HUMAN LEVEL [94, 95]. These ten best practices describes behaviors such as "H" for **h**onoring the golden minute by starting the visit technology free and allowing the patient to start with their concerns and "U" for **u**sing the triangle of trust to place the screen in a position to allow both the patient and doctor to see the screen at the same time. The full human level mnemonic is summarized in Fig. 9.1.

Engaging physicians at all levels of training and practice to integrate these patient-centered communication strategies can help mitigate negative patient perceptions and optimize the use of EMRs as patient engagement and empowerment tools. Major medical education organizations, like the Liaison Committee on Medical Education (LCME) and the Alliance for Clinical Education (ACE), have called for adequate EMR training for medical students in order to prepare them to practice in our current healthcare environment [96]. Interestingly, the ACE calls for EMR training to start in preclinical years to allow students to develop sound EMR skills early, which may allow for good habits to take hold before exposure to potentially negative role modeling during clerkships.

One challenge in teaching patient-centered EMR use curricula to students may be the limitations placed on student access to medical records. There is great variability across institutions regarding student utilization of the EMR, with some institutions barring students from using the EMR completely, some granting full but supervised access, and others allowing partial EMR access with view only privileges without the ability to charting or enter orders [97, 98]. Since the vast majority of students will be using EMRs to provide patient care and in order to adequately prepare them for this reality, medical educators should advocate for student access to EMRs and work toward implementing EMR curricula [98].

Resident education is equally important and timely since these trainees are transitioning to their careers in clinical medicine, starting to develop their own practice styles, and developing core clinical skills. Interns in particular may be primed for training on patient-centered EMR use since they are tasked, often for the first time in their training, with navigating how to meaningfully interact with patients while using the EMR in their daily practice. Residents may also be exposed to negative EMR communication behaviors from observing their faculty or near peers. At the

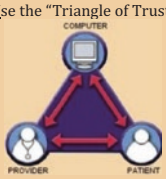
HUMAN LEVEL - 10 Tips to Enhance Patient-Centered EMR Use [95,96]		
H	**H**onor the "Golden Minute"	Make the start of the visit completely **technology free**. Greet the patient, start with **their** concerns and establish an **agenda** for the visit *before* engaging technology.
U	**U**se the "Triangle of Trust" 	Create a **triangle configuration** that puts you, the patient and the computer screen at each of the three corners. This allows you to look at both the patient and screen without shifting your body position, and also enables **shared** screen viewing.
M	**M**aximize patient interaction	Encourage patient **interaction**. Pause for questions and clarification. Allow time for questions and to verify understanding.
A	**A**cquaint yourself with chart	Review the chart **before** you enter the room to prepare, inform and **contextualize** your visit.
N	**N**ix the screen	When discussing **sensitive** information, **completely disengage** from the EMR (look at the patient, turn away from screen, take hands off keyboard, etc.)
L	**L**et the patient look on	**Share** things on the screen with your patients.
E	**E**ye contact	Maintain **eye contact** with patients as much as possible. Treat patient encounters as you would a conversation with friends or family members.
V	**V**alue the computer	Praise the **benefits** of the EMR and take advantage of opportunities to use technology as a tool to **engage** patients (pull up lab result to review together, utilize graphics, etc.).
E	**E**xplain what you're doing	Be **transparent** about everything you do. Avoid long silences, aim for conversational EMR use by explaining what you are doing as you are doing it.
L	**L**og off	At the end of the visit, **log off** of the patient's chart while they are still in the exam room. This reassures the patient that their medical information is **secure**.

Fig. 9.1 Human level mnemonic for patient-centered EMR Use [94, 95]

same time, teaching best practices and providing feedback about their interactions with patients is particularly important since they will soon be role modeling EMR use for junior trainees. Access to resident learners can be challenging due to their long work hours, work-hour restrictions, and crowded curricula. However, finding the opportunity to address these this topic in residency allows for reinforcement of best practices at a critical time in their professional development and should be a priority for medical educators.

Lastly, faculty and practicing physicians also need training on how to integrate and role model best practices [20, 99]. Faculty must be equipped with the tools to

teach and give trainees feedback on these skills in order to meaningfully impact how students and residents use EMRs with patients. Finding time to provide training to faculty is logistically challenging, perhaps even more challenging than with residents or medical students learners. Faculty are often busy juggling demands of busy clinical practices, in addition to managing their teaching responsibilities and scholarly work. In addition, faculty may not be required to participate in skills training sessions, may not have institutional support to take time out of their clinical practice to attend trainings, and are often at the mercy of clinical productivity demands. Despite these challenges, targeting faculty for training is important in addressing the hidden curriculum and empowers faculty to provide meaningful feedback on these skills to their learners.

More importantly, longitudinal training throughout one's career is essential to ensure continued reinforcement of key concepts and successful integration into practice. Training students, residents, and faculty at these different time points in their clinical development allows for opportunities to reinforce training, provides feedback, and allows for individual self-reflection in the clinical context. Despite widespread EMR adoption, calls for improved EMR education and available best practices, longitudinal curricula on patient-centered EMR strategies remain rare [6, 45, 69–71, 90]. Many factors contribute to the dearth of longitudinal curricula, including lack of resources and time to participate in training and lack of formal requirements for training from medical education or professional licensure organizations [99]. Despite these challenges, there are some existing programs that are at the forefront of delivering this longitudinal curricula to students, residents, and faculty.

One model for a longitudinal curriculum exists at the University of Chicago. The patient-centered EMR use curricula is introduced to second-year medical students as a one hour lecture within their required clinical skills course and highlights the best practices summarized in the HUMAN LEVEL mnemonic (Fig. 9.1) [94, 95]. The students then participate in a group observed structured clinical exam (GOSCE), during which students interact with a standardized patient (SP) while using the EMR to discuss a chief concern of abdominal pain, review relevant lab results and prior notes, and counsel on lifestyle modification. To create a high-fidelity experience, students navigate a mock patient chart in the EMR. Students receive immediate feedback on their ability to provide patient-centered care while using the EMR from their peers, from the SP, and from a faculty facilitator.

The students receive a refresher on this material prior to their transition to third-year clerkships during a three-day Clinical Biennium which trains rising third-year students in hands-on skills that they will need during their clinical rotations. During the biennium, the students receive a lecture on "Technology Skills for the Wards," reviewing patient-centered EMR use best practices. Lastly, the third-year students have one more opportunity to reinforce this material through the clinical performance experience (CPX), which is a day-long series of OSCEs at the end of their clerkship year. One of the CPX OSCE stations is dedicated to patient-centered EMR use and is modeled after the second-year OSCE, which allows students to once again practice their skills and receive feedback from the SP.

Internal medicine and pediatrics interns and residents also receive a one hour lecture on best practices. The lecture incorporates a trigger video which illustrates poor EMR use and learners discuss barriers to patient-centered care observed in the video before moving on to learn about best practices and practical strategies for implementation. Due to time constraints, an OSCE experience was not possible, however providing this lecture allows interns and residents to be more intentional about integrating the EMR into their clinic and inpatient workflows. In an effort to expand this training to other residency programs, a condensed 15-min patient-centered EMR use curriculum was integrated into the institutionally required EMR training for all incoming interns, residents, and fellows during their orientation to the University of Chicago and offered early exposure to this type of training. This novel partnership with the institutional EMR trainers allows for augmentation of required EMR training to include communication skills and allows for an easy and efficient way to access to trainees.

Lastly, through a faculty development program, faculty from all departments have the opportunity to participate in a free CME-accredited 90-min training that includes a 20 min lecture on best practices followed by a GOSCE based on the student curriculum. Faculty interact with an SP and discuss their chief concern, review relevant data in the mock EMR patient chart, and document various components of the visit including the history of present illness, assessment and plan, and after-visit summary with patient instructions. Faculty receive immediate feedback from their peers, the SP and a faculty facilitator.

This longitudinal patient-centered EMR use curriculum has been well received and allows for targeted training at each stage of one's medical career in order to build on existing knowledge and promotes meaningful integration of this content into the culture of clinical care. These strategies to approach training on patient-centered EMR use can be tailored to different clinical environments and are adaptable to a learner's specific needs.

The EMR is a permanent part of the clinical care environment and clinicians need to work to continually improve their skills. Curricula for patient-centered use and strategies to teach these best practices exist and are feasible to implement. Developing longitudinal curricula on this important topic can help to create a culture of patient-centered EMR use by introducing formal training and feedback mechanisms throughout all stages of physician development.

Conclusion

When used well, the EMR can be a valuable tool for physicians to create meaningful interactions with patients, promote engagement, and enhance patient-centered relationships. Physicians can be taught best practices to integrate patient-centered communication strategies into their EMR workflow.

Ironically, while physicians exhibit potentially negative communication behaviors with EMR use (e.g., interrupted speech patterns, long periods of silence, and

low rates of screen sharing with patients), the majority of studies examining patient perceptions reported no change in overall satisfaction, communication, or the patient–doctor relationship, and some studies showed improved perceptions on these domains. Qualitative studies found that patients are satisfied with their physicians' EMR use overall and liked that it improved clinical efficiency. Despite these encouraging findings, researchers have identified negative EMR-based communication behaviors that can adversely impact patient doctor communication. For example, patients felt disconnected from their doctors when there was poor eye contact, the physician's back was to them, or if they sensed a lack of transparency with EMR use. These findings should encourage healthcare providers to embrace EMR use and work toward integrating patient-centered care strategies while managing the demands of the EMR.

Lastly, medical education targeting the continuum of learners can help foster humanistic patient–doctor–computer interactions and improve a physician's computer-side manner. Moreover, medical educators, health systems, and policy leaders should advocate for inclusion of communication skills content into mandatory EMR training to promote collaborative and humanistic EMR use. In conclusion, understanding the impact of EMR use on patient–doctor communication and implementing evidence-based best practices to promote patient-centered EMR use are fundamental to promoting humanism in the digital age.

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Chapter 10
Physician Dissatisfaction, Stress, and Burnout, and Their Impact on Patient Care

Alan H. Rosenstein

Introduction

Physicians just want to practice good medical care. Unfortunately, over the past decade there have been a number of different factors that have had a significant negative impact on their ideals, expectations, attitudes, and behaviors, which have distracted their attention away from their primary focus of providing best practice medical care. Many of these factors are based on more deep-seated internal influences molded by age, gender, culture, ethnicity, spirituality, geography, socioeconomics, and early life experiences, all of which help shape one's values, perceptions, ego, and personality. On top of these deep-seated internal factors are the contributions of more external based influences shaped by the health care training culture and experience, Health Care Reform, changing models and priorities of the workplace environment, growing complexity, and the introduction of new technologies, all of which has added a new level of distraction that has significantly increased the incidence of frustration, dissatisfaction, apathy, stress, and burnout. In combination these factors have adversely affected moods and disposition, with lower levels of tolerance, acceptance, compliance, and overall engagement. In an effort to help physicians through these distractions, we need to gain a better understanding of all of these contributing factors and how it affects their mindset and then provide the necessary guidance and support to help them better adjust to the pressures of today's health care environment.

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Contributing Factors: Internal

The first step in reducing distractions is to gain a better understanding of the factors influencing individual values, perceptions, attitudes, biases, and behaviors. Table 10.1 presents an overview of the internal and external factors which contribute to the overall makeup of thoughts and reactions that affect clinical behaviors.

Age and generational issues are based on the values and perceptions reinforced by the current existing status of the social, economic, and political environment at the time in which the individual grew up. Differences in views as to work ethic, commitment, views of authority, and work-life balance are different for each of the groups (Millenniums <1980–1995>, Generation X < 1965–1979>, Baby Boomers <1946–1964>, Veterans/Traditionalists <pre 1946>) which under stressful situations may lead to conflict in the workplace environment. Veterans and Baby Boomers whose parents were brought up during the depression and world war years are thankful to have a job, have strong loyalty to their organization, tend to stay at their job until retirement, and are willing to put in the extra effort and additional time in to get the project done. At the current time this is the majority group in today's health care workforce, and they fill most of the leadership positions. Generation X and Millenniums have been brought up during a time of economic prosperity and advanced technology. They live in a fast-paced world of information overload, feel more entitled and empowered, are more apt to question process and authority, have shorter time span job commitments, and believe in a strong work-life balance. For Baby Boomers, these preferences may lead to potential distractions and conflicts with Millenniums involving perceptions around commitment and work ethic. It's not that either group is right or wrong, it's just that they have different ideas and approaches to work responsibilities [1]. As the older workforce retires and the younger workforce moves in, the issue of how to deal with Millenniums is taking center stage [2]. Many organizations have addressed the issue by offering programs that educate staff about generational differences and provide strategies to help them reach compromises during periods of conflict or disagreement.

Gender differences may also affect the way individuals react in stressful situations. Males are typically more assertive, task oriented, and domineering and under pressure tend to dig in. Women are more socially oriented and under pressure will look for consensus opinions to support their points of view [3]. In the past these problems were exacerbated by the predominantly female nursing workforce and the

Table 10.1 Influencing factors

Internal factors	External factors
Age and generation	Training
Gender/sexual orientation	Health care reform
Culture/ethnicity/spirituality	Work environment
Geography/socioeconomics	Complexity/technology
Life experiences	Stress and burnout
►Values, personality	►Mood, disposition, engagement

predominantly male physician task force. While the percentages are changing, potential conflicts may still arise. Many organizations have addressed these issues by educating staff on sexual equality and harassment [4]. Other distractions related to gender workforce equality issues, sexual orientation, or sexual discrimination may also influence individual behaviors.

As the world situation changes, we are seeing a greater diversity in our patient and staff populations with a greater influx of foreign-born or foreign-trained nursing and medical staff with their own individual ethnic, cultural, and religious beliefs that affect values, thoughts, and beliefs as to religion and spirituality, hierarchy, authority, and communication styles. In difficult situations this can lead to distractions related to misunderstandings in purpose and intent that may negatively affect communication efficiency, expectations, and outcomes. In this regard there is a big push toward training providers on cultural competency and/or providing diversity training to help individuals better understand individual needs and values, address hidden assumptions or biases, and provide effective solutions for more effective communication [5–8].

All of these factors combined with genetics, socioeconomic factors, geographic influences, and other individual life experiences help to shape an individual's personality. Strategies for improvement should focus on introducing a variety of different training programs designed to enhance personality and relationship management. These programs might include such topics as sensitivity training, diversity management, cultural competency, mindfulness, generational gap values, personality traits, conflict management, stress management, anger management, sexual harassment training, customer satisfaction, and improving overall communication and collaboration skills. Some organizations have added a more in-depth focus by providing training in emotional intelligence to enhance staff and patient relationships [9, 10]. The process includes a four-step approach designed to [1] enable the individual to gain a better understanding of their own individual perceptions, values, biases, and trigger points; [2] raise social awareness by enabling the individual to better recognize the perceptions, needs, and values of others; [3] learn how to modify their own behaviors; and [4] be more sensitive to the cues and reactions needed to foster a positive relationship and positive outcome. Each of these programs has value, but success will depend on the specific situation, underlying organizational dynamics, culture, and leadership commitment.

All of these internal factors have a deep-seated impact on a person's mood, disposition, character, and personality and may be more difficult to address than some of the external factors to be discussed in the next section.

Contributing Factors: External

The external factors include current day circumstances that influence present state perceptions. For physicians one of the key factors starts with the training environment. Some equate this training to a fraternity/sorority hazing-type environment

where individuals are harassed to the point of losing self-esteem. In some cases this can lead to severe cases of stress, burnout, depression, and suicidal ideation [11, 12]. In response the trainees try to develop knowledge and technical competencies through exhaustive independent study. As a consequence there is no focus on developing personal skills or team collaboration mechanics which leads to a lower degree of sensitivity and emotional intelligence. This presents a definite liability in today's complex multi-spectrum health care environment so dependent on multidisciplinary collaboration. The problem is further exacerbated by the traditional hierarchal health care structure with dedicated roles and responsibilities and set boundaries between the different health care disciplines. Fortunately, there are movements in place to try and deal with these training hazards. Many medical schools are now looking for more "well-rounded" "better adjusted" students who are majoring in something other than the traditional math and science tracks [13, 14]. The MCAT (Medical College Admission Test) now includes questions on sociology and humanities [15]. Some of the more progressive medical schools are adding programs that focus on improving emotional intelligence and communication skill efficiencies, in some cases pairing medical students with nursing students, pharmacy students, and other ancillary staff members during their freshman year to learn about the different perspectives on care management responsibilities [16–19]. The overall goal is to build personal relationships and develop team competencies along with clinical expertise.

Health Care Reform has added another level of disturbance to the force. Where physicians used to pride themselves on their ability to provide best practice care with autonomy and control, the introduction of new care restrictions, utilization controls, changing incentives, and performance accountability metrics based on a series of "questionable" variables has forced many physicians to reassess their positions and change models of care. While concerns about Accountable Health Care continue to arise, at the current time the program is here to stay. The best remedy is to educate physicians on what it is and what it means to their practice and then provide the necessary resources and support to help them achieve compliance.

Technology

One of the major factors contributing to care distractions is the growing complexity of care management and the introduction of new technologies, in particular, the electronic medical record. The main frustration for physicians is the time it takes to complete all the documentation which could be better spent on face-to-face direct patient care. Given these frustrations, the main focus needs to be to convince physicians of the values of technology innovation and provide the necessary training and logistical support to help them master the system.

Table 10.2 provides an overview of the advantages and disadvantages of electronic medical records. The key advantages of the electronic medical record are the ready access to real-time information and the ability to share information with all

Table 10.2 Advantages and disadvantages of electronic medical records

Advantages	Disadvantages
Access/analysis	Training
Timeliness/efficiency/standardization	Time
Data flow/dissemination	Restrictive format
Population health	Distraction
AI/alerts and reminders	Dissatisfaction
►Value added (access/time/analysis/efficiency)	► Value depleted (expense/utilization/harm)

those who need to know. The system provides greater access to information, improved information flow, improved efficiency, and the support of best practice care through standardization, algorithms, guidelines, alerts and reminders, and other types of improved intelligence. With a focus on full-spectrum care and population health, electronic records play an important role in overall chronic disease and risk management. When done correctly, it's definitely a value add.

The problem occurs with physician acceptance, adoption, and compliance. Compulsory mandates can lead to a significant degree of physician dissatisfaction. Physician complaints about time spent on data entry, forced fields, and/or rigid requirements for documentation have all been reported as major distractions taking physicians away from direct patient care [20–24]. Recognizing this frustration organizations need to invest the appropriate amount of time, training, and customized support to help physicians better accommodate to the new electronic environment. One solution that has been particularly successful is to provide "scribes" to help physicians with data input and documentation support [25].

Stress and Burnout

Recent studies have shown that more than 50% of physicians report a significant amount of stress and burnout that has led to increasing irritability, cynicism, apathy, fatigue, disillusionment, dissatisfaction, and in some cases more serious depression, behavioral disorders, and even suicidal ideation [26–29]. As a result there is an increasing amount of physician dissatisfaction, where many physicians have either changed practice settings, joined different groups, or moved into salaried positions. Others have either left the profession entirely or chose early retirement. Not a good situation particularly with the looming physician shortage.

So how do we deal with stress and burnout? The first issue is physician awareness. Many physicians are unware that they are working under stress and the physical and emotional toll it's taking on their livelihood. If they do admit that they are under stress, they accept it as being part of the job and rationalize that they have been working under stress all their lives. Even if they think they may need some outside help, they are reluctant to ask in fear of concerns about their competency,

confidentiality, discoverability, or a blow to their ego [30]. These are significant barriers that need to be addressed before moving forward. If physicians are reluctant to admit or receive assistance, we need to look for the organizations that they are associated with to take a more pro-active stance in trying to encourage and provide support.

Where to begin? As mentioned previously, there is a growing amount of evidence suggesting that high levels of stress, burnout, depression, and even suicidal ideation starts during the first year of medical school. This probably results from a combination of factors of having individuals driven by a strong competitive egocentric driven personality being dropped into an intensely complex bewildering hierarchal system without direction and a sense of nowhere to go. These problems are further exacerbated by a sense of physical and emotional exhaustion, stress, and fatigue, which can take a toll on physical and mental well-being. One of the major barriers is the student's reluctance to seek help from issues related to stigma and/or time. Fortunately many organizations are making a concerted effort to provide resources to help students adjust to the pressures in the academic environment [31].

Once a physician gets out into practice there are other day-to-day pressures that promote a stressful environment. As mentioned previously, many physicians are either unaware or reluctant to admit that they are under stress, and even if they do recognize it, that won't take any action. In this case we need to look for outside assistance from friends, peers, or the organizations in which the physician is associated with to help out. The most consistent approach is to provide pro-active support at the organizational level. Unfortunately, many physicians feel that their organizations don't support them. In a recent study conducted by Cejka Search and VITAL WorkLife, when asked if their organization did anything currently to help physicians deal more effectively with stress and/or burnout, 85% of the respondents said no [32]. Another study conducted by InCrowd showed similar findings reporting that 75% of surveyed physicians did not feel that their organization was doing anything to address burnout [33]. So, in an effort to better address the issue of physician stress and burnout, we need to [1] raise awareness, [2] motivate physician reactiveness, and [3] have the organizations take a more active role in providing visible support services to help physicians better adjust to the stress and pressures of today's health care environment.

Support can come from a variety of different directions. At one level the organization can provide training on stress management, time management, conflict management, business management, and other appropriate programs to teach basic skill sets on stress reduction. On a deeper level the organization can provide more personalized support services through Physician Wellness Programs, Wellness Committees, and Physician EAPs (Employee Assistance Programs) or through individualized coaching or counseling. Some physicians may require more in-depth behavioral modification programs. Organizations need to approach these programs with the idea that they understand the physician's world, that they respect and value the physician's time and what the physicians do, and that they are here to help. They need to make an effort to promote individualized support and be responsive to physician resistance, time constraints, and fears of confidentiality. To motivate physician

action, the focus needs to be on the goal of helping the physician do what they want to do, which is to practice good medical care.

One excellent case example is the approach taken by the Center for Professionalism and Peer Support at Brigham and Women's Hospital in Boston [34]. Recognizing the impact of physician burnout and the emotional stress it had on physicians and organizational culture, the hospital started its peer support program in 2008 in an effort to provide resources to support physician well-being and resilience. Through a multistep process that includes education, pro-active outreach, peer training, peer support, and individualized coaching, the organization has led the way in developing programs that are now been replicated across the country. Many other examples from the Mayo Clinic, Stanford University, and other hospital centers across the country provide a variety of different innovative approaches designed to reduce physician stress and burnout. [35, 36].

Consequences: Disruptive Behaviors

Despite all the evidence and concern about the physician behavioral turmoil, in many cases it goes unresolved. In more extreme cases, depending on the circumstances, the combination of internal and external factors can result in inappropriate actions that lead to disruptive behaviors. Unfortunately, many disruptive events either go unrecognized, go unreported, or are ignored for a variety of different reasons [37]. The problem with this personal and organizational reluctance is the potential for bad things to happen to patients and staff (see Table 10.3).

Disruptive behaviors are a serious issue which not only provide a distraction, they can also negatively affect outcomes of patient care [38–41]. Many individuals who act "disruptively" aren't aware that they are acting in an inappropriate nonprofessional manner. This is particularly true for physicians who are used to taking control and "giving orders." Under times of stress they may yell and intimidate others and not even realize they are doing it. Even if they are aware they justify their behaviors as being necessary to direct patient care. The problem is that they are oblivious to the downstream negative consequences this may cause on care relationships, communication efficiency, task accountability, and patient outcomes.

Table 10.3 Reluctance and ramifications

Organizational reluctance	Risk of non-action
Awareness/accountability/tolerance	Staff retention/recruitment/patient satisfaction
Financial	Staff/patient satisfaction
Hierarchy/boundaries/sacred saints	Quality/patient safety
MD autonomy	Medical errors/care efficiency
Code of silence/fear of reporting	Joint Commission accreditation standard
Conflicts of interest	Liability/litigation/fines/penalties
Structure?/skill set?/solutions?	Reputation/social media

A second big concern is the issue of organizational tolerance. Many of the events involve very prominent physicians who bring a large number of patients and revenue into the organization. Many organizations are reluctant to address the issue in fear of antagonizing a physician to the point where they worry that the physician won't bring their patients into the facility. This is particularly true for smaller organizations where there may be a shortage in supply of certain specialties. There is also the concern about crossing boundaries. Physicians work autonomously, and in many organizational cultures physicians are viewed as "sacred saints" impeding the willingness to intervene. There is also a hidden "code of silence" where health care workers are reluctant to report disruptive behaviors [42]. This lack of reporting is accentuated by potential conflicts of interest, concerns about lack of confidentiality, and/or fears of retaliation. Many who do report are frustrated by the lack of administrative support and the fact that despite reporting, the perception is that nothing ever changes, so why bother.

And lastly is the structure and skill set to deal with behavioral problems. Organizations have policies and procedures in place to address clinical competency but may not be well equipped to deal with behavioral problems. They need to have the right structure in place supported by individuals skilled in facilitation and negotiation techniques. Turning matters over to the Chief or Chairman of the Department may not lead to an effective resolution.

The Risks of Inaction

The risk of inaction can lead to downstream consequences that affect moral, culture, and workplace atmosphere and/or lead to medical mishaps that have significant direct or indirect financial penalties [43] (Table 10.4).

On one level disruptive behaviors have been shown to have a significant negative impact on nurse satisfaction and retention [44]. Replacing a nurse can cost the organization anywhere from $60,000 to $100,000 for recruitment, training, and secondary opportunity costs [45]. When it occurs in a public arena, disruptive events can also lead to patient dissatisfaction which can negatively impact HCAHPS scores and other patient satisfaction pay for performance initiatives which can have a negative effect on reimbursement. Then there is the spillover effect on hospital reputation which may impact market share and contract negotiations.

From a patient care perspective, the biggest concern is the occurrence of preventable medical errors or adverse events [39, 46, 47]. In addition to waste, duplication, and inefficiencies in management, lack of communication and collaboration can lead to task failures that result in medication errors, infections, delays in treatment, and other serious medical conditions which can increase lengths of stay and accrue significant non-reimbursable costs of care. The Joint Commission states that more than 50% of adverse sentinel events can be traced back to human factor issues and/or failures in communication [48, 49]. In response to the concerns about the impact of disruptive behaviors on patient safety in 2010, the Joint Commission added a new

Table 10.4 Economic consequences

I. Recruitment and retention RN: $60,000–100,000/ additional opportunity costs
II. Patient satisfaction/HCAHPS/reputation, market share implications ($?)
III. Adverse events ("No pay" for adverse event initiatives)
Medication error: $2000 to $5800 per case/> LOS 2.2–4.6 days
Hospital-acquired infection: $20,000 to $38,500
Deep vein thrombosis: $36,000/> LOS 4.2 days
Pressure ulcer: $22,000/> LOS 4.1 days
Ventilator-associated pneumonia: 49,000/> LOS 5.3 days
IV. Joint Commission standard
V. Compliance issues ($?)
Impact on documentation and coding
Impact on utilization efficiency (LOS/resource efficiency/DC planning)
Impact on quality
Impact on productivity and efficiency (down time/waste/ delays)
Communication inefficiencies ($4 million 500 bed hospitals)
VI. Risk management/malpractice: $521,560/lawsuits/ fines: $25,000–$100,000

leadership standard requiring hospitals to have a disruptive behavior policy in place and to supply support for its intent as part of the leadership accreditation standards [50]. In order for hospitals to receive Medicare reimbursements, they need to pass the accreditation survey requirements [51].

From a compliance perspective, noncompliant behaviors that adversely impact coding and documentation requirements, nonadherence to utilization protocols, and/or not following best practice guidelines, policies, and procedures can all have a significant negative economic and quality impact on patient care outcomes. It is estimated that the average yearly cost for a midsize hospital due to communication deficiencies is $400,000 [52].

From a risk management perspective, issues can arise from not only the occurrence of medical errors or adverse events, but other issues can be related to poor compliance, poor communication and collaboration, impeded information transfer, neglect, failure to respond, and/or poor patient satisfaction. More egregious cases can lead to litigation. Time, preparation, and malpractice awards can result in significant dollar amounts with average malpractice settlements averaging above a half a million dollars [53–56]. In California there is the additional penalty of hospital fines (ranging from 25,000 to 100,000) for the occurrence of significant adverse events [57].

Addressing Disruptive Behaviors

Recognizing the multidimensional cause, nature, and extent of disruptive behaviors, it is clear that there is no one solution to resolve the problem. The ultimate objective is to prevent disruptive behaviors from occurring. If they do occur the organization and staff need to take immediate action to lessen the likelihood of any adverse event on staff or patient care. Depending on the nature and frequency of events, further interventions may be required to prevent repeated incidents. Table 10.5 provides a list of recommended strategies. In addition to reducing the incidence of disruptive behaviors, this approach can also improve organizational culture, staff relationships, team collaboration, communication efficiency, physician engagement, physician well-being, and overall physician satisfaction.

One of the earliest steps is to improve the process and criteria for medical school selection. As discussed earlier, many medical schools are looking for more "well-rounded" medical school applicants who majored something other than pure science and mathematics. The new MCAT (Medical College Admission Test) is now introducing more questions on humanities and social sciences. The goal is to look for individuals with more highly developed personal rather than technical skill sets. Many of the more progressive medical schools, supported by large grants from The AMA and Robert Wood Johnson Foundation, are in the process of revising their curriculum to focus more on the importance of developing strong individual communication and team collaboration skills [58, 59].

From an organizational perspective, hiring and retaining the right people is key to success. Many organizations are recognizing the importance of the right "cultural fit" and are using more selective interviewing techniques to assure that new hires will work well with the mission and operational needs of the work environment [60]. Once hired, there should be a comprehensive on-boarding process to first welcome the physician and then explain organizational priorities and incentives working under the complexities of today's health care environment and the support available to help physicians negotiate through the maze of medical requirements [61, 62]. Recognizing administrative concerns for financial viability, and clinical staff concerns about quality and safety, there needs to be a mutually agreed upon rallying point and alignment around best patient care.

Organizational culture sets the tone. Strong and supportive organizational cultures have been shown to significantly enhance staff morale, satisfaction, motivation, and engagement which leads to behaviors that result in best patient outcomes of care [63]. Having a strong, committed, and respectful leadership, an effective structure and process in place manned by skilled individuals, and a willingness to address and respond to individual concerns and barriers that pose a potential disturbance in the force; establishing priorities; and enlisting the help of key individuals who act as champions and catalysts to help promote a positive work environment are the key ingredients to a successful culture. In today's multitasking pressure-filled-here's-what-you-need-to-do world, always remember to take a step back and take time to thank and recognize physicians and staff for their efforts and a job well done.

Table 10.5 Recommended strategies

1. Training redesign
Applications/MCAT testing
Revised curriculum
2. Organizational culture/work environment
Hiring/on boarding
Mutual alignment
Leadership commitment/structure and process
Encourage motivation/address barriers/set priorities
Engage champions/catalysts/role models
Recognition and rewards/
3. Education
Awareness/responsibility/accountability
The business of health care
Expectations vs. reality
4. Relationship training
Address factor influences: generation/gender/culture/ethnicity
Diversity management/cultural competency/sensitivity training
Personality profiling
Customer satisfaction
Stress/conflict/anger management
Emotional intelligence
5. Communication skills/team collaboration training
6. Behavioral policies and procedures
Definition/accountability/incident reporting and review
Risk management
7. Intervention
Prevention
Tiered approach: informal/formal/disciplinary
8. Staff support
Administrative/clinical/behavioral (EAP/Wellness Committees/coaching/counseling)
Behavioral modification programs
Career guidance
9. Physician well-being
Awareness/reflection/motivation
Self-care/relaxation
Stress reduction/setting limits
Quadruple Aim
Mindfulness
Resilience
10. Physician engagement
Input/empathy/responsiveness/alignment
Recognition/respect

Another crucial step is to make an effort to educate staff about what's going on, what **we** need to do in response, and how it might impact individual roles and responsibilities. Providing educational sessions on the evolving health care environment, value-based care, system redesign, performance-based accountabilities, and the business implications of clinical practice will help set realistic expectations by giving physicians a better understanding of what's happening and how it might affect their individual practice.

Providing training to enhance relationship management is crucial. Under an umbrella of increasing complexity and accountability, more segmentation between specialty and discipline-specific tasks and responsibilities, and a greater focus on care responsibilities that extend across the entire spectrum of care, it is crucial for all members of the health care team to work well together to provide best patient outcomes. In order to accomplish this, we need to gain a better understanding of the factors affecting individual values, perceptions, and behaviors.

Earlier I discussed the implications of a number of different internal and external factors influencing one's personality, mood, and demeanor. Providing specific training programs to address some of these specific factors is beneficial in gaining a better understanding of contributing circumstances and how individuals can deal more effectively with complicated issues. These programs might include training in diversity management, cultural competency, sensitivity training, generational values, personality assessments, and customer satisfaction. Additional programs on conflict management, anger management, and stress management may also be of value. As mentioned earlier, there is now a growing focus on using emotional intelligence training as a way to improve behavioral and relationship management techniques [64]. Several organizations have had notable success after implementing these types of programs.

Communication, Team Collaboration, Work Relationship Skills Training

Beyond addressing disruptive behaviors is the need to improve overall communication and team collaboration skills. Physicians are typically not the best communicators. There are many barriers that get in the way [65]. First, they look at patient management as a one-way dictatorial process. They're trained to work autonomously, to take control, and to give orders. Communication gaps are further accentuated by time constraints; a bureaucratic health care hierarchy; a teaching focus on gaining knowledge and technical competency rather than personal skill development; segmented, siloed, and discipline-specific priorities which focus more on the organ or disease rather than the patient; and an overriding strong ego that resists outside advise, interference, or involvement. In today's complex health care world, improving communication skill sets should be a number one priority.

There are many different types of communication skills training programs available. At one level is the SBAR (Situation, Background, Assessment, Recommendation) script available to help nurses more effectively organize their thoughts in presenting patient information to the physician. At a deeper level are the basic communication techniques taught by a number of different programs such as the AIDET, Bayer, or STARS programs. The focus is getting the physician in synch with effective two-way communication. Crucial points emphasized include a proper introduction and acknowledgment; making time and patience; exhibiting positive body language and verbal tone; enabling trust; avoiding distractions or conflict; reflective listening; being sensitive to the other's values, needs, and desires; providing clarification and understanding; and setting appropriate expectations. In a demanding hectic environment, taking the time to listen, understand, respond, and explain is the key to gaining compliance and a successful interaction and outcome [66, 67].

A further extension of communication is to teach team collaboration. One of the most effective programs in health care is the TeamSTEPPS program based on the Crew Resource Management techniques used in the aviation industry [68]. The focus of the training program is to teach team members how to [1] anticipate and assist; [2] build trust, respect, and commitment; [3] understand your role and roles of others; [4] reinforce accountability and task responsibilities; [5] avoid/manage conflict or confusion; [6] be assertive; [7] follow up discussions; and [8] thank for a job well done. Assertiveness training is a crucial part of the process reinforcing the need to speak up when there is a question of patient safety. In addition to the Team STEPPS program is the training offered through VitalSmarts Crucial Conversations [69].

Policy, Process, and Procedure

In order to hold individuals accountable for their behaviors, the organization needs to have a code of conduct policy in place that outlines nonprofessional behaviors and the ramifications of noncompliance [70, 71]. The policy must be backed by an effective incident reporting system where each complaint is evaluated on its individual merits and recommendations given for appropriate follow-up action. In order for the program to be effective, individuals need to be willing to report. Barriers to reporting include fear of whistleblower retaliation, a double standard of reluctance to apply consistent reprimands when it involves physicians, and the sense that they report and report and nothing ever changes. On the incident evaluation side, determinations need to be made by trained individuals functioning without personal bias or conflicts of interest with recommendations passed on to an individual or committee who has the appropriate facilitation skills to foster accountability and resolution. When patient quality or safety is of concern, many of these issues fall under a risk management protocol.

When it comes to intervention the first intervention is prevention. As discussed previously, taking a pro-active approach in trying to get a better understanding of behavioral characteristics and teaching basic principles about behavioral management can certainly reduce the predilection for behavioral problems. For recurring issues early intervention has a much greater potential for success than waiting until a bad incident occurs where the interaction takes on more of a remedial tone [72].

Interventions can occur at several different levels. In all cases it's crucial to intervene at the appropriate time and place with the intervention conducted by someone skilled in the arts of facilitation and conflict management.

The first intervention is real time. If somebody is acting inappropriately, the recipient needs to be assertive in addressing their concerns in a respectful professional manner. Assertiveness and Crucial Conversations training can help reinforce these capabilities.

The next series of interventions are post-event interactions. Hickson and his group at Vanderbilt University have come up with a four-phase process for intervention that includes informal, awareness, authority, and disciplinary actions [73]. The informal interaction is often described as the "cup of coffee" approach where you take the physician aside, describe the series of events, and ask for their opinion. The usual response is that they weren't aware of any problem and question how someone could think that they were acting in a disruptive manner. Their next thought is justification as the need to take control during a period of uncertainty or crisis. Their next thought is rationalization and passing blame onto someone or something else for their behavior and not take any responsibility for their actions. A good facilitator will listen to what the physician has to say, ask if they thought that their action was appropriate, address their concerns but bring the focus back to their behaviors, reframe the issue to bring it into context, ask them to think about the impact it had on the other person(s) involved, and what they could have done differently to ease the angst of the situation. When the situation is addressed under the guise of raised awareness, most physicians will self-correct.

For repeat offenders or when the incident is of a serious nature, there needs to be a more formal intervention. The physician needs to recognize the ramifications of noncompliance with the code of behavioral standards, and the organization needs to reinforce the importance of a zero tolerance policy with the potential of disciplinary action. In some cases the recommendations may be made for anger management, conflict management, or diversity training and in more serious cases the need for individualized counseling. Always keep in mind the underlying possibility of drug or alcohol abuse. Depending on the nature of the problem, some physicians may be required to attend an outside behavioral modification program offered through state-sponsored Physician Health Programs (PHPs), or proprietary programs offered through the University of California San Diego PACE program, the Vanderbilt University Disruptive Behavior Program, and the University of Florida Program, or other state-sponsored or private outside resources [74].

In the more extreme cases where physicians are resistant to follow recommended actions, the only recourse may be sanctions or termination of privileges. Having served as an expert witness on both sides of the picture (representing hospitals,

representing individual physicians), termination cases stir up a lot of legal entanglement and organizational aggravation [75]. Most physicians will fight and appeal termination decisions based on failure of the hospital to follow due process, breach of contract, anti-trust issues, bad faith, malice or discrimination, defamation of character, or on the basis of undue harassment and retaliation. In their defense hospitals need to have a clear line of documentation as to the issues, to follow due process, to adhere to the bylaws and HCQIA requirements, to be consistent with similar types of cases, to document follow-up discussions, to comply with the rights of the physician to be heard, to provide specific recommendations designed to resolve problems, and to state the ability to reapply once the issues are addressed and resolved. Hospitals wind up winning more than 80% of the appeals.

When possible the focus of any intervention should be on trying to help the physician better adjust to the situation by offering assistance and career guidance rather than punishment. The primary focus should be on positive physician support.

As mentioned previously physicians are overwhelmed by administrative requirements and time constraints and are being asked to take on more and more responsibilities that take them away from direct patient care. There are several ways in which the organization can help. From an administrative and logistical perspective, having the organization be more sensitive to on-call schedules, productivity requirements, and meeting or committee attendance will help reduce some of their administrative load. Offering administrative assistance by providing more help with documentation and compliance with electronic medical records through additional training, staff support staff, or "scribes" will help ease physician frustrations in this area.

From a clinical perspective using physician assistants, nurse practitioners, or case coordinators to help cover some basic medical necessities will free the physician up to concentrate on more complex patient management issues.

From a behavioral perspective, providing services to help the physician better adjust to the pressures of medical practice, organizations can offer services through Wellness Committees, Employee Assistance Programs, individualized coaching and counseling sessions, or other services offered though human resources, medical staff services, or outside referral services.

As mentioned previously stress and burnout are a major problem affecting physician satisfaction and overall well-being [76, 77]. As much as we try to support physicians, it ultimately rests in the physician's hands to make the commitment. Unfortunately, there is often a significant gap between intentions and action, and we need to motivate physicians to move forward [78].

Motivation and Engagement

Motivation for physician well-being needs to be linked with the physician's primary goal and aspirations to provide best practice care. They need to recognize, understand, and accept the fact that emotional and physical well-being affects their levels of energy and the joy of being a physician. Many recent studies have

documented that emotional and physical wellness is a strong contributor to physician satisfaction, improved care relationships, and improved patient outcomes of care [79, 80]. This all starts by getting the physician to understand the importance of good health and the negative consequences of ill-health on performance that impacts family, friends, colleagues, staff, and ultimately patients. They need to understand the importance of relaxation and recreation, adequate sleep, regular exercise, and good nutrition. They need to try and avoid stressful situations, be able to set limits, and be comfortable in saying no. They also need to be willing to accept outside advice. One of the most important components is to teach them techniques to support self-reflection, self-preservation, and the importance of time off and relaxation to achieve inner peace. For most physicians the recognition is there, but it becomes a secondary priority to the daily grind. We need to aggressively promote and support the importance of physician well-being and help them commit to make it happen [81, 82].

There are now a growing number of different initiatives being introduced to support this point. From a health care policy perspective, the IHI (Institute for Healthcare Improvement) and other health care societies are promoting the extension of the concepts of the Triple Aim (enhancing the patient experience, improving population health, reducing costs) to the Quadruple Aim adding to the goals the importance of improving the work life of health care providers [83, 84]. Many organizations are introducing the concepts of mindfulness and mediation training programs for physicians as a way to promote self-refection, purpose, and fulfillment [85, 86]. Mindfulness activities help to reinforce purpose and meaning by focusing on the benefits of the current activity or task. It incorporates many of the ideals of meditation and relaxation techniques with the goal of providing a more productive and fulfilling interaction. Many organizations have successfully used these techniques to improve overall physician satisfaction, well-being, and engagement [87]. The term resilience is used to describe the capacity to “bounce back” and respond to stressful situations in a successful manner [88, 89]. Many of the attributes of resilience lie in positive organizational support, mindfulness, relaxation, self-preservation, and the ability to set limits.

The final phase is to enhance physician engagement. The key steps include establishing an underlying culture of positive support for physician livelihood, giving physicians an opportunity for input and discussion, and responding to their needs and concerns [90–94].

Think about this. Physicians are a precious resource. All they really want to do is to practice good medical care. But growing frustrations arise from outside intrusions and someone else unidirectionally telling them what they need to do. Part of their frustration is the lack of physician input. Physicians want to have a voice particularly when it involves issues revolving around patient care. Input can be gathered from several different sources. These include surveys, discussions at town hall or department meetings, specialized task forces, or, better yet, one-on-one conversations with administrative and clinical leaders. Allowing input diffuses some of the frustrations particularly if there are expressions of empathy and understanding of

the physician world. Input must be followed by responsiveness. It's not that you'll be able to solve every problem, but at least you can provide an explanation and coordinate next steps on achieving mutually aligned objectives. There is a strong correlation between physician engagement, physician alignment, physician well-being, physician satisfaction, physician motivation, improved relationships, and improved outcomes of care. And always remember to visibly show respect and thank physicians for what they do.

Conclusion

Increasing complexities in today's health care environment have introduced a number of different factors distracting physicians from their primary goal to provide best practice care. At times the resulting levels of frustration, dissatisfaction, stress, and burnout can affect their attitudes and behaviors to a point where they can negatively impact relationships that adversely affect patient outcomes of care. With this in mind, we need to do what we can to help them better adjust to the pressures of medical practice. In order to do this we must first get a better understanding of the impact of contributing factors, give them an opportunity to discuss their concerns, and then provide pro-active support to help them thrive. This will require a multi-step process that includes education, advanced training to enhance work relationship, communication, time, and conflict management skills and by providing the necessary logistical, clinical, and behavioral support to help them deal with the day-to-day distractions. In some cases more in-depth support needs to be provided to help reduce the effects of stress and burnout. We need to support physician health and well-being by encouraging and supporting rest, relaxation, and teaching coping skills for resilience. More comprehensive behavioral support can come from coaching, counseling, or services provided through a Physician Wellness Committee or Physician EAP. When more serious behavioral problems occur, the organization needs to take the necessary steps to address the issue head on before it comes to the point where it can compromise care. They need to have the right policies and procedures in place, provide the necessary interaction steps to hold the physician accountable for their actions, and implement the appropriate recommendations for improvement. To better motivate and engage physicians we need to address the barriers, resistance, or the reluctance from "what's in it for me." We need to provide a supportive culture that makes an effort to better understand their world, enhance their engagement by allowing them an opportunity for input and discussion, motivate their inner passion by reminding them of the pride and joy of who they are and what they do, show respect, and thank them for a job well done. The reason that it's a "we" is that physicians won't take the necessary action on their own. We need to look at physicians as an overextended precious resource and take a pro-active stance in helping them to succeed.

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Chapter 11
Distractions in the Operating Room

Michelle A. Feil

Acronyms and Abbreviations

ACS	American College of Surgeons
AORN	Association of periOperative Registered Nurses
ASA	American Society of Anesthesiologists
CIC	Case-irrelevant communication
CRM	Crew resource management
MCARE	Pennsylvania Medical Care Availability and Reduction of Error Act of 2002
OR	Operating room
PA-PSRS	Pennsylvania Patient Safety Reporting System
PED	Personal electronic device
TeamSTEPPS	Team Strategies and Tools to Enhance Performance and Patient Safety
TJC	The Joint Commission
WHO	World Health Organization

Distracted Doctoring in the News

On April 1, 2014, one of Christopher Spillers' Facebook posts was suddenly getting a lot more attention than when he originally posted it in 2012. "Just sittin here watching the tube on Christmas morning. Ho ho ho." The post included a photo of

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a vital signs monitor, with operating room (OR) equipment in the background. Instead of being shared with family and friends, Dr. Spiller's post was now being shared with all the readers of the *Dallas Observer*, accompanied by the headline "Dallas Anesthesiologist Being Sued Over Deadly Surgery Admits to Texting, Reading iPad During Procedures."

The story began in April 2011, when Dr. Spillers was the anesthesiologist for Mary Roseann Milne, a 61-year-old woman who died after experiencing severe hypoxia during an atrioventricular node ablation. Her family sued the surgeon for malpractice, but the surgeon pointed the finger at Dr. Spillers, saying that he failed to notice the patient's low blood-oxygen levels until "15 or 20 minutes after she turned blue" because he was "doing something… on his phone or cell phone or pad or something."

When questioned by lawyers for the prosecution, Dr. Spillers admitted to using electronic devices to access medically necessary information during procedures, but said that "the time spent on the Internet during a case is, you know, very brief, a couple, three minutes." He specifically denied posting on Facebook during surgical procedures—until confronted with the Facebook post from Christmas 2012 [1]. The case was later settled in the fall of 2014 right before it was scheduled to go to trial. Charges against the surgeon were dropped.

This story is just one of many examples of "distracted doctoring"—a term that first appeared in a December 2011 New York Times article entitled, "As Doctors Use More Devices, Potential for Distraction Grows." The author, Matt Richtel, had previously won a Pulitzer Prize for a series of articles he wrote about distracted driving. In the new article, he turned his attention to the specific problem of health care professionals distracted by electronic devices [2].

The concern for this threat to patient safety was growing at such a rapid pace in the year following Richtel's article; the ECRI Institute identified distractions from smartphones and other mobile devices for the first time as one of the top 10 health technology hazards for 2013 [3].

Pennsylvania Patient Safety Authority

In 2012, analysts for the Pennsylvania Patient Safety Authority (henceforth: The Authority) noted the growing concern for health care worker distraction as a contributor to adverse events, including, but not limited to, distraction from electronic devices. In response, analysts queried the Pennsylvania Patient Safety Reporting System (PA-PSRS) to see if such events were being reported in the state [4].

The Authority is an independent state agency established as part of the Pennsylvania Medical Care Availability and Reduction of Error (MCARE) Act of 2002. This act mandates health care facilities to report adverse events, including Serious Events (i.e., events that harm the patient), and Incidents (i.e., events that do not harm the patient) [5]. PA-PSRS was launched in June 2004 to collect these reports. Today, PA-PSRS is "what many consider to be the foremost event and near

miss database in the country and, indeed, the world" [6]. The Authority monitors, trends, and analyzes data from these event reports in order to identify opportunities for improvement, education, and outreach [7].

Distractions in Pennsylvania Health Care Facilities

Authority analysts sought to answer two questions: (1) were adverse events involving distraction reported by Pennsylvania hospitals, and (2) what other patient safety events were being reported due to distraction? Analysts began with a broad look at all forms of distraction mentioned in reports for events occurring across the hospital setting.

Event Types

Pennsylvania hospitals submitted 1015 reports to PA-PSRS in 2010 and 2011 describing events that could be attributed to distraction. The most frequently reported events were medication errors (n = 605, 60%), followed by errors related to procedures, treatments, and tests (n = 282, 28%) (see Fig. 11.1).

Within the category of medication errors, the most frequently reported adverse events were dose omissions (46.8%, n = 283 of 605), followed by errors with some

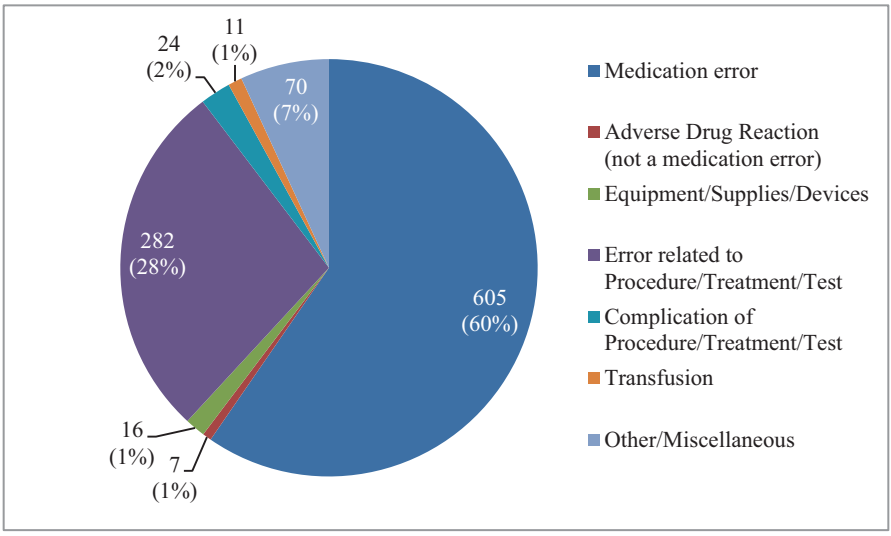

Fig. 11.1 Event reports to the Pennsylvania Patient Authority attributed to distraction, by event type, 2010 through 2011 (N = 1015) (Source: Feil [4])

aspect of medication administration labeled as "wrong" (33.9%, $n = 205$). Wrong time ($n = 49$) and wrong dose/overdosage ($n = 47$) were the two most commonly reported errors of this type.

The most frequently reported errors related to procedures, treatments, and tests were laboratory test problems (45%, $n = 127$ of 282), and of these, test ordered and not performed ($n = 36$) and result missing or delayed ($n = 30$) were the two most commonly reported errors.

Level of Harm

Nearly all events that could be attributed to distraction were reported as Incidents resulting in no harm to patients. Of the 13 events reported as Serious Events resulting in patient harm, the majority were split equally between medication errors and errors related to procedures, treatments, and tests. Table 11.1 shows the number of Serious Events reported by event type and harm score.

Table 11.1 Serious event reports to the Pennsylvania Patient Authority attributed to distraction, by event type and harm score[a], 2010 through 2011

Event type by harm score	Reports
Harm score E: an event occurred that contributed to or resulted in temporary harm and required treatment or intervention	*12*
Medication error	**5**
Extra dose	1
Wrong dose (overdosage)	2
Wrong rate (intravenous)	2
Adverse drug reaction (not a medication error)	**1**
Error related to procedure/treatment/test	**4**
Surgery/invasive procedure problem—other	1
Radiology/imaging test problem—wrong site	1
Radiology/imaging test problem—other	1
Other	1
Complication of procedure/treatment/test	**2**
Complication following surgery or invasive procedure—other	1
Other	1
Harm score G: an event occurred that contributed to or resulted in permanent harm	*1*
Error related to procedure/treatment/test	**1**
Laboratory test ordered, not performed	1
Total events with harm	**13**

Source: Feil [4]

[a]National Coordinating Council for Medication Error Reporting and Prevention [56]

Clinicians Impacted by Distraction

Two thirds of reports (66%, $n = 672$ of 1015) described nurses as the distracted parties involved in the adverse event. Smaller numbers of reports described distracted health care workers in a wide variety of roles (e.g., physicians, unit secretaries, laboratory technicians, phlebotomists, pharmacists). Caution must be taken in interpreting this result, as nearly all events appear to have been reported by nurses.

Sources of Distraction

The majority of reporters did not directly identify the source of distraction in the event narratives. In general, the reports described some element of patient care being forgotten, without identification of the reason for the lapse in memory, or the reason for the memory lapse was attributed to a general cause such as being "busy." The use of this term may reflect multitasking. In fact, many of the report narratives described this phenomenon using a variety of terms.

Interestingly, only 40 event reports (3.9%) specifically identified distractions from phones and/or computers and other technologic devices as contributing to errors.

Event Reports

The following are examples of patient safety events reported to PA-PSRS involving various distraction sources and health care workers[1]:

> [The night before, the] patient was ordered to have a potassium level drawn, with the results to be called to the attending [physician's attention]. It was learned the following morning that the test had not been ordered. The nurse had gotten distracted with seven admissions in eight hours and missed the order.
>
> While logged into this patient's report screen, I inadvertently viewed the slide of another patient and reported the results from that slide. I immediately realized my error and notified the nurse taking care of the patient. I was distracted and trying to do too much at the same time.
>
> The assisting surgeon was placing a central venous catheter. The procedure was interrupted in the beginning prior to getting started, by a nurse asking when the doctor would be coming to the OR. She informed him she would be there in 30 minutes. After closing the door and placing the "Do Not Enter" sign up, the anesthesiologist came into the room and again asked when she would be coming to the OR. She told him that she would be there as soon as she found a vein. I turned to get something and heard the doctor yell "ouch". When I turned back around, I saw that she was pulling the scalpel out of her finger.
>
> I saw that unusual custom traces were ordered. I informed the technician to make the special dilutions (which was done without incident). When I entered the prescription into

[1] The details of the PA-PSRS event narratives in this article have been modified to preserve confidentiality.

the compounding computer, I forgot to "zero-out" the neonatal trace mix, which provides the standard traces. Because of other unusual events in the area, I did not catch my error that day and the double-dose was dispensed. (Persons were talking to me while I was entering and while I was checking, and I was stressed due to a drug shortage and multiple new procedures required, and I was striving to meet delivery deadlines despite late-received adult orders.) I am very sorry. In the future, if someone is talking to me while I am entering or checking a prescription, I will stop until I can fully concentrate. I caught my mistake when I entered the new prescription for today.

OR Distractions in Pennsylvania

In search of best practices and specific tools to reduce, manage, and eliminate distraction in the hospital, Authority analysts identified the perioperative area to be the health care setting in which the most concrete work had been done to address this hazard. In fact, in 2013, at the same time Authority analysts were reviewing all events reported to PA-PSRS involving distraction, the Association of periOperative Registered Nurses (AORN) identified preventing distractions and interruptions as a key strategy to prevent three of the top 10 patient safety issues identified by its members: wrong-site surgery, retained surgical items, and specimen mismanagement errors [8, 9].

In light of the new AORN recommendations, and knowing that even minor distractions in the OR can have a cascade effect ultimately resulting in major events and patient harm [10], Authority analysts turned their attention to reports submitted to PA-PSRS for events occurring in the OR involving distraction.

Analysts identified 304 reports submitted to PA-PSRS from January 2010 through May 2013 for events occurring in the OR in which distractions and/or interruptions were indicated as contributing factors.

Event Types

The majority of OR events associated with distraction were reported as errors related to procedures, treatments, or tests ($n = 224$). Within this event type, surgery or invasive procedure problems were reported most frequently ($n = 169$), followed by laboratory test problems ($n = 43$).

Table 11.2 shows the various event subtypes reported in the category of surgery or invasive procedure problems. The subtypes reported with greatest frequency were incorrect counts of equipment ($n = 39$) and incorrect needle counts ($n = 27$). Of note, within the subtype labeled "other," three events involved specimen mishandling during the procedure, and three events involved the use of expired products or implanted materials that were discovered after having been used as part of the procedures.

Table 11.2 Surgery or invasive procedure problems attributed to distractions in the operating room, as reported to the Pennsylvania Patient Safety Authority, January 2010 through May 2013

Event subtype	No. of reports
Count incorrect—equipment	39
Count incorrect—needles	27
Preparation inadequate/wrong	19
Break in sterile technique	12
Count incomplete/not performed	11
Other (specify)	11
Procedure delayed	10
Foreign body in patient	9
Wrong side (left versus right)	9
Count incorrect—sponges	7
Wrong procedure	4
Wrong patient	3
Identification missing/incorrect	2
Procedure canceled/not performed	2
Wrong site	2
Procedure not completed	1
Unintended laceration/puncture	1
Total	**169**

Source: Feil [57]

Table 11.3 Laboratory test problems attributed to distractions in the operating room, as reported to the Pennsylvania Patient Safety Authority, January 2010 through May 2013

Event subtype	No. of reports
Mislabeled specimen	10
Specimen label incomplete/missing	10
Specimen quality problem	7
Specimen delivery problem	7
Result missing or delayed	4
Other (specify)	2
Test ordered, not performed	2
Wrong test performed	1
Total	**43**

Source: Feil [57]

Table 11.3 shows the various event subtypes reported in the category of laboratory test problems. The subtypes most frequently reported included mislabeled specimens ($n = 10$), specimen labels incomplete or missing ($n = 10$), and specimen quality problems ($n = 7$).

Level of Harm

As with events involving distraction in other hospital settings, the majority of events involving distraction in the OR were reported as Incidents not resulting in patient harm ($n = 268$, 88%).

The following are examples of the types of events reported as Serious Events resulting in patient harm:

- Wrong-side surgery
- Transfusion of the wrong blood to the wrong patient
- Failure to remove a piece of resected tissue, requiring a return to the OR
- Injection of a patient using an unlabeled syringe and needle previously used on another patient
- Inflation of a tourniquet applied to a patient's extremity for longer than intended, resulting in neurovascular changes

Limitations

In-depth analysis by the Authority for events occurring in the OR associated with distraction is limited by the information provided in PA-PSRS event report narratives. Much of what is known about distractions in the OR has been gained from observational studies in real or simulated OR environments. Given the complexity of the OR work environment, and the ubiquity of distraction, the events reported to PA-PSRS may represent a small number of all events occurring in the OR as a result of distraction.

Discussion

Distractions are encountered in health care settings on a nearly continuous basis. Distraction is particularly detrimental to performance of complex tasks that require high levels of cognitive processing [11]. Such tasks are encountered often in the OR, due to the complex nature of each work system factor: the physical environment, teamwork and communication, tools and technology, tasks and workload, and organizational processes [12]. Even minor distractions in the OR have the potential to cause errors or lapses that result in serious patient harm [10].

Health care facilities can reduce both the occurrence of distraction in the OR, and its potential negative impact on patient safety, by identifying the sources of distraction currently present and addressing them through application of strategies and tools such as those developed by perioperative professional associations and patient safety organizations.

Sources of Distraction in the OR

Distractions occur frequently in the OR setting, both due to intrinsic sources (e.g., surgical equipment alarms, surgical team communication relevant to the procedure) and extrinsic sources (e.g., beepers, phone calls, communication from staff outside the OR) [13]. Distractions can affect all members of the surgical team: anesthesiologists and nurse anesthetists, nurses, perfusionists, surgeons, surgical technicians, and other team members. Cognitive workloads are demanding for each of these professionals, with high levels of cognitive processing required of different members of the team at different times, resulting in multiple high-risk points in the course of an operative procedure [10].

OR team members can serve as both the source and the recipient of distracting communication. An observational study of distracting communications in the OR identified many case-irrelevant communications (CICs), defined as communication not relevant to the surgical procedure in progress. Half of all CICs consisted of "small talk." Although surgeons initiated and received the greatest number of CICs, visitors to the OR (defined as external staff not belonging to the OR team involved in the current surgical procedure) initiated CICs with the highest levels of observable distraction (i.e., causing team members to pause, disruptive to work flow). Communications directed to nurses and anesthetists resulted in higher levels of distraction than communications directed to surgeons [14].

A common source of intrinsic distraction is multitasking. Multitasking is a universal and constant challenge in health care settings and is not limited to the OR. Being able to continually process incoming information while balancing and responding to competing priorities and completing necessary tasks is an essential skill for health care workers. Multitasking creates a stream of interruptions that may, in fact, be necessary and may increase efficiency. However, more research is needed on the optimal level of interruptions that minimize error and maximize efficiency [11, 14].

Observational studies of nurses and physicians have been conducted that have found multitasking to be highly prevalent—with interruptions occurring anywhere from 1.4 times per minute [15] to once every 14 min [16]—and observable multitasking occurring more often than perceived by the clinicians themselves [17].

Unfortunately, there is a very real limit to the ability of the human brain to multitask. True multitasking refers to performing two tasks simultaneously. This is something the human brain is not able to do [18]. What the brain is actually doing in these situations is task switching. Each time the brain switches between tasks, it distracts from the primary task and may contribute to error [11, 19].

Limiting Distraction in the OR

Managing the problem of distraction in the OR begins with primary prevention (i.e., limiting the number of distractions that are occurring). Specific strategies supported in the literature include implementation of the "sterile cockpit" rule and reducing distractions from technology and noise.

"Sterile Cockpit"

The "sterile cockpit" protocol in aviation applies during critical periods of high mental workload and high risk, when all communication in the cockpit is restricted to information necessary for handling the plane. These critical periods occur during taxi, takeoff, landing, and any flight operations below 10,000 ft. This rule not only prohibits nonessential conversation but also eating, reading materials not relevant to operating the plane, or any other activity that could distract a member of the flight crew [20].

In order to apply the "sterile cockpit" rule in the OR, it is necessary to first define the critical phases of operative procedures during which the rule would apply. Briefing, time-out, and debriefing have been identified as critical phases common to all operative procedures and affecting all team members [9, 21]. However, difficulty lies in further identifying critical phases common to the entire team, as the tasks and their associated cognitive loads vary over the course of the procedure, by role, with different roles experiencing higher or lower levels of mental workload at different times [22]. For instance, induction and emergence from anesthesia are critical phases analogous to takeoff and landing for anesthesia providers [23]. But for surgeons, the critical phase of an operative procedure may occur at various points during the procedure, depending on the steps involved [22]. For nurses, surgical counts and specimen labeling are examples of critical phases [9].

Critical phases may also vary by procedure type. For example, in a study examining the feasibility of applying the "sterile cockpit" concept to cardiopulmonary bypass surgery, researchers found it was more beneficial to define critical phases according to procedure-specific events (e.g., establishment of activated clotting time, initiation of cardiopulmonary bypass, administration of cardioplegia) rather than specific time intervals. A structured communication protocol designed to limit distraction during these critical phases reduced miscommunication by 50% [22]. In a similar study evaluating the use of an intraoperative pathway for deep inferior epigastric perforator flap breast reconstruction surgery, nine critical stages were identified (e.g., induction, perforator dissection/flap harvest, recipient vessel harvest). The activities for each staff member were defined for each stage, and checklists and interphase transition briefings were used to standardize processes, resulting in improved interdisciplinary communication and statistically significant reductions in OR time and costs [24].

Reducing Distractions from Technology

Distraction from the use of newer technologies, such as smartphones and other personal electronic devices (PEDs), is a growing concern in health care [2, 25–28]. In addition to phone calls and text messages, these devices introduce distractions from social media, e-mail, and other forms of electronic communication. The compulsion to constantly check PEDs is being recognized as an addiction that is impacting users of these devices, not least among them health care providers [29]. In 2014, AORN

recognized this concern and updated its position statement on noise in the perioperative setting to include new suggestions for preventing distractions from PEDs during critical phases of perioperative care [30].

Information on hospital cell phone policies is limited. Anecdotal information gathered from administrators and OR staff suggests that in hospitals that have established such policies specific to the OR setting, cell phone use is typically banned, though these policies are not strictly enforced, nor do they apply to surgeons. In general, hospitals that have established institution-wide policies regarding cell phone use tend to restrict the personal use of cell phones to nonwork time in nonpatient areas [31].

Position statements on distraction in the OR have been published by three major associations representing perioperative professionals: AORN (as previously mentioned), the American College of Surgeons (ACS) [32, 33], and the American Society of Anesthesiologists (ASA) [34].

With regard to cell phone use, AORN has recommended that OR staff leave cell phones and pagers with someone outside the procedural environment whenever possible, properly identify cell phones and pagers that must be answered, place any nonessential communication devices on mute or standby during surgery, and limit external communication to urgent or emergent conversations [30].

In 2008, ACS issued an official statement on the use of cell phones in the OR in which they recognized that "the undisciplined use of cellular devices in the OR—whether for telephone, e-mail, or data communication, and whether by the surgeon or by other members of the surgical team—may pose a distraction and may compromise patient care" [32]. In 2016 ACS issued an updated statement that included distractions from technology, including smartphones. ACS did not propose a ban on the use of these devices; rather it listed 10 considerations to guide appropriate use, including avoiding personal calls, silencing ring tones, forwarding calls, and setting a distinct alert for emergency calls [32, 33].

In October 2015, ASA also issued a statement on distractions, without specifically mentioning cell phones or other devices. In the statement, the ASA reminded anesthesiologists that "Part of patient care includes managing the working environment to control and when possible eliminate distractions that reduce appropriate attention to the patient within the anesthesia care environment" [34].

Not all news about cell phones, pagers, and smartphones is bad. While these devices have been recognized as a source of distraction, they may also help to prevent it—the key is in how they are used. Historically clinicians have preferred synchronous communication (e.g., face-to-face or telephone conversations) and engaged in more of this type of communication, over asynchronous communication (e.g., numeric or alphanumeric paging, text messages, voicemail). Both types of communication produce frequent interruptions, but synchronous communication is the most disruptive [35]. Asynchronous communication using newer technologies provides a way for the sender to communicate information to the receiver while allowing the receiver to review the information and respond at a later time, if appropriate, thereby decreasing interruptions to their workflow [36, 37].

Reducing Distractions from Noise

In addition to the types of OR noises already discussed (i.e., verbal communication, cell phones, pagers, PEDs), other sources of noise in the OR include music, surgical equipment, and clinical alarms. Noise can lead to miscommunication and impair performance, even when the noise level falls within the range of normal conversation and ambient background noise. Performance further deteriorates at higher noise levels, most notably noise from music [38]. Music is of particular concern, as more than 60% of perioperative staff report listening to music in the OR, and more than 50% prefer to listen to music at medium to high volumes [39].

Clinical alarms are intended to distract or interrupt clinicians in order to appropriately refocus their attention. In fact, well designed and properly managed clinical alarms create purposeful distractions that share important information and help improve problem identification [40]. Poorly designed and improperly managed clinical alarms, on the other hand, create hazardous distractions that threaten patient safety [3].

False alarms, also called nuisance alarms, are a source of noise and distraction that disrupts patient care and impairs clinician performance. Aside from this direct effect, frequent false alarms can distract clinicians causing them to fail to recognize "real" events [41]. Individualizing alarm settings for each patient's condition is the most direct method for decreasing false alarms [42].

Tools to Ameliorate the Impact of Distraction in the OR

Because total elimination of distraction in the OR is not likely, secondary prevention strategies to ameliorate the impact of distraction are necessary. Surgical checklists and preoperative briefings are two tools that can help the OR team to achieve and maintain situational awareness and avoid and/or recover from the negative effects of distraction.

Surgical Checklists

When distraction diverts attention from a primary task, the likelihood of committing an error upon return to the primary task is increased [11]. Checklists are a tool to focus the attention of the surgical team on the primary task (i.e., the operative procedure) and aid the team in quickly regaining that focus after encountering a distraction. Checklists outline the minimum number of discrete steps required in a complex process. They are particularly useful tools in situations that create high cognitive workload and are distraction prone [43]. When utilized during an operative procedure, a checklist serves as an event-based cue that aids memory recall by providing information about what steps in a procedure have been completed and what steps remain to be performed [44].

Surgical checklists have been developed by The Joint Commission (TJC) [45], the World Health Organization (WHO) [46], and AORN [47]. The Authority has also developed a preoperative checklist, available as part of an extensive collection of tools and resources designed to help hospitals prevent wrong-site surgeries [48]. This collection is available on the Authority website and includes a tool entitled "Actions to Satisfy Universal Protocol and WHO Surgical Safety Checklist" that presents expanded advice from the Authority alongside recommendations from TJC and WHO.

Preoperative Briefings

The purpose of a preoperative briefing goes beyond completion of the preoperative checklist. A briefing conveys "precise instructions or essential information" [49] about the primary task (i.e., the operative procedure) to all members of the surgical team. The beneficial impact of briefing on reducing distractions is illustrated in a study by Henrickson et al., which found a statistically significant decrease in surgical flow disruptions ($p < 0.05$) after implementing a cardiovascular surgery-specific, multidisciplinary briefing protocol, designed with input from all members of the OR team. The authors proposed that this is because a briefing promotes mindful engagement, open communication, and a shared mental model for the team. Without active participation in the briefing by all members of the team, staff can become disengaged and "miss subtle migrations toward error during a procedure" [50]. AORN specifically includes time for a briefing, time-out, and debriefing as part of the Comprehensive Surgical Checklist [47].

Empowering the Surgical Team

Empowerment and teamwork is necessary for all members of the surgical team to promote an environment with reduced distractions and to speak up when they recognize that distraction is impairing performance. This can only be achieved within a culture of patient safety, with skilled leaders and clear communication.

Teamwork Training

Crew resource management (CRM) was developed by the aviation industry in 1979 in response to the devastating crash of United Airlines flight 173 that occurred as a result of distraction (the plane ran out of fuel, while the flight crew was distracted by troubleshooting a problem with the landing gear) [51]. CRM was later adapted to health care following the 1999 Institute of Medicine report, *To Err is Human: Building a Safer Health System*, in which recommendation was

made to apply aviation safety concepts to health care systems. CRM is a team-based training that teaches cognitive and social skills that empower all team members to promote safety and improve performance. The training focuses on communication, decision making, interpersonal relations, team coordination, and leadership [52].

Similar to CRM, Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) is a team-based training program that teaches skills in four domains: leadership, mutual support, situation monitoring, and communication. Situation monitoring is "the process of actively scanning and assessing elements of the situation to gain information or maintain an accurate understanding of the situation in which the team functions." The skills and tools taught as part of this domain apply most directly to the challenge of managing distractions [53].

Both CRM and TeamSTEPPS training include tools already mentioned, such as checklists and briefings. But beyond the use of these standardized processes and tools, both programs stress the importance of cross monitoring and advocacy and assertion [52, 53].

- Cross monitoring (i.e., "watching each other's back") is "the action of monitoring the behavior of other team members by providing feedback and keeping track of fellow team members' behaviors to ensure that procedures are being followed appropriately" [53]. This skill allows team members to help each other maintain focus on the primary task in the face of distraction.
- Advocacy and assertion involves speaking up about patient safety concerns, especially when the leader or other members of the team have failed to recognize the concern or do not believe the concern to be valid [53]. This skill empowers team members to speak up when they recognize a distraction or interruption is impairing performance.

Surgeon Engagement and Leadership

Lack of engagement from surgeons is a major barrier to promoting a culture of patient safety in the OR. Guidelines, checklists, and protocols alone will not be effective without the input and ongoing support of surgeons [45]. In surveys of perioperative professionals, between 29% [54] and 43% [55] of respondents report being encouraged to speak up and report concerns during procedures. As OR team leaders, surgeons are expected to demonstrate leadership skills that are foundational to establishing a culture of patient safety, as emphasized in CRM and TeamSTEPPS training. TeamSTEPPS training specifically notes that leaders "should be able to effectively empower team members to speak up and openly challenge, when appropriate" and that effective leaders "are responsible for ensuring that team members are sharing information, monitoring situational cues, resolving conflicts, and helping each other when needed," [53]—all skills essential to both avoiding and handling distraction in the OR.

Risk Reduction Strategies

In summary, the Authority offers the following strategies for reducing distractions in the OR setting:

- Assemble multidisciplinary teams to identify critical phases in operative procedures, specific to individual teams and procedure types as necessary that should not be interrupted [22].
- Implement a "sterile cockpit" or "no interruption zone" protocol during critical phases of operative procedures [9, 21, 22].
- Use preoperative and procedural checklists [9, 43, 45, 46, 48].
- Design and implement a multidisciplinary briefing tool [50].
- Utilize a structured communication tool, such as SBAR (i.e., situation, background, assessment, recommendation), especially during critical phases of a procedure [50, 52, 53].
- Minimize communication by members of the OR team that is irrelevant to the current procedure and limit interruptions from outside staff and other visitors to the OR [14].
- Establish guidelines and expectations, applicable to all members of the surgical team, for the appropriate use of cell phones, pagers, smartphones, and other PEDs in the OR, and monitor for compliance [29–34].
- Educate staff about electronic distraction and its potential detrimental effect on patient safety [2, 3, 25–29].
- Raise awareness of the addictive component of PEDs and other technologies [29].
- Reduce noise level in the OR whenever possible, especially during critical phases in the procedure [38, 39] (e.g., limit conversation not relevant to the current procedure, lower the volume of background music, adjust surgical equipment settings to reduce excess noise, as able).
- Customize alarm settings for individual patients and use smart alarms, when available, to reduce distraction from false or nuisance alarms [42].
- Provide teamwork training, such as CRM and/or TeamSTEPPS, utilizing case study scenarios specific to the OR [52, 53].
- Engage surgeons in patient safety teamwork training and quality improvement projects targeted to reducing distraction [52, 53].
- Ensure that surgeons and other OR team leaders promote a culture of patient safety, encouraging all team members to practice skills necessary for situation monitoring and to voice concerns at any point during a procedure [52, 53].

Conclusion

Distraction is a threat to patient safety that is present in all health care settings. Distraction in the OR can be especially dangerous due to the complex nature of operative procedures that require higher levels of cognitive processing. There is a growing

body of research examining the impact of distractions in the OR setting. Electronic distraction is of particular concern, as the use of smartphones and other personal electronic devices have become ubiquitous in the health care setting. Substantial work has been done by perioperative professional associations and patient safety organizations to create guidelines and tools that can be utilized in hospital ORs to limit, and/or ameliorate the negative impact of, distraction. The Authority encourages hospitals to engage surgeons and form multidisciplinary teams charged with addressing the issue of distraction in the OR setting by identifying sources of distraction that may be unique to individual hospitals, surgical teams, or procedures and designing process improvements based on existing guidelines and tools. An approach is suggested that includes primary prevention (i.e., implementing strategies that decrease the occurrence of distraction in the OR environment), secondary prevention (i.e., utilization of tools and processes that helps OR teams maintain situational awareness and avoid and/or recover from the negative effects of distraction), and team-based training.

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Chapter 12
Risk Reduction and Vigilance in Anesthesia

Roy G. Soto, Mallika Thampy, and Sara Neves

Introduction

Anesthesia providers thrive in environments of high risk, rapid change, and intense concentration. Intermittent moments of extreme stress are much less common than long stretches of routine monitoring and documentation, thanks, in part, to advances in medical and device safety as well as improvements in medical and nursing education. As when driving, distraction can result in lapses of vigilance, and these lapses can result in harm. We find ourselves in a unique time period: safety is at an all-time high with machines and automated alarms aiding in the provision of safe care, while the world's knowledge and entertainment content are at our literal fingertips everywhere we go. In this chapter, we will discuss the standard techniques used in the past to ensure risk reduction in the perioperative environment as well as challenges to vigilance in the digital era.

The History of Anesthesia and Patient Safety

"When I beheld the flames gushing forth from his mouth, I almost believed it was a veritable fire demon sitting before me" [1]. This description of accidental ether ignition during tooth extraction under candle illumination in 1866 highlights just how far we have come in our field. Although, per the original author, "the patient's

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toothache did not return", we cannot count this as a successful anesthetic! Fortunately, we have made great strides in patient safety, and the 2000 Institute of Medicine report "To Err is Human" singled out the specialty for its great strides in safety improvements: "... anesthesiology has successfully reduced anesthesia mortality rates from two deaths per 10,000 anesthetics administered, to one death per 200,000 to 300,000 anesthetics administered" [2].

Safety factors cited in the report include:

- Improvements in technology
- Improvements in information management
- Improvements in human factors
- Formation of the Anesthesia Patient Safety Foundation
- Strong specialty leadership focused on safety

Indeed, the increased membership in anesthesia specialty societies has been linked to improvements in safety (Fig. 12.1) [3], and there is no doubt that the organized dissemination of education about new medications, new devices, new technologies, and adverse events has improved care (Table 12.1) [4].

Much of the improvement can be traced to the day-to-day practice of anesthesia. Complications which resulted in catastrophe, harm, or near misses were commonly experienced on a daily basis, and there was a clear specialty-wide need to improve airway management and intraoperative monitoring, for example. The identification of these problems has led to research and collaboration with industry and allied

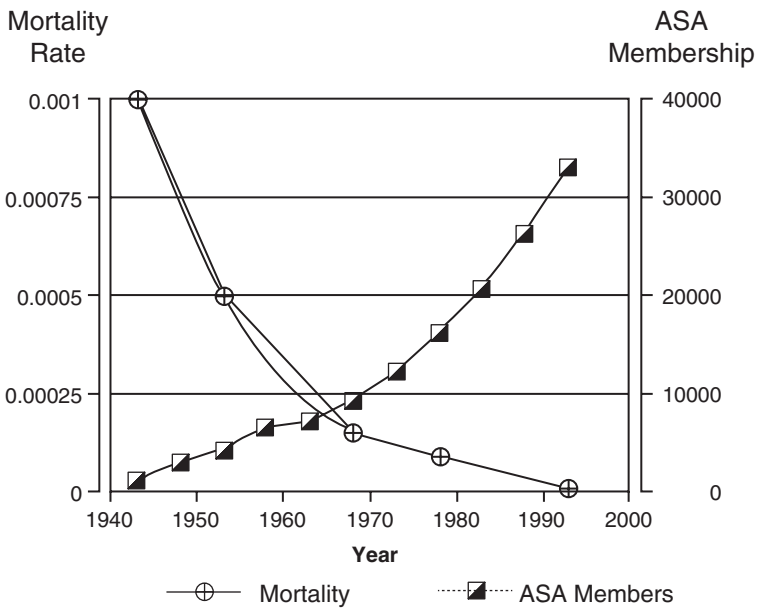

Fig. 12.1 Correlation of anesthetic mortality rate with ASA membership (Reproduced with permission from Abenstein and Warner [3])

Table 12.1 Highlights in safety advances in anesthesiology

Late 1800s	Identification of dedicated anesthesia personnel
Early 1900s	Formation of anesthesia professional organizations
1920s	Description of stages of anesthesia
1940s	Introduction of intravenous anesthetic techniques
1950s	Introduction of paralytics
1960s	Improvements in standard cardiac monitoring
1970s	Routine use of safe nonflammable volatile anesthetics
1980s	Introduction of pulse oximetry
1990s	Routine use of capnography
2000s	Perioperative risk stratification, preoperative optimization, and enhanced recovery protocols

specialties to ultimately improve care. Guidelines and standards for safe care are now the norm for anesthesiology, and advances in maintenance of certification ensure that providers remain up-to-date on safe practice.

As described previously, these advances in patient safety have resulted in a dramatic reduction in anesthesia-related mortality over the past half century and have resulted in consistently low insurance premiums for anesthesia providers, despite a perception for high risk [5]. Anesthesia providers, however, cannot only rely on the strength of their technologies; they must also remain vigilant during all aspects of anesthetic care.

Vigilance, Distraction, and Multitasking

Eternal vigilance is the price of patient safety. This quote is an amalgamation of "Eternal Vigilance is the Price of Liberty" (commonly misattributed to Thomas Jefferson) and "Eternal Vigilance is the Price of Safety" (an apropos banner on a cruise ship bridge which the primary author found shortly after residency training). Vigilance can be defined as the state of keeping careful watch for possible danger. As anesthesia providers, we scour medical records for possible signs of future anesthetic complications; we examine patients for potential airway difficulty; and we stand at the bedside as surgeons spectacularly interfere with the physiologic milieu within which an equilibrium is normally maintained. Our specialty is marked by obsessive attention to detail and near-paranoia about potential complications. By our nature, we are paranoid and are prepared for the unexpected (or cautiously expected) problem with algorithms, techniques, medications, and plans A, B, C, and D.

This vigilance, however, occurs in an environment of routine and safety. Even the most complex cases may proceed without incident, allowing emergency medications and devices to remain (thankfully) unused. A typical week in the life of an anesthesia provider could include dozens of patients (young, old, thin, obese, fit,

frail) undergoing dozens of procedures (minor, major, routine, uncommon), and all will go according to plan. Like airline pilots, we train for rare emergencies but spend the vast majority of our time "cruising at altitude," or maintaining a stable anesthetic state with routine inductions or emergences (takeoffs and landings, if you will). Also like airline pilots, we operate in extraordinarily complex environments and are surrounded by vast arrays of potentially distracting technology (Fig. 12.2).

Distraction can lead to problems with situational awareness or the ability to multitask, both of which are vital for safe patient care. Situational awareness (SA) and multitasking represent two sides of a coin. SA is how we function in a complex environment. It's composed of three components: the *perception* of environmental elements, the *comprehension* of their meaning, and the *projection* of their status after an intervention [6]. Having good SA means successfully incorporating many pieces of information into a cogent plan. In the OR, this is how we use pulse, blood pressure, capnography, what surgeons are saying to each other, and the sound of suction to recognize hemorrhagic shock and treat it. SA is how we react in a complex and distracting environment.

Multitasking, in contrast, is the practice of performing multiple, often unrelated tasks at the same time. Clifford Nass, a researcher on the interaction between humans, technology, and distractibility described it as follows:

> The problem with multitasking is not that we're writing a report on Abraham Lincoln and … read words of Abraham Lincoln and see photos of Abraham Lincoln. The problem is we're doing a report on Abraham Lincoln and tweeting about last night and watching a YouTube video about cats playing the piano, et cetera…It's extremely healthy for your brain to do integrative things. It's extremely destructive for your brain to do non-integrative things [7].

In our practice, that translates into listening to the monitors, talking to the surgeon about the weekend, and checking email on a smartphone while drawing up the next dose of antibiotics. Multitasking creates a complex and distracting environment, and our brains are notoriously bad at adapting, despite our own beliefs to the contrary. A study in NEJM from January 2014 [8] demonstrated that texting or dialing a phone while driving significantly increases the risk of a car crash. Those findings, as translated to the distracted anesthesiologist, paint a bleak picture. Those who perceive skill at multitasking are often actually worse than those who don't multitask. As a corollary, then, while the younger population may be more adept at troubleshooting an app on an iPad, there's no evidence to suggest that they are any less susceptible to distraction when multitasking and may in fact be more addicted to distracting personal electronic devices than those who grew up without them.

Reading in the Operating Room?

Before we turn our attention to electronics, it is worth mentioning simpler modes of distraction. There has been a long-standing concern among academic anesthesiologists that even educational reading in the operating room by residents leads to a lack of vigilance. Residents, on the other hand, view the long stretches of tedium

Fig. 12.2 The technologically complex environment of a typical anesthesia work station (Photo: Roy Soto)

as prime education/reading times, comfortable in their ability to scan monitors frequently and quickly, and relying on alarms to notify them of impending problems. It is interesting asking residents if it is okay to read comic books in the operating room. From our personal experience, they all feel that it is inappropriate, yet it can be easily argued that reading scientific literature would be even more

Table 12.2 Modified CAGE questionnaire

	Question	Points
C	Have you ever felt you needed to **C**ut down on the use of your electronic device?	1
A	Has anyone ever **A**nnoyed you by criticizing the use of your electronic device?	1
G	Do you ever feel **G**uilty about your electronic device use?	1
E	Do you reach for your electronic device as soon as you wake up (**E**ye-opener)?	1
Used to identify very high users of electronic devices (two or more points) who may be targeted for additional help with preventing distraction from electronic device use in OR		

Source: Adapted from Papadakos 2013 [14]

distracting and less appropriate. In 2009, Slagle and Weinger [9] showed that while anesthesiologists read during a significant portion of many cases, it did not appear to affect vigilance. In contrast, it has been demonstrated that background noise causes as much as a 17% reduction in the ability to recognize changes in O_2 saturation [10]. Workload in the operating room varies significantly from case to case, suggesting that the impact of distraction may vary as well. Also, emergent/urgent issues focus attention on specific aspects of care and away from distractors (medical and otherwise) [11].

The Effect of Personal Electronic Devices

Over the past decade, the pervasiveness of personal electronic devices (PEDs) have led to a new form of distraction, as anesthesia providers use these devices for both professional and personal purposes during patient care. A 2011 article in the New York Times coined the term "distracted doctoring" and focused attention on this growing potential problem [12]. Since then, media attention has highlighted negligence in patient care with resultant patient harm.

It is unclear if the improvements in patient safety that PEDs provide (by making medical knowledge more readily accessible) outweigh the risks of distraction. It is clear, however, that despite known risks, health care workers (similar to drivers) continue to use their devices even though risks are clear, and, as with distracted driving, details of device use may be unrelated to the more critical task at hand. A study of texting-while-driving behavior suggests that PED use can have an addictive component [8]. CAGE questionnaires have been used successfully to gauge levels of addiction in those abusing alcohol or participating in other potentially addictive behaviors [13].

Recently we conducted a survey study using a modified CAGE questionnaire [14] (Table 12.2) to assess level of potentially addictive behavior that anesthesia personnel had with their PEDs. We found that although nearly all respondents felt that the benefits of PED use outweighed the risk of their use, a significant proportion

Table 12.3 Self-reported potential addictive behaviors. Note those reporting ≥2 are provided **in bold**

Number of CAGE risks self-reported	Number of respondents (%)
0	285 (44%)
1	217 (34%)
2	**85 (13%)**
3	**37 (6%)**
4	**11 (2%)**
Total	646

Table 12.4 Breakdown of CAGE responses

CAGE responses		
	C Cut down	125
	A Annoyed	46
	G Guilt	125
	E Reach	246

reported behaviors suggestive of addiction [15]. Tables 12.3 and 12.4 list numbers of behaviors per respondent and most common responses given. The near-pervasiveness of wireless (and less frequently cellular) signal in the operating theater, coupled with the pervasiveness of PEDs in general, allows for rapid availability of medical information unlike any other time in the history of medicine. The corollary, of course, is that rapid access to the entire cornucopia of Internet content is available on the same devices, and only self-control and discipline prevent providers from moving beyond situational awareness and multitasking into distraction.

The fear of intraoperative PED use implies that only an unhealthy relationship with PEDs exists; however, this is clearly not the case. Evidence suggests that mobile devices can improve communications and patient safety [16]. Furthermore, conventional wisdom suggests that convenient ACLS algorithm "apps," rapid answers to clinical questions, and fingertip access to drug information can improve patient care; indeed, many have described potentially distracting behaviors that may, in fact, improve care [17, 18].

Conclusions

As the previous discussion has suggested, anesthesia providers find themselves in extraordinarily safe practice environments, surrounded by distracting technologies of dazzling complexity. Fortunately, we know that we can thrive in complex, stimulating environments. We must recognize that technologies will continue to be more complex, and we must prepare ourselves for the continuing discordance between technology and distraction. Although much of this seems to be common sense, and nobody would intend to become so distracted that patient harm could occur, the

reality is that this is not a danger that is typically taught. Just as we prepare our residents to understand the risks of intraoperative fire, or explain to them the importance of open communication and handoffs, we can train residents to improve their situational awareness and recognize the dangers of multitasking and inappropriate use of PEDs in the OR. As technology advances, so too will distraction, and we must remain *proactively* vigilant to ensure the best and safest care for our surgical patients.

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Chapter 13
Managing Distractions Through Advocacy, Education, and Change

Donna A. Ford

Introduction: Gaining Awareness of Distractions as a Patient Safety Concern

Distractions have become a challenging intrusion in the health care setting. For many years, the hospital environment was meant to be a quiet, restful place for healing. As technology has advanced, and equipment has been added, the environment of the hospital has become busier and noisier [1]. Today's health care setting is a busy environment full of distractions, interruptions, and the potential for errors. In this complex hospital environment, keeping distractions and interruptions minimized has become more challenging than ever.

Seeing distracted health care providers in a noisy and busy environment does not promote a feeling of safety for patients or families. To help reassure patients, the health care environment must look and sound safe. Patients perceive a safe care environment as one without excessive noise, distractions, and interruptions and as an environment in which care providers are completely focused on the patient [2].

Distractions can be especially concerning and dangerous because health care professionals (HCPs) must often process large amounts of cognitive information that changes very frequently and have to recall previous information from their memory [3]. As HCPs struggle with the challenges of distractions in today's health care setting, it is important to maintain, as a central focus, the HCP's role as patient advocate. Through a blend of reinforcement of the importance of the advocacy role and ongoing education, HCPs can learn to effectively balance their focus on patients with the distractions in the health care setting.

The views in this chapter are those of the author and should not be attributed to Mayo Clinic.

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In operating rooms and procedural rooms, distractions are a very serious concern. The OR is a practice environment requiring significant amounts of concentration and focus (high cognitive demand), and there are multiple ways for interruptions and distractions to occur [4]. Sedated or anesthetized patients are unable to speak up and advocate for themselves and depend upon HCPs to be focused on the patient's needs. Distractions can result in mistakes, omissions, duplication, and delays and can lead to change of the team's focus from the care of the patient to the distraction.

When HCPs maintain a focus on minimizing distractions in the health care setting, they are fulfilling their role as advocates for the safety of their patients. HCPs can increase their awareness about ways to minimize distractions through comprehensive education on distraction and inattention and through prevention strategies while developing an understanding of the culture change that needs to occur. This chapter will describe ways to manage distractions through the advocacy role and implementation of the change process through improved awareness and education.

Distractions, Interruptions, Disruptions

Various terms exist pertaining to events that can distract a caregiver, interrupt a task being performed, or disrupt the flow of a surgical procedure. It is known that distractions, interruptions, or disruptions can have a detrimental effect on the surgical team's ability to remain engaged in the care of the patient [5]. When health care professionals (HCPs) are distracted from the task they were performing, or are interrupted to perform another task, the possibility exists that there may be an omission or repetition of a step. The HCP may forget to perform another related task altogether, and this can lead to an error [6, 7].

Distractions

Distractions are defined as "that which diverts the attention from or prevents concentration on a task" [8] Another definition is "the behavior observed when there was a diversion of attention during the execution of a primary task and /or a verbal response to a secondary task not related to the procedure being performed" [9].

For example, HCPs can be distracted by someone talking, while they are still carrying out the primary task, such as reviewing a patient's medical record or preparing a medication. The HCP continues performing the task but is only directing partial attention to the conversation and the primary task. The result is that the HCP continues on the task at hand with partial attention diverted with the potential for an error to occur [10].

Interruptions

Interruptions are defined as an "unplanned or unexpected event causing discontinuation of a task or performance" [8]. Interruptions make it difficult for people to process cognitive information and can result in wasted time, as well as the potential for error [11]. This may leave the HCP saying "where was I and what was I just doing?"

Interruptions often require the person to perform a completely different task, and subsequently they will attempt to return to the primary task. Because interruptions cause persons to stop what they are doing, such as performing counts or opening sterile supplies, there is a complete diversion of attention [10].

Unfortunately, a nonsignificant issue that interrupts a HCP during a complex task has the potential to lead to a serious medical error [12].

Disruptions

Disruptions are defined as "deviations from the natural progression of an operation" [5]. Malfunctioning equipment is an example: the surgical team may be ready to use the equipment but is forced to wait until the equipment is working again, or they may have to do another part of the surgical procedure while waiting for the equipment to be ready, or they may not be able to use the equipment at all. A disruption like this can completely disrupt the flow of the surgical procedure.

Distractions, interruptions, and disruptions, which can potentially result in severe consequences, can occur for an individual team member or for the entire team. It is virtually impossible to eliminate distractions, interruptions, and disruptions from the operating room environment [9].

Some distractions may have a positive effect on patient care when additional critical information is provided to assist the HCP in decision-making, planning, and delivering care [13]. However, many distractions have the potential to result in an error, which can be detrimental to patient safety. Prevention or minimizing these distractions is the goal. In this text, the term "distractions" will be used to encompass distractions, interruptions, and disruptions.

Causes

Multiple causes of distractions exist in today's hospitals. Some distractions can be avoided and some cannot, and it is not possible to completely eliminate distractions from the practice setting [9]. Patient-pertinent conversations can be distracting, but conversations that are not patient related or case related are considered severe distractions [14]. At times when focus and attention to the task at hand are critical, non-pertinent conversations are a distraction that can lead to errors [15].

Multiple publications have referenced the importance of increasing awareness of potential patient safety concerns caused by distractions. Unfortunately, there are

also numerous published accounts of situations caused by distractions occurring in health care settings that have resulted in patient harm or even death. When given new information, HCPs must be able to focus their attention and be able to retain large amounts of information for a later time. Having one's attention divided at the time new information is being taken in can directly interfere with "working memory" and is the first point at which distractions interfere with memory [3]. HCPs should also be aware that performing two or more cognitive tasks, such as techniques in a surgical procedure and talking, is more cognitively demanding than listening to low background music when operating [16].

Sources

Distractions can also come from sources outside or within the (individual) HCP, which are called external or internal sources. External sources of distraction can include noise, other people's conversation or actions, sounds, odors, or lighting in the environment that captures one's attention [17]. In the hospital environment, distracting sources include alarms, phones ringing, non-pertinent conversations, pagers, use of personal electronic devices (PEDs), handling messages for surgical team members, other surgical equipment noise, personnel traffic, and communications [18, 19].

Internal distractions can include personal emotions (including anxiety, stress, and loneliness), physical symptoms (including thirst, hunger, pain, and nausea), and disinterest in surroundings or topic, or the inability to maintain focus, resulting in the desire to doodle, play with items in one's hands, or use social media on a smartphone [17].

To others, distractions can be observable or not observable. Examples of observable distraction include talking with colleagues while performing another task, such as computer documentation, preparing a medication, or reading information on the smartphone while attending a surgical briefing [10].

Distractions that are not observable include daydreaming or thinking about something else while performing a task, and mental exhaustion, or the inability to "think straight" [10]. Either type can be quantified by collecting the following data: (1) frequency of occurrence; (2) the number of times distraction occurs while performing a task; (3) the length of time taken by individuals to complete tasks, while they are distracted; and (4) evaluation of events, near misses, and other errors to determine if distraction was a factor [10]. According to Pereira et al., reason identified these human factors as contributors to errors: stress, fatigue, distractions, interruptions, personal problems, interpretation, communication, misjudgment, and inattention to detail [9]. The human factors also contribute to distraction.

Pereira suggests use of recovery techniques when distractions occur, which include identifying, asking, deciding, acting, prioritizing, planning, and checking. Steps to mitigate the disruption:

- Recognize and identify the distraction.
- Restore situational awareness.

- Identify what was being done.
- Remember what was being done when interrupted.
- Decide how to return to the primary task—what task or actions should be taken to return to the primary task.

This technique is useful even when subtle distractions occur and allows the HCP to restore situational awareness and complete the original task [9].

The Concerns with Distractions

An environment with distractions is conducive to medical errors and can also be dangerous for patients [20]. A study on distractions in the critical phases of anesthesia described distractions caused by auditory and physical means [21]. Examples of auditory distractions included alarms, conversations, and other equipment sounds. Examples of physical distractions include additional HCPs entering and exiting the room, talking, and the movement of equipment accompanied by loud noises. This study found that unexpected loud noises, additional HCPs, and extraneous conversations increased significantly during emergence from anesthesia, at a time that is critical to the safety of the patient [21]. This is very concerning since other activities being performed may divert attention of caregivers away from the patient at a critical time and may impair verbal communication among team members.

Distractions in an environment such as the OR are potentially dangerous. According to Feil, distracted caregivers are believed to "compromise patient safety and contribute to medical errors" [3]. Distracted caregivers are also less efficient and less productive and can endanger patients [3]. Distractions and changes in the flow of surgical procedures can affect the ability of the surgical team to remain fully engaged in the care of the patient [5]. According to Wiegmann et al. [5], disruptions in surgical flow were observed and categorized in the following types:

- Teamwork/communication failures
- Equipment and technology problems
- Extraneous interruptions
- Training-related distractions
- Issues in resource accessibility

Teamwork and communication-related issues can be a serious concern, since omissions can occur and perhaps go unnoticed. The Joint Commission has identified communication-related concerns as one of the most frequently reported root causes of sentinel events and specifically identifies miscommunication as a root cause in nearly 70% of reported sentinel events [22].

Personal Electronic Devices in the Perioperative Setting: Benefits and Challenges

Technological advances that help us more safely care for our patients are also a source of distractions [10]. Personal electronic devices (PEDs) bring an added dimension of benefits and concerns into the health care setting. PEDs provide many benefits and conveniences in our personal and professional lives, but there are also many potential concerns.

We now live in an age of constant connection to others, through texting, email, and social media apps. People are accustomed to staying in continuous contact with family and friends throughout their workday, as well during their personal time. The ability to instantly communicate with others is both a benefit and a challenge in our lives.

Benefits of PEDs

Personal electronic devices (PEDs) facilitate communication among team members and between health care providers, patients, and their families. Text messaging affords easier communication in noisy settings. PEDs have greatly improved the ability of HCPs to collaborate and share expertise [23, 24]. Other benefits include easy access to resources for patient care and medication information. Managing professional and personal schedules, coordinating patient care, and being able to readily access medication information and other resources are additional benefits [24].

PEDs also facilitate direct communication among caregivers and, because of the direct communication, can minimize the possibility of misinterpretation of information by a person taking a message. Following a handoff, using PEDs allows an opportunity to contact another caregiver with questions, if any should arise, especially after handoff communication. If a bedside computer is not readily available, PEDs also allow questions to be answered and information retrieved without leaving the side of the patient.

Challenges Unique to PEDs

According to Patterson, PEDs "introduce a new level of distraction into an already stressful environment" [18]. People have become "programmed" to constantly check email, social media, and text messages and surf the Internet [25]. PEDs have almost become addictive and difficult to leave alone [26]. "Irresistible" is the way author Matt Richtel describes the power of the strong desire to be constantly socially connected and having that ability to stay in constant contact with family, friends, and others. The PED has become a "brain hijack machine" [26]. Many people can relate to feeling addicted to their PEDs, especially noted when they have forgotten or lost their device or try to go on a "media fast" [26].

Societal changes are also occurring with the ever-present PEDs. HCPs are on their social media, checking emails, playing games, or on the Internet rather than focusing on their patients [27]. During breaks from work in the health care setting, HCPs are often fixated on their PEDs instead of talking with each other. Younger HCPs are less inclined to want to have a conversation with a friend or family member and more willing to send text messages. This may have a detrimental effect on our HCPs being able to interview patients and obtain health history information.

What does it really take for a distraction to occur? McBride described six traits of a distraction by PEDs: (1) it involves the experience of the HCP with clinical responsibilities, (2) a disturbance of the primary task being performed by the HCP occurs, (3) performance of the primary task is stopped, (4) the distraction is externally initiated (such as PEDs ring tone or vibration) or internally initiated (such as a break in concentration or an intrusive thought), (5) the distraction occurs in a clinical setting, and (6) the distraction is facilitated by the PED [28].

It is not known what the actual effect on patient safety may be when HCPs have their PEDs with them during care provision, but unfortunate situations have occurred [10]. Health care providers are human and can make mistakes. Just like the general public, many HCPs prefer to always have their PEDs with them. Patients and families know how attached they are to their own PEDs yet expect caregivers be focused completely on them during the delivery of care, and if they see a HCP on his or her PED, they assume the HCP is "unfocused" [18].

The use of PEDs increases reaction time, reduces ability to focus, lowers performance of tasks requiring concentration and decision-making, decreases ability to think, has a (cognitive performance) negative effect on attentiveness, and can cause intentional blindness. Intentional blindness occurs when a person becomes so captivated by what they are looking at on their PED that they shut out everything else around them [23]. Even more concerning is that distractions from PEDs degrade the performance of the entire team [23]. According to Attri et al., "smartphones can impair short-term memory, vigilance and other aspects of cognitive performance" [23], p. 7.

PEDs are more concerning than computers because their portability can become a constant and ever-present source of distraction [23]. Since PEDs are often carried in the hand or close to the body in a pocket, distractions can be caused even by a sound or vibration indicating that message has been received [24].

Environmental contamination and infection control issues are another concern [29]. There are not acceptable cleaning guidelines for PEDs that meet hospital-cleaning standards [24]. Bacteria present on PEDs can easily be transmitted to the HCPs' hands and then to the patient [30]. To minimize the possibility of microorganisms being spread to patients and the environment, HCPs should ensure use of proper hand hygiene [18] and ensure the cleanliness of their devices [31].

The AORN Guideline for Surgical Attire states "Personal communication devices should be cleaned with a low level disinfectant (according to the manufacturer's instructions for use) before and after being brought into the perioperative setting." Moderate evidence exists for this practice [32]. Cleaning guidelines based on available evidence should be incorporated into facility guidelines whenever PEDs are brought into the clinical setting.

Managing Distractions Through Advocacy

Many HCPs enter the health care profession because of a desire to help others. A health care environment that supports a culture of patient advocacy and safety provides motivation for HCPs to act in the best interest of the patient at all times. This important advocacy role involves consistently placing the needs of the patient first [33]. Health care organizations that are models of this advocacy role have an organizational culture that reflects patient advocacy. For example, the Mission and Values of Mayo Clinic includes "the needs of the patient come first" as the Primary Value [34]. Values include respect, compassion, integrity, healing, teamwork, excellence, innovation, and stewardship [34]. Mayo Clinic strongly supports a culture of patient advocacy and safety as evidenced in the Mission and Values statements [34].

Physicians, nurses, and other HCPs have shared professional commitments sharing a common interest in patient advocacy [35]. The American Medical Association's Professional Codes of Ethics also describe the HCP's role as a patient advocate. Provision 3 of the Code of Ethics for Nurses states "The nurse promotes, advocates for, and protects the rights, health, and safety of the patient" [36].

Professional Associations

Professional associations serve as advocates for the professionals they serve and for patients. Professional associations disseminate professional knowledge through scholarly publications and education and promote professional development, guidelines, and standards for practice [37]. For example, the Association of Perioperative Registered Nurses (AORN) is the "leader in advocating for excellence in perioperative practice and health care" [38].

Several professional associations of health care professionals have taken positions on the importance of managing distractions. In 2008, the American College of Surgeons (ACS) issued a statement on the use of cell phones in the operating room. This statement stressed the need for cell phones as a communication tool while also recognizing the concerns for distractions caused by cell phones. This statement said the "undisciplined use of cell phones" may be a distraction during patient care, encourage surgeons to be "considerate" of the OR personnel's responsibilities, and "refrain from engaging them unnecessarily in activities that might divert attention from the patient or conduct of the procedure" [39].

The ACS recently updated this statement and cited several considerations for guiding the use of cell phones in the OR, including repeating the concerns identified above. Additional considerations include minimizing any personal calls and keeping these calls as short as possible, silencing ring tones or enabling a ring tone only for urgent and emergent calls, and ensuring that there is no compromise of the sterile field due to use of the mobile device [19].

Another publication in the ACS Journal supports the common belief that noise impairs communication and emphasizes the need to foster an environment that promotes communications and limits distractions such as background conversations that can lead to medical mistakes. While this publication refers primarily to background noise impairing the ability to communicate, music and other background noise can also contribute to distractions and should be minimized [40].

The American Association of Nurse Anesthetists (AANA) published a Mobile Information Technology position statement in 2012 and updated this statement in 2015 to encompass new and more detailed information on the topic [41].

AORN took a stance on minimizing noise in the perioperative environment in a 2009 Position Statement. In 2014, this Position Statement was updated and approved in 2014 to include ways to minimize OR noise, distractions, and interruptions [8].

The American Society of Anesthesiologists (ASA) published a Statement on Distractions, which was approved by the ASA House of Delegates in 2015. This statement emphasizes the importance of vigilance in ensuring attention to the patient and minimizing or eliminating distractions that "reduce appropriate attention to the patient within the anesthesia care environment" [42]. This statement further recommends a facility-based policy, and ongoing education about distractions, including ways to prevent or minimize distractions. The statement also supports more research into the effects of distractions on quality of care and suggests the use of peer review and quality improvement activities to measure the quality of anesthesia care [42].

The Association of Surgical Technologists (AST) published Standards of Practice for Use of Mobile Information Technology in the Operating Room [31]. This Standard of Practice (SOP) was developed to provide assistance for health care organizations in the process of developing their own policies. The AST recommends use of PEDs only in noncritical areas such as lounges and other non-patient-care areas. The AST also recommends never allowing PED use during perioperative patient care and reminds HCPs of the importance of maintaining professionalism and assuring patient confidentiality at all times [31].

The Council on Surgical and Perioperative Safety (CSPS) is comprised of the following member organizations: American Association of Nurses Anesthetists, American Association of Surgical Physician Assistants, American College of Surgeons, American Society of Anesthesiologists, American Society of Perianesthesia Nurses, Association of Perioperative Registered Nurses, and Association of Surgical Technologists. This coalition represents 250,000 members of its seven association and the interests of over 2 million health care professionals worldwide [43]. CSPS developed an electronic distraction logo identifying concerns and solutions for managing PEDs in the health care setting. (Insert Fig. 13.1 Electronic Distraction Logo). The CSPS website also has links to additional articles on the topics of distractions and noise, which are also helpful resources for education.

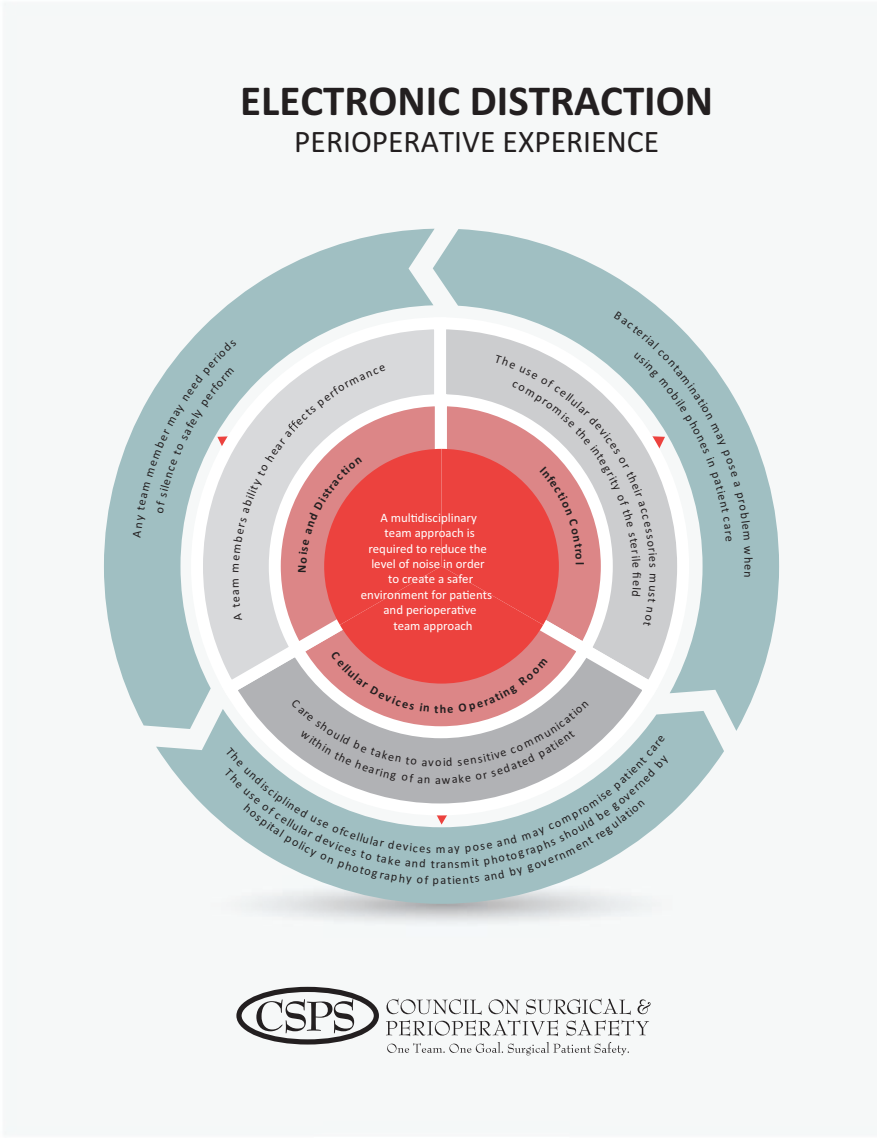

Fig. 13.1 CSPS electronic distraction poster. The Council on Surgical and Perioperative Safety (CSPS) developed this poster depicting concerns and providing solutions. More information is available on the CSPS website at www.cspsteam.org (Used with permission of the Council on Surgical and Perioperative Safety)

The Advocacy Role of the Perioperative Team

Advocacy is a foundational principle of the nursing profession [37]. Nurses are conscious of the importance of ensuring quality of care and continuity of care [44], and of their responsibility and accountability to patients, and must be able to ensure care is safe and competent [44]. Patients and their family members depend on nurses and all HCPs to keep them safe [33].

In the OR, perioperative nurses especially value and understand the critical and important role they have serving as advocates for the patient when the patient is under sedation or anesthetic, ensuring safety through maintaining sterile technique, using principles of safe patient positioning, assuring privacy and confidentiality, and controlling the environment through limiting traffic and other potential distractions [33, 44].

According to Seelanders, "Advocacy includes a complex interaction between nurses, patients, professional colleagues and the public." [45] Advocacy is an integral component of patient safety as demonstrated by the American Nurses Association's (ANA's) dedication to quality and patient safety [46]. The important role of HCPs as patient advocate is important to emphasize [29]. Health care team members must be focused on the goal of keeping their patients' best interest, safety, and comfort as their primary concern.

Nurses and other HCPs can be role models of minimizing distractions in the practice environment through positive influence. Part of the advocacy role is working toward solutions to minimize distractions by (1) identifying the issue and developing goals and a strategy to address the issue and (2) by developing a plan of action and establishing a timeline. Suggestions for building support to reduce distractions include the importance of developing a compelling case for the need to minimize distractions [47]. Following making the case, it is important to exercise patience, collaboration, negotiation, and compromise to be successful in working toward solutions to minimize distractions [47].

In addition to distractions and interruptions in workflow, Elfering et al. discussed the importance of considering conscientiousness and safety compliance on the assumption that individuals with a higher level of conscientiousness are also more diligent and likely to have more attention to their work [48].

Managing Distractions Through Education

Education regarding distractions in the health care setting should occur early and often. HCPs (including surgeons and perioperative personnel) should have ongoing education on the concerns with distractions, on ways to minimize these concerns, and should include the most current information and evidence [19]. These topics are also important in education and training programs for all HCPs. This includes nursing and medical students, surgical technologists, anesthesia providers, and other

HCPs working in an operating room or procedural setting. Suggested topics for education are listed in Table 13.1.

An excellent resource for education on attention is *A Deadly Wandering* by Matt Richtel [26] and the accompanying study guide [55]. Several free resources are available on the website associated with the study guide, including quizzes and other tools to emphasize current information about attention [56].

The White Paper: A Nurse's Guide to Social Media is another excellent resource that not only guides nurses in the use of social media but also applies to other health professionals [54]. In addition to offering suggestions for maintaining professional conduct while still being able to take advantage of the many benefits of professional social media use, this document includes scenarios that are excellent examples to use in discussions in education programs.

Residents should receive training on managing intermittent auditory and mental distractions [14]. These distractions occur in all facets of the health care setting, and it is important for new physicians training in their chosen specialties to be able to effectively manage these distractions.

An education program for any health care professional should also include an emphasis on defining appropriate and inappropriate use of PEDs. Maintaining patient privacy and confidentiality is of utmost concern, and Health Insurance Portability and Accountability Act (HIPAA) laws must not be violated. According to Snoots, "inappropriate PED use is any activity that is not patient centered and consists of, but is not limited to, accessing social media sites, personal text messaging, browsing the Internet, and/or unlawfully photographing or disseminating data that directly violates the federal Health Insurance Portability and Accountability Act" [57].

Suggested Interventions and Topics

Table 13.2 includes a list of suggested interventions and education topics that can be used as appropriate in an individual health care setting.

Managing Distractions Through Change

Effective management of distractions in a busy health care setting may require a culture change. Obviously, it is important to create a culture that discourages inappropriate use of personal electronic devices, but striving toward an overarching goal of minimizing distractions and keeping an intense focus on the needs of the patient may require a complete culture change, or at least some efforts to improve the practice environment. Table 13.3 describes resources to help promote positive change.

Establishing processes to minimize distractions will likely reduce the occurrence of medical errors [63] as will using a systems-approach mindset that recognizes that

Table 13.1 Education topics

Topic	Possible content
Potential dangers of distractions [14]	Review of published accounts of events related to distractions
Terminology	Mindfulness: "paying attention to the present moment, on one's purpose and doing so in a non-judgmental manner" [49]
	Situational awareness: the perception of the elements within a volume of time and space, the comprehension of their meaning, and a projection of their status in the near future [50]
	Vigilance: "a state of readiness to detect and respond to small changes occurring at random intervals in the environment"
	Cyber loafing, cyber slacking [28, 51]
Examples of application in the practice setting	Mindfulness: staying focused on the surgical procedure and avoiding unnecessary conversations Mindfulness can keep patients safe because HCPs who are mindful are more likely to be focused and have intent to concentrate on the work environment since they have awareness of the potential dangers of distractions to the patient [49] Keep calm and regulate emotions Vigilance: "a state of readiness to detect and respond to small changes occurring at random intervals in the environment" [11]
"Sterile Cockpit" [23]	Specified points of a process where focus and attention is critical. During these specified points in time, avoid engaging in non-pertinent conversations and activities. Critical phases of flight (such as takeoff and landing) are identified Critical phases during surgical procedures can include the time-out, counts, critical dissections, anesthesia induction and emergence, identification and labeling of surgical specimens, and identification and confirmation of implants [6, 21]
Potential for addiction	Develop professional awareness of the deep attachment there is in our society to our PEDs [27] Modified CAGE Questionnaire [52]
Factors contributing to errors	Human factors, the effects of fatigue, anxiety, stress, personal problems, lack of judgment, and poor attention to detail are contributors to errors [9]
Recovery techniques when distractions and interruptions occur	Recognize and identify the distraction Restore situational awareness Identify what was being done Remember what was being done when interrupted Decide how to return to the primary task—what task or actions should be taken to return to the primary task
Avoidance of critical times/ processes	Focus on one critical task at a time [53] Eliminate extraneous conversations and movements [21] Review electronic etiquette, human-to-device interactions, and ways to explain to device use in conversations with patients [25]
Ensure compliance with HIPAA and health care setting policies	Importance of maintaining patient confidentiality [31, 54] Educate staff about appropriate use of social media [24]
Miscellaneous	Education topics should be reviewed annually [31] Emphasize that people learn more effectively when not distracted or trying to multitask [23]

Table 13.2 Interventions

Topic	
Eliminate all unnecessary distractions	Determine examples of unnecessary distractions [53]
Control of environment (people, equipment)	Limit traffic [18] Limit numbers of visitors [5] Ensure equipment is available and functioning properly to minimize distractions and delays [4]
Control of environment (sounds and interruptions)	Establish phone call triage process [4] Management of unnecessary interruptions [4] Use of "critical language" used to defer distraction "Not now" Channel communication to a point person outside OR [58]
Efforts to reduce of the effects of distractions	Develop prevention strategies, safety nets, and ways to reduce the effects of distractions [9] Ensure patient safety during anesthesia induction and emergence [21]
Communication techniques	Use effective and safe communication practices

Table 13.3 Promoting positive change

Quality projects can assist in determining the causes and sources of distractions and gaining an understanding of the effects of these distractions on patient care [9, 59]
Develop a *human factors-based error management program:* understanding the causes behind minor/major errors helps development of patient safety programs [5, 59]
Speak Up Campaign: communication plan that breaks down the usual impairments to communication of concerns and encourages HCPs to immediately verbalize concerns or questions needing clarity [60]
Establish a "*Fair and Just*" *Culture* Definition of Fair and Just Culture: one that learns and improves by openly identifying and examining its own weaknesses [61]
Environment of Mutual Respect and emphasis on the value of team members can reduce communication problems that can result in distractions and interruptions [62] Components of effective teamwork and communication Structured language Effective assertion/critical language Psychological safety Effective leadership [59, 61]
Commitment to Safety/Team Engagement Model: implementation of efforts to improve leadership, teamwork, information, and communication handoffs and further improve the patient safety culture [63]

"errors occur as a result of a breakdown in a component of a system rather than the fault of an individual, and multiple factors contribute to this system in the surgical/procedural setting" [5].

When making the case for change, it is helpful to have facts and data as well as to put a "human face" on the concern by providing a story such as a published account or "near miss" related to a distraction situation [47].

Putting It All Together

A critical first step in the effort to minimize distractions, particularly from PEDs, is to have a policy tailored to the individual hospital [14]. Prior to developing the policy for managing distractions, input should be obtained from a multidisciplinary team of health care professionals (HCPs) who are stakeholders. Ideally, this policy should define times, locations, and situations when it is unacceptable to allow distractions [53]. Table 13.4 describes processes and components to consider.

A variety of team members from various disciplines should provide input on the appropriate management and use of devices [66]. In this process it is important to review evidence-based publications to determine the appropriate guidelines based on the input of stakeholders [28]. Other considerations when developing the policy include determining appropriate areas of use, any restrictions that may exist on use during work hours, and any restrictions of access to social media [24]. Through effective policy development, ongoing conversations about concerns of distractions, and an intense focus on the patient, teams can evolve into expert teams instead of simply being a team of experts [67].

Table 13.4 Policy development and components

Multidisciplinary team	Provide feedback Develop policy
Literature review	Use evidence, when available (McBride)
Identify critical phases pertinent to individual practice setting	Prohibit non-procedure-related conversations during critical phases [64]
Develop strategies to minimize distractions	Determine "noncritical" areas and allow PED use only in these areas [31]
Guidelines should address how to manage the distractions [64]	Determine what are "allowable" distractions and the types of circumstances that these are allowed [4]
Establish best practices and policies use of PEDs in health care settings [64]	Benchmark practices with similar health care settings
Ensure that patient care standards are not compromised by the use of devices [64]	Consider mission, vision, and values of health care setting when determining if, and under what circumstances, PEDs are allowed [65]
Consider "trialing" proposed interventions to determine effectiveness in individual health care setting	Sterile cockpit concept/no-interruption zone [6]

Source: Data from Refs. [4, 6, 28, 31, 64, 65]

Conclusion

An organization-wide team engagement model can help improve the culture of patient safety, leadership, teamwork, and communication handoffs [63]. Other contributing factors include open communication among team members, respect for each other's responsibilities, and keeping patients as the top priority [29]. Ensuring that HCPs also recognize and maintain their role as patient advocates, and receive initial and ongoing education about the potential patient safety dangers caused by distraction, can substantially contribute to progress in the prevention of unnecessary distractions.

HCPs must develop a balance between the use of technology and interactions with patients. Observational and listening skills must be used frequently, and HCPs must be diligent about ensuring professional conduct when interacting with PEDs in the health care setting [23].

As patient advocates, HCPs must remain attentive to patient care and make a conscious effort to not allow distractions to occur, mindful that there is an appropriate time and a place for use of PEDs in the health care setting. Through reinforcement of the advocacy role, education, and change, a significant opportunity exists to minimize distractions in the health care setting.

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Chapter 14
Electronic Devices as Potential Sources of Biological Contamination

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In today's world, mobile phones have become an extension of our body. The volume of reported mobile phones has led to controversy between benefit and harm [1]. We live, work, eat, and sleep with our devices and probably give little thought to the risk for potential bacterial contamination they can provide [2]. Similar to the character Tommy's experience in the song "Pinball Wizard," we are dealing with a new form of sensory overload [3] and not really understanding the potential infectious threats that mobile devices can carry. The role mobile devices play in our culture is huge, but their possible impact on infection control has yet to be adequately assessed [4].

The increased presence of mobile phones in our operating rooms, intensive care units, procedural areas, and medical-surgical beds is clearly evident. In many instances, the environments our patients live in can be considered high risk in nature. Infection protocols, coupled with the surge in devices, are challenged [5]. With this explosion of technology and the demand to increase patient volumes, many infection control principles may not be adhered to because of the huge social acceptance these devices have. We mandate employee infection control education in our health care settings, but concerns with compliance and reinforcement exist.

Historically, in the mid-1800s, research by Ignaz Semmelweis associated "handwashing" with bacterial contamination. Lister's research (1867) described infections relating to the environment and the role of asepsis [6]. Aronson (1977) and Cozanities (1978) looked back at the environment and were able to trace pathogens on telephones, while Borer (2005) was one of the first to find similar findings on mobile devices [7].

"Contamination" can occur in open areas or spaces known as "fields." "Contamination" can subsequently lead to an infection and possible sepsis [8]. "Operating fields" are special areas where surgery is performed. What we are looking to create is a "sterile field" when we do procedures or operate [9]. We start by

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wearing proper attire, adhering to handwashing protocol, preparing surgical (procedural) sites according to aseptic technique utilizing sterilized equipment, and assuring that the patient and tables are covered with drapes in a sterile fashion. Microorganisms can live in our epidermis and certain microorganisms can produce infection. If a confirmed infection occurs in patients during the hospital stay, then that is known as a nosocomial infection. We are all potential carriers of microorganisms that could be pathogenic. Increased incidence of wound infections can occur with surgical site infection (SSI) contamination at the rate of 10^5 organisms per gram of tissue [10]. Applying aseptic technique "best practices" should follow without incidence, but in today's society we are seeing fundamental principles of asepsis being disputed.

In order to prevent cross contamination, heightened awareness must take place with all mobile devices and high-touch surfaces. These types of devices can be classified as "fomites." Fomites are "objects or materials that are likely to carry infection" [11].

To date, one of the most important interventions in improving patient and worker safety is the simple process of washing one's hands before and after contact with a source of contamination. The irony of it is that some of the lowest scores of compliance with this measure can be found in health care settings [12]. Research on "handwashing" by Krediet et al. found that adherence to handwashing policy was not followed by all that entered the operating room. Personnel that were not part of the scrub team demonstrated poor handwashing compliance rates [13]. There can be many confounding factors influencing these measures. Policies may be in existence, and if they are, compliance can be challenging. Data collection in many instances may be inconsistent during different times of the day, especially evenings, nights, weekends, and holidays. External surveillance and the use of "secret shoppers" may provide an unbiased view.

"The Joint Commission evaluates and accredits nearly 21,000 health care organizations and programs in the United States…. Their mission is to continuously improve health care for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value. Their vision states that all people should always experience the safest, highest quality, best-value health care across all settings." [14]

The concern with handwashing is so great that the Joint Commission has considered handwashing a Hospital National Patient Safety Goal – NPSG.07.01.01 [15]. To improve the efforts, a 234 page monograph entitled "Measuring Hand Hygiene Adherence: Overcoming the Challenges" has been made available. The Association for Professionals in Infection Control and Epidemiology supports this monograph along with the Centers for Disease Control and Prevention, the Institute for Healthcare Improvement, the National Foundation for Infectious Diseases, the Society for Healthcare Epidemiology of America, and the World Health Organization World Alliance for Patient Safety [16].

Research has shown that the number and types of contaminants cultured from an individual's hands can be found on the devices they carry [17]. Research has also

shown that the number of people in a closed environment and their movement within that environment may have a direct relationship with the degree of surgical site infections (SSIs) [18]. One would have to believe that no clinician wants to see his or her patient obtain an infection, especially from factors that can be controlled.

Gram-negative infections that result in severe infection or impending mortality are every caregiver's concern. Attention to the appropriate antibiotics and timely administration of antibiotics is key, but the overuse or improper use of antibiotics has been found to result in multidrug-resistant infections. Despite the promotion of antibiotic stewardship programs, the use of antibiograms and the initiation of a biomarker (e.g., procalcitonin) the root of the issue still falls upon the technical aspects required to prevent.

Hand to Phone Contact

Research on "hand to phone contact" by Trivedi et al. studied three groups of caregivers where 59% of hands cultured and 47% of mobile phones cultured had bacterial contamination [19]. Ulger et al. cultured the dominant hand of health care workers and their mobile phones. Bacterial contamination was found in 95% of phones [17]. Ustun and Cihangiroglu screened 183 health care workers phones. Significant differences in expanded spectrum beta-lactamase-producing gram-negative bacilli were found between ICU workers and non-ICU workers [20]. Nwankwo et al. swabbed health care workers and students. Increased bacterial antibiotic resistance was found in health care workers phones [21]. Karabay et al. conducted a study in a teaching hospital. They had seen mobile phones being utilized in the hallways and in the specialty areas, including laboratory areas, procedural areas, intensive care units, patient rooms, and the operating rooms. They collected 122 samples and 111 of those samples grew out organisms, which included *Escherichia coli*, *Pseudomonas aeruginosa*, and *Klebsiella pneumonia* [22]. Tagoe et al. cultured 100 mobile phones from university students. Only a small percentage had one organism, but 65% had three or greater contaminants [23]. These findings raise the concern about the spread of infection from mobile phones.

Disinfecting

Research on "disinfecting" by Badr et al. used alcohol wipes on the hands of 32 staff members prior to using mobile phones. Hand contamination was equivalent to devices at 94% with usage [24]. White et al. studied the utilization of smartphones with students. Devices were cleaned with 70% isopropyl alcohol and returned. Subsequent microbial and polymicrobial contamination was found in 86% of devices [25]. Shakir et al. studied the contamination rate of cellphones used by

orthopedists in the hospital setting. Fifty-three participants were enrolled where 44 cell phones (83%) initially had pathogenic bacteria, 4 cellphones (8%) had pathogenic bacteria after disinfecting, and 40 cell phones (75%) had pathogenic bacteria after a 1-week period [26]. Foong et al. followed 226 hospital staff members. Most of the cultures consisted of normal skin flora, which were similar to the dominant hand. Pathogenic bacteria were found in 83% of phones shared. Similar contamination was found in 8% of phones after disinfecting, with 95% of cell phones contaminated after 1 week. Junior staff was at higher risk to have increased bacterial growth on their mobile phones. Limited cleaning decontamination was noted, but those that cleaned their phones daily had no pathogenic organisms in a small sample [27].

Key Pads and Touch Screens

Research on "key pads vs. touch screens" by Pak et al. found high rates of cell phone contamination with laboratory technicians that used keypads compared to touch screens. This finding may be due to contamination within the crevices of the keypad [28]. Health care workers' hands may come across blood soiled products, human fluids, and contaminated surfaces resulting in bacterial cross contamination of equipment [29].

Personal Belongings

The location of a mobile phone in a woman's pocket book compared to a man's pocket or travel case may have higher levels of contamination [30]. A database search on personal belongings and outcomes relating to SSIs brought into the operating room looked at personal items in the OR (e.g., handbags, purses, wallets, pens, badges, pagers, backpacks, keys, jewelry, phones, and eyeglasses). Review of the literature, with this association, found no direct evidence that personal belongings increased risk of SSIs. One article studied the wearing of a wedding band under surgical gloves and did not find any risk of SSIs during surgery. The authors note, "The barring of personal devices in the OR may be based totally on theoretical concerns or expert opinion than objective evidence" [31].

High attention toward aseptic principles and spacing [32] needs to take place in restricted areas. The operating room and procedural rooms can be considered as restricted areas. Differences between semi-restricted areas and restricted areas need to be clear. Change of clothing (scrubs) is usually designated in these areas. Focus is placed on proper handwashing technique before entering a sterile environment then gowning and gloving. The surgical (procedural) site is prepared in a sterile fashion. The surgeon (proceduralist) and members of the team in essence become part of that sterile field. Hand movements should be limited from the waist

level to the chest level. In order to prevent contamination, careful movement from the front to the bottom of the OR table or to the opposite side of the OR table is important. Reaching for the sterile light handle or bringing in a sterile piece of equipment has to be approached carefully. The introduction of devices, whether they are clipped to one's belt under a gown, or part of head piece, or brought over by the circulator nurse, now presents as a potential source of contamination. During my own training, I was taught that draping always had to be at the level of the waist. Special attention was directed to making absolutely sure that the drape never dropped below that level. If this was to occur, that drape was considered to be unsterile. So if one is reaching below the level of the operating table or below the waist level to shut off a beeper, or answer a device or twirl so that the circulator can reach to grab or review what's on that device, then a potential unsterile practice can occur.

Critical Questions

Ideally, what interventions can be implemented to overcome barriers? Does it matter if the device is a personal device vs. an institutional device? Change is not easy when preexisting institutional cultures and philosophies exist. How do we alleviate these problems? Should all devices be checked-in before they enter a sterile environment? As one enters the operating rooms' main desk, should one have already handed off their devices to someone who can triage nonurgent, urgent, and emergent calls? Otherwise, as we contain or pass on a device, potential bacterial cross contamination can occur.

Bringing in devices into the operating room has potential for concern. Let's say we skipped the main check-in desk and now are checking our devices at the circulator's desk in the operating room. Were the devices cleaned before they entered the operating room? Were the devices placed in a self-contained bag? Who is responsible for responding to these multiple devices at the circulator's table? Never mind the potential vectors that can be initiated by touching these devices. The anesthesiologist may have a device that he or she is responding to and may not have adhered to the same disinfecting or containment protocols. Other providers not scrubbed at the surgical table may also respond to a device where additional vectors for contamination can possibly occur.

Are there differences in the management of devices based on practice settings? For instance, can a solo practitioner not afford to check his or her device when other emergencies may occur simultaneously? It makes sense that phones can be handed off to colleagues that will be on the floors. Perhaps the surgeon (proceduralist) can hand off his or her phone to another member of the team. Many providers may feel that they must know, at all times, what is going on with their service and will not relinquish their devices to someone else to answer. Device hand-off practices are probably easier to comply with during normal operating room hours compared to those off hours. Again, it becomes very complicated.

Recommendations

What are some of the recommendations based on a more critical review of the literature?

Attri et al. looked at device usage in the lives of health care professionals. The authors note that a sensible adoption of evidence-based policy should be applied. In their paper they describe three categories on usage policies from the University Hospitals Bristol Foundation Trust [33]:

- Category 1: Nonclinical areas/low-risk patient areas (e.g., ward day rooms, clinic waiting areas, corridors, reception areas) where mobile phones can be used by staff, patients, and visitors.
- Category 2: Clinical patient areas (e.g., general wards and departments where mobile phones can be used by staff, patients, and visitors but may be subject to local restrictions if their use is deemed to be affecting patient care, dignity, or confidentiality.
- Category 3: Safety critical patient areas (e.g., intensive care/coronary care units, OTs, etc.) where the use of mobile phones by patients and visitors is prohibited, but where phones may be used by clinical staff with extreme caution, particularly in intensive care units if within 1 m of sensitive medical devices associated with life support. Patients and visitors' mobile phones must be switched off in these areas.

The Joint Commission (TJC) describes opportunities for synergy, collaboration, and innovation where areas for interventions to improve safety include the settings, potential benefit to patients, employees, and the health care organization [34]. In addition to the TJC beliefs on handwashing, they recommend "that electronic devices should be disinfected with wipes that won't ruin them" [35]. The Joint Commission, under Standard IC.02.02.01, requires hospitals to implement infection control activities to minimize, reduce, or eliminate the risk of infection" [36]. Special attention toward environmental surface infection protection needs to include stationary and mobile electronic devices.

The Association of Operation Room Nurses (AORN) has included guidelines to support the safe overall practices that should take place in the operating room. Under recommendation VIII (VIII.b.5):

"The health care organization should establish a policy and procedure for the use of mobile communication devices that includes:"

- Use of personal devices
- Use of facility-owned devices, locations or prohibited locations for use, allowable information that may be conveyed by the mobile device (e.g., patient-related information only, photography)
- Level of encryption and security controls
- Device cleaning [37]

The American College of Surgeons provides a subheading statement to "Inspire Quality: High Standards, Best Outcomes." A formidable statement was developed [ST-59] on the use of cell phones in the operating room. Bullet points emphasize what can occur with the "undisciplined use of cellular devices in the OR." The eighth bullet point in the position statement says, "The use of cellular devices or their accessories (such as earphones or keyboards) must not compromise the integrity of the sterile field" [38].

The American Association of Nurse Anesthetists (AANA) comments on the importance of the devices for communication but notes Jeske's study that "even after 40 anesthesiologists used hand sanitizer, over the course of time most personal mobile devices had critical pathogens on them, indicating that these devices can easily transmit pathogens from hand to device and vice versa" [4]. The position statement from the AANA states that "anesthesia professionals should use caution and adhere to infection control policies and procedures where appropriate." Again, there are benefits with the use of devices, but AANA notes that patient outcomes should not be compromised [39].

The Council on Surgical and Perioperative Safety (CSPS) is an incorporated multidisciplinary coalition of professional organizations whose members are involved in the care of surgical patients. CSPS members consist of the American Association of Nurse Anesthetists (AANA), the American Association of Surgical Physician Assistants (AASPA), the American College of Surgeons (ACS), the American Society of Anesthesiologists (ASA), the American Society of PeriAnesthesia Nurses (ASPAN), the Association of periOperative Registered Nurses (AORN), and the Association of Surgical Technologists (AST). The Council endorses a safe surgery resource chart to reduce the risk of noise and distraction in the perioperative period (Fig. 14.1). The chart emphasizes attention to the elements of noise and distraction, infection control, and privacy. CSPS encourages all hospitals, ambulatory surgery centers, and procedural areas to use the chart. The chart can be downloaded from the group's website at www.cspsteam.org as a cognitive aid to enhance awareness and promote best practice [40].

The need to create policy needs to be established. When setting policy in the operating room or other high-risk settings, it is important to obtain buy-in from all stakeholders. Important elements of the policy should focus on handwashing before and after the donning of gloves. A major educational campaign [41] with the concept of "bare below the elbows" can help to increase the awareness and frequency of handwashing [42].

The use of wipes should not influence the importance of first washing one's hands [42]. The cleansing of devices, including perhaps the use of alcohol pads or a combination of ethyl alcohol and isopropyl alcohol on mobile devices, can help to eliminate microorganisms [43, 44]. Lower contamination rates with flat screens compared to devices with keypads have been found [45]. The use of touch screens should occur with wipes after handwashing as well [42]. After initial disinfection, reinforcement on the frequency of device-cleaning should align with the degree of contamination and the extent of recontamination several days later [26].

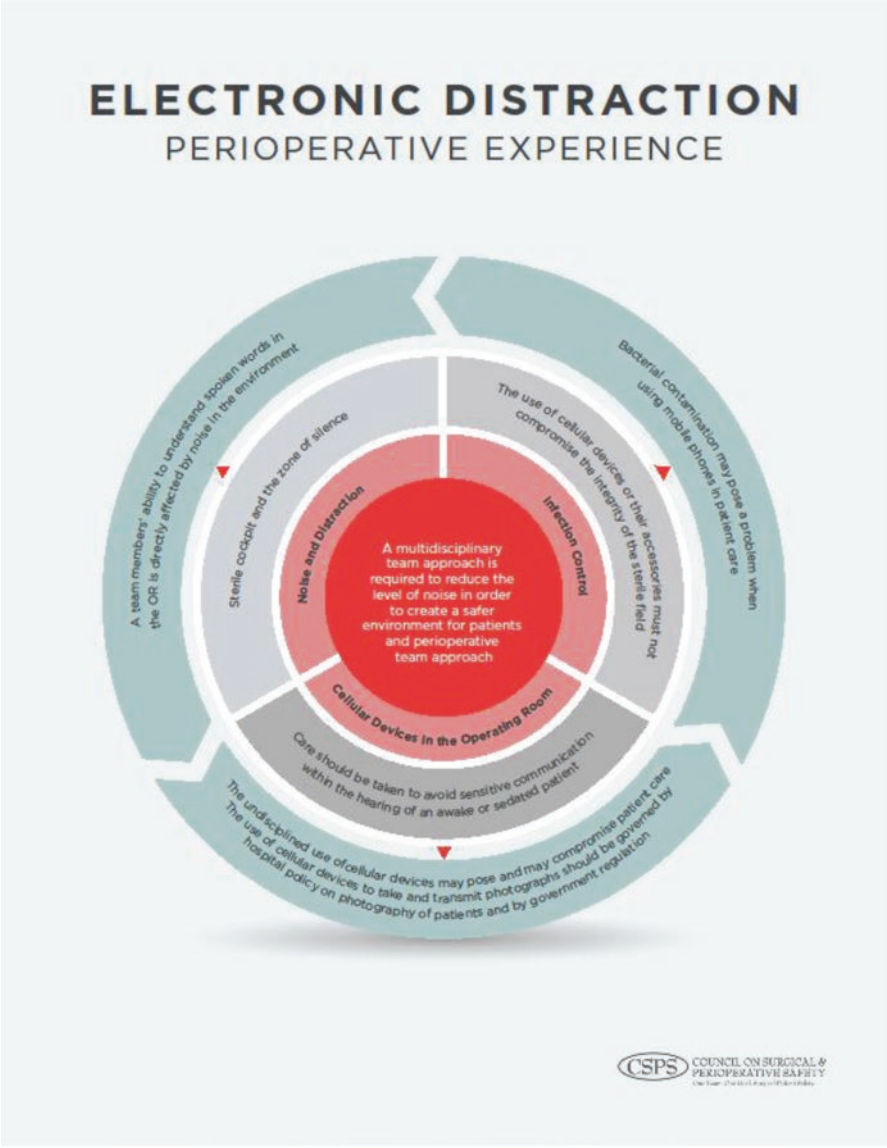

Fig. 14.1 The poster was developed by the Council on Surgical and Perioperative Safety (CSPS) and can be used as a cognitive aid in operating rooms and perioperative areas. The poster focuses on the importance of "minimizing noise and distraction during patient care" in order to "promote the safest care for every surgical patient"

Various apparatuses for the storage, cover, and display of personal communication devices are also available [46, 47]. Sterile iPads have been used in the operating room. IPads are contained in sterile bags and can be brought on to the sterile field in order to review images or other pertinent information [48, 49].

What does the future hold? Is there a role for the use of UV lamps? Reduced keyboard contamination and subsequent reductions in contamination have been found as a result [50].

If there is a concern with the handling of devices, could the use of smart glasses be introduced? Superimposed images are also available where interventions can be performed based on these images [51]. The capabilities of the smart glasses include the ability to review checklists and pertinent patient data [52]. Conversations relating to the surgery or necessary intraoperative consultations may be easier to obtain without the present worries over contamination. As a consequence, could this direction lead to the utilization of hands-free devices? Could voice-activated commands likewise replace the handling of devices?

Does the category of bacterial contamination from devices fall into the "never event" category? Simple awareness on the issues relating to bacterial contamination from devices needs to continue to grow. With the pressures involved in bringing a team together, the necessary equipment that needs to be available and the focus with operating room on-time starts this "awareness" can fall out. Are we adequately able to capture all of the events that occur, and are the reporting mechanisms consistent throughout organizations across the country? [53]

What about the introduction of a recognized patient safety program? The Department of Defense and the Agency for Healthcare Research and Quality (AHRQ) has developed TeamSTEPPS®. Key principles of TeamSTEPPS® include team structure, leadership, situation monitoring, mutual support, and communication. TeamSTEPPS® can help to build patient safety and communication teamwork skills [54]. When applied properly, this evidence-based program can optimize patient outcomes. The development of hard-wired tools can help with recommendations sought first from bottom-up and then top-down stakeholders. Subsequently "bottom-up" and "top-down" recommendations can be applied toward "inside-out" practices. The formation of a "huddle" prior to a procedure could reinforce a no-device zone while at the same time bring into the discussion the major concerns of the case. Understanding the importance of situation monitoring can help to protect patients with the delivery of safe and quality care [55]. In the "time out" the reinforcement statement does include speaking up when safety is an issue, similar to Amtrak's slogan: "If you see something say something." [56] The fears of negative team relationships may inhibit the inclination of someone to speak up [57]

Does the public perception of sterility and aseptic techniques present as scientific fiction movies of the future with sterility as "white" with no personal artifacts and complete facial cover-up? Does the evidence for eradication of devices need to be stronger? [33] If we were able to demonstrate the true financial gain associated with not allowing devices in the operating room, would there be more buy-in? As Ramona

Conner (Editor in Chief of Practice Guidelines for the AORN) states: "We don't want to throw out the baby with the bath water. We want to be able to take advantage of this wonderful technology" [58].

The casual use of mobile devices can result in potential infectious threats. Adherence toward aseptic principles is every health worker's responsibility. Breaks in practice can compromise the integrity of the sterile field. Robust process improvement (RPI) programs can "provide new ways of examining complicated problems and discovering highly-effective target interventions" [59]. Future directions should continue to include original research that focuses on gaps in the literature on this topic. Since, "human infallibility is impossible, the only chance to keep human errors from hurting patients is by creating collegial interactive teams" [60].

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Chapter 15
Digital Distraction and Legal Risk

James E. Szalados

Focus and Distraction

The importance of the power of focus is undisputable. The notion of mindfulness has its origins in Buddhism but has more recently gained widespread common recognition in the newfound importance of living fully within the present moment and focusing upon one's purpose. In the 1700s, Lord Chesterfield remarked that "steady and undissipated attention to one object is a sure mark of a superior genius; as hurry, bustle, and agitation are the never-failing symptoms of a weak and frivolous mind" [1]. Later, Mihaly Csikszentmihalyi, the Hungarian psychologist and the author of *Flow*: *The Psychology of Optimal Experience* [2] defined "flow" as a mental state in which a person performing an activity is so fully immersed in a feeling of energized focus, involvement, and enjoyment that he or she is completely absorbed so as to perform at the peak of their abilities. Csikszentmihalyi writes that "flow helps to integrate the self because in that state of deep concentration consciousness is unusually well ordered." In such a state of concentration, thoughts, intentions, emotions, feelings, and all the senses are focused on the same goal, an experience in which one is fully in harmony with the moment. Immersion in a state of flow is well known to athletes, performers, and innovators who widely acknowledge that they achieve their greatest when they are "in the zone" – with complete mindfulness at the moment and without distraction. Moreover, surgeons, anesthesiologists, intensivists, and other medical personnel describe moments of flow-like intensity of concentration in which the world around them temporarily ceases to matter, and the

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focus is on performance solely within the moment. Truly then, there may be no power greater than a focused mind.

The demands of our modern lives have fostered a fallacy that the best of us can achieve even more in any unit measure of time by "multitasking" or performing multiple tasks simultaneously. The reality is that true multitasking can only be accomplished if (1) at least one of the tasks has been so well practiced that it is performed at a subconscious or automatic level, or (2) the tasks are processed and controlled through different loci within the brain. It has become increasingly established that multitasking is actually a process of "task switching" and represents not the simultaneous focus on two or more competing sensory data points, but instead, the rapid shifting of focus back and forth between competing inputs. Given what we are learning about multitasking, it is unlikely that multitasking can result in better patient care than can a state of focus. Therefore, a state of sensory overload produces an intrinsic state of confusion, a "response selection bottleneck" during which time the brain attempts to determine which data points to prioritize its focus upon. Edward Hallowell, in his book entitled *CrazyBusy* [3] described "attention deficit trait," a condition similar to attention deficit disorder or ADD, a compulsion to scan increasingly greater numbers of external data points, which then becomes a habit, and from which we derive increasingly greater satisfaction.

The average modern knowledge worker is said to have an attention span of approximately 3 min, constant interruptions are an Achilles' heel of the US information economy, and distractions account for approximately 28% of the average American workday, accounting for a lost productivity cost of $650 billion annually [4]. The impact of electronic distraction on productivity is staggering: 25% of workers are completely unproductive at least 7 h a week, and 22% of workers are completely unproductive 5–6 h a week, representing an average of 11% lost full-time employee equivalents (FTE) or 2.3 days lost per employee per working month [5]. Increasingly, it has become apparent that electronic distraction rapidly evolves into electronic addiction. The CAGE tool [6] is a highly validated survey of alcohol addiction which has been used to demonstrate an addiction component to the use of personal electronic devices (PEDs) in studies of cardiac perfusionists and pediatric residents, who realized that the use of PEDs distracted from patient care, but could not abstain from focusing on PEDs rather than the patient [7]. The danger is that providers and other professionals chronically engaged in multitasking eventually develop a type of addiction to that stimulation and subsequently cannot focus even when they must.

Patients have a right to expect that their provider is focused on their medical problem during an encounter of care. Health care workers represent a special class of knowledge worker, professionals with an exceptional fiduciary obligation to a special class of consumer, the patient. A fiduciary is one who holds a legal or ethical relationship of trust. This special trust is based on an imbalance of knowledge, training, and experience, whereby the fiduciary has both ethical and legal obligations to act undividedly on the behalf of the beneficiary under circumstances which require total trust, good faith, and honesty. The physician-patient relationship represents a fiduciary duty which encompasses (1) a duty of care with respect to prevailing standards of care tempered by professional medical judgment; (2) a duty of competence

established by benchmarks of competency such as licensing and credentialing; (3) a duty of loyalty to maintain the patients' rights and interests, including rights such as disclosures, respect, and privacy, over his or her own; and (4) a duty to avoid conflicts of interest. The seminal case of *California Supreme Court in Moore v. Regents of the University of California* deemed the patient-physician relationship to be fiduciary in nature and stressed that the fiduciary obligation required the physician's disclosure of "personal interests unrelated to the patient's health, whether research or economic, that may affect the physician's professional judgment." Nonetheless, although courts have since been reluctant to impose liability on physicians and providers for causes of action predicated on a breach of fiduciary duty alone, the impact of describing a breach of loyalty to a medical malpractice jury can have important consequences to the outcome of litigation. In *Rules of the Road*: *A Plaintiff Lawyer's Guide to Proving Liability* [8], the authors discuss a method for presenting a case to jury at trial whereby the invocation of common sense and universally accepted rules of behavior, when applied to the evidence of what occurred in a case, logically allow the jury to conclude the reasonableness of the behaviors or actions preceding the injury. The public's trust in their health care provider is based, to a very large degree, on the expectation that their provider will devote their undivided attention (focus) to their patient and so will devote undivided attention to critical elements of monitoring and decision-making. In the instance where distracted patient care can be established, an argument suggesting a breach of fiduciary duty will disadvantage any legal defense. In the context of digital distraction, it can be argued that providers breach a duty of trust when they cease to focus on the concerns and care of the patient, especially when the loss of focus stems from preoccupations which are external and relatively trivial. Although patient satisfaction is predicated on focus and concern, litigation from such breaches is legally inconsequential unless an adverse outcome ensues *and* there is evidence that the adverse outcome was a result of the distraction.

Electronic Discovery of Distraction and Its Use in Litigation

Distraction has long represented an inevitable workload challenge for busy clinicians; interruptions and competing demands for attention and focus are not new to medicine, and interruptions are not new to nanosecond-based electronic environments. However, arguably modern medical practice has not only become much more demanding in terms of the workload demands, complexity of illness, and team-based models of care but has also been impacted by technology. Therefore, information which had been previously "held" until a prior task was finished is now communicated instantaneously and continually. Communication flow is facilitated by cellphones as opposed to pagers; laboratory, chart, and radiology data is now streamed live to the point of care; online algorithms and calculators guide care decisions; and the electronic medical record (EMR) facilitates point of care data entry by clinicians. Ours is indeed a time of great opportunity but also a time which poses immense challenges to the very processes of the provider-patient relationship.

Therefore, at no prior point in the history of medicine have there been so many simultaneous demands on our focus and, therefore, never before have there been so many opportunities for medical errors to result because of distraction.

When attention is diverted through distraction, focus is temporarily lost; refocus, if it occurs, is delayed, and the linearity of thought is not continuous; interruptions are known to cause lapses which result in inadvertent acts or omissions. After an interruption, a full return of focus to the task can take up to 30 min depending upon the nature of the interruption, which often results in busy providers moving on to the next task and forgetting a key element in the care plan. Clinical realities may be inevitable, but when the environmental complexity is further impacted by recreational distractions introduced by choice, the opportunity for errors becomes even greater because distractions with an emotional component are cognitively perceived to be more intense than are distractions based on objective information streaming.

Providers frequently fail to realize that their words and actions within the clinical context are easily discoverable through the testimony of those around them. Nurses and other staff are often eager to testify that another team member or provider is either regularly preoccupied in digital communications or was actually engaged in some other form of distraction in the moments immediately preceding an adverse clinical event. Such testimony can be elicited through whistleblowing, subpoena, interrogatories, or via depositions.

The flow of almost all digital information now occurs via internet protocols. Therefore, the metadata inherent in electronic medical records, cellphone communications, social media, and actual internet access all occur in a public arena. Although there is a reasonable expectation of privacy within the ambit of our communications, which privacy continues to be eroded, especially within the context of discoverability of evidence for the purposes of litigation. Attorneys are increasingly learning to leverage electronic discovery to aid in the prosecution or defense of their clients. Social media sites such as Facebook, Twitter, LinkedIn, Tumblr, Snapchat, and Instagram are, arguably, the least private and therefore the most easily discoverable, especially if the party used his or her own name on the account and did not restrict access [9]. The information in the medical record also now contains more information than most providers realize. Metadata is defined as data about data: (1) descriptive metadata is mainly descriptive for the purposes of data identification such as author, keywords, and title; (2) structural metadata describes the ordering of the data content; and, (3) administrative metadata which relates to the date of creation, access privileges, and the access log. With respect to a medical record, electronic discovery can identify who accessed what portions of the record, when, and for how long. The use of metadata in litigation has become commonplace to interrogate witnesses regarding whether or not notes, laboratory data, or radiographs were reviewed during the clinical assessment of a patient. Therefore, in litigation, both the electronic medical record and the treasure trove of metadata which it contains will be accessed and reviewed for the purposes of client defense or impeachment. In medical malpractice litigation, the plaintiff puts his or her relevant medical record into controversy, and therefore, within open court, that information is neither privileged nor protected by the Health Insurance Portability and Accountability Act

(HIPPA). However, the discovery of evidence in the form of electronic communications such as emails or cellphone records is less straightforward. Even so, courts will allow access to personal electronic communications, and these will be discoverable and admissible when a proper evidentiary foundation has been laid. Civil discovery laws in the United States are relatively broad, supported by the subpoena powers of the courts, and allow for the discovery of any material or information which might be reasonably believed to lead to admissible evidence in the case. For example, cellphone records are now routinely requested in automobile accident cases in an attempt to demonstrate that a driver was distracted at the time of the accident. The discovery process will also almost certainly seek to locate workplace rules and regulations, as well as policies and procedures, regarding the use of electronic devices and the clinical circumstances under which they can be used. Either the presence or absence of such workplace policies can help a plaintiff's case; policies can help implicate the institution, group, or employer in liability. In the event of an adverse therapeutic outcome for which medical malpractice is alleged, the potential scope of discovery has become almost limitless, and attorneys are actively learning how and where to look for electronic evidence. Proof of distraction can bolster a plaintiff's case by implying a provider's breach of fiduciary duty, bad judgment, carelessness, and lack of professionalism. The issue of malpractice, as it relates to practitioner distraction, is, at the present time, highly under-recognized and therefore poses an increasingly greater future potential for serious liability to providers, groups, and health care institutions.

A Review of the Law of Medical Malpractice

An unexpected or adverse clinical outcome is not, in itself, a proof of medical malpractice. Similarly, a medical judgment wherein a provider chooses among two or more reasonable alternatives, and a bad outcome results, is not, in itself, medical malpractice. Medical malpractice represents a fairly narrowly construed cause of action for unintended harm which results specifically from an unreasonable deviation from widely accepted medical practice. Medical errors are often the basis of medical malpractice litigation since an error is, by definition, an act inconsistent with standards of medical care. Errors may or may not in themselves represent medical malpractice, especially in the context of a complication, for example, a surgeon who severs the common bile duct during a cholecystectomy made an error that is not necessarily malpractice, for malpractice occurs when there is a failure to recognize the error, failure to adequately correct the error, and a denial of postoperative symptoms of bile leak. If the error is committed during a distraction, the chance of recognizing it will be significantly lower. Errors can in some cases represent recognized complications of treatment. Nonetheless, not all medical errors are discovered, not all errors result in compensable harm, and not all of those harmed will chose to sue.

Medical malpractice is a civil tort. Torts are civil laws which govern the adjudication of wrongful acts which result in a compensable harm to another person. The tort of negligence addresses conduct which is outside the "reasonable person standard" such that a reasonable person would find that the conduct in question is more likely than not violated norms of reasonable behavior. Professional malpractice is a subset within the law of torts which addresses deviations from recognized or accepted professional standards. By it physicians, nurses, attorneys, accountants, and engineers are held to define standards of practice and become liable for damages when there is a deviation from accepted standards which results in a real or economic injury. Medical malpractice is yet again a specific subtype of professional negligence. Medical malpractice can be the result of either an affirmative act or an omission by a provider during the care of a patient. There are many potential causes of action in medical malpractice proceedings frequently beginning with the words "failure to" such as failure to (timely) diagnose, failure to monitor, failure to treat, failure to supervise, and failure to rescue. Since omissions are especially likely to occur in the context of provider distraction, a reasonable causal link between the lack of mindfulness during a clinical encounter and a subsequent injury, and hence the basis for medical malpractice lawsuit, can readily be made evident to a jury.

Torts are civil laws governed by state civil statutes. In the United States, litigation occurs under an adversarial system, whereby each side has the right to legal counsel, who argue on behalf of their respective clients using procedural rules, namely, state-specific rules of civil procedure. The incident which gives rise to the lawsuit is known as the cause of action. The aggrieved party, usually the patient, initiates the lawsuit before a court and is referred to as the plaintiff. The plaintiff must file the lawsuit in accordance with defined rules of procedure. The lawsuit must be filed through a vehicle such as a summons and/or complaint, in a timely manner within a state-specific time period known as the "statute of limitations" which varies from state to state. The party against whom the complaint is directed is the defendant; in the case of medical malpractice, this may be a physician, other licensed provider, hospital, professional group, or any combination thereof. Once the complaint is filed, a process of discovery begins which can include subpoenas, or requests for documents, interrogatories, and depositions. In the case of electronic records, such as electronic medical records or cellphone data, forensic specialists who are experts in electronic discovery are frequently retained to obtain evidence that is not in paper format.

Medical malpractice places the burden of proof upon the plaintiff, to prove by a preponderance of the evidence, the legal argument posited. There are four elements of medical malpractice: (1) the existence of a professional duty owed to the patient, (2) breach of that duty, (3) an injury that is proximately or legally caused by that breach, and (4) resulting harm which defines compensable damages. Breach of professional standard almost always requires expert witness testimony. However, in some egregious cases, expert testimony is not required because the facts of the case and the appropriate standards do not need to be defined through expert witness testimony, and the facts of the case are said speak for themselves – a case of *res ipsa loquitur*. Expert testimony is necessary in medical malpractice cases to determine a

medical standard of care and its breach; however, in the event of cases such as wrong-sided surgery or operating room fires, expert testimony is not required because the rules of the road are widely understood. *Res ipsa* cases are easier for plaintiffs to litigate because the typical argument of the experts, and the associated costs, can be dispensed with. Arguably, distraction cases may fall within the ambit of the *res ipsa* doctrine.

Medical malpractice cases that are settled, or those cases wherein a judgment is entered against the defendant provider, must be reported to the National Practitioner Databank. Credentialing services are required to query the databank as a prerequisite to granting privileges. A finding in a medical malpractice case does not bar a separate suit for criminal negligence and may in fact also trigger a separate investigation by the state professional licensing body which may result in additional proceedings, possible incarceration, and loss of licensure. Malpractice liability policies do not typically cover criminal prosecutions or state medical board hearings.

Negligence and Medical Malpractice in the Context of Electronic Distraction

An allegation of medical malpractice, or medical negligence, must prove more than the occurrence of an outcome adverse to the patient. Unexpected outcomes and complications are an integral part of medicine, which, in the words of Osler, is a "science of uncertainty and an art of probability" [10]. A provider who chooses between two or more reasonable alternatives, or a provider who commits an error but recognizes and remedies the error, may not be guilty of malpractice. The burden of proof falls upon the plaintiff to prove that there was indeed professional negligence, conduct nonconforming to prevalent standards within the relevant medical community or actions incongruent with those expected of a reasonable practitioner. The terms "standard" and "reasonable" are extremely important in the legal sense because they describe concepts which a layperson juror can understand. Once again, since we all know to obey traffic signals and traffic laws, the analogy is self-evident, and most jurors can be expected to understand the "rules of the road" or norms of reasonableness.

In order to develop the story and in order to produce compelling evidence to the jury, counsel for the plaintiff will need to gather that evidence through a process of "discovery." Coworkers and staff will often volunteer testimony regarding habits, such as the use of distracting electronic devices and media during clinical duties; if they do not volunteer, they can be compelled to testify. Electronic discovery also called as "e-discovery" refers to the discovery of electronically stored information (ESI) using digital fingerprints. In 1986, the congress enacted the Stored Communications Act ("SCA") [11] which extended the Fourth Amendment protection against unreasonable search and seizures into the realm of electronic information given the expansion of potential privacy breaches which were not contemplated at the time that the Fourth Amendment was enacted. The SCA has been interpreted to cover the content of emails, private Facebook messages, YouTube videos, and the

so-called metadata, or noncontent information, connected to our Internet transactions (e.g., websites visited, to/from and time/date stamps on emails) and their protection from third party discovery. Nonetheless, in civil litigation, the SCA offers little protection with respect to electronic discovery requests between parties.

The use of electronic devices represent both unique challenges and unique opportunities in the context of discovery; because although metadata can be technically difficult to obtain, once obtained, it can triangulate the actions of the user in physical space and time. Therefore, it can be determined where the user of the electronic device was, what they were doing, at what time, and for how long. In the case of motor vehicle accidents, it has become standard discovery procedure to obtain cellphone records of both parties involved because the sheer number of motor vehicle accidents, which have a causative link to cellphone or other personal digital assistant usage, telephone conversations, facetime, surfing, or texting, has grown exponentially. Cellphone records are typically obtained through a subpoena served upon the drivers' cellphone carrier or provider. When reviewing a driver's cellphone records, the goal is to determine whether the driver of the motor vehicle was using the device, and in what capacity, at the time of the accident, in order to posit a case for distracted driving. GPS enabled devices can produce high-probability evidence regarding the events immediately preceding the accident, even to a level of determining whether a car was stopped at the stop sign or not or whether the driver was texting, Facebooking, Tweeting, or not using the device at the time of the accident.

State-specific procedural rules pertaining to discovery, and electronic discovery, govern what information each attorney can request or subpoena from the opposing party. Many states allow "open and broad" discovery which generally permits "discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the pending action … [or] appears reasonably calculated to lead to the discovery of admissible evidence." In such a context, under such rules, counsel for the plaintiff might request personal cellphone records, social media records, or potentially even the electronic devices themselves for forensic analysis, and the judge would have the discretion to decide if the request was proper. Furthermore, if the requested devices were to be intentionally lost or destroyed to prevent access, sanctions and penalties could be assessed for destruction, or spoliation, of evidence.

Discovery requests for cellphone records will almost certainly be contested during pretrial as potentially overreaching into a personal arena in which there is an expectation of privacy; however, strong case law is evolving to the contrary. For example, in the case of *Antico v. Sindt Trucking, Inc.* [12], the plaintiff was the widower of a decedent killed after a truck collided with her vehicle. Plaintiff alleged wrongful death and sued the truck driver and his employer. The primary defense countered that the decedent was at least partially if not totally responsible for the accident because she was allegedly distracted on her cellphone; at least two witnesses attested to seeing the decedent driving while using the phone, and the first responder police reportedly supported that assertion. The trucking firm also filed a request to have a technology expert analyze the phone for information, and the trial court granted the order, but set specific instructions regarding how that information

could be obtained, and also limited the search to a 9-h window around the time of the accident. Plaintiff countered the request for cellphone records citing concerns for his wife's privacy, objected to this search, and appealed that decision to the Court of Appeal. The appellate court nonetheless affirmed the opinion of the trial court, finding that potential privacy breaches were outweighed by the importance of the information and that the discovery demand fell within the ambit of Florida's rules of civil procedure.

Increasingly, the interests of justice appear to be encroaching on expectations of privacy because it is apparent that a distracted driver is legally responsible for ensuing damages. Each of the 50 United States imposes on every driver a legal duty of care to other drivers who share the road. A driver who intentionally engages in distracted driving breaches the duty of care; that breach of duty is negligence which imposes a legal obligation to compensate victim for damages. Medical mishaps resulting from cases involving distraction are thus easily extrapolated from this paradigm.

Within the medical context, the 2011 Texas case of Mary Milne, which has received widespread media attention, exemplifies each of the elements above. Milne died in a Dallas medical facility during an outpatient procedure, an AV node ablation, intended to correct an irregular heartbeat. The patient's surgeon later accused the anesthesiologist of failing to monitor the patient's blood-oxygen levels for 15–20 min while surfing Facebook on his cellphone. The family subsequently alleged medical malpractice against Medical City and two individual doctors involved in the procedure. The anesthesiologist's Facebook post during the anesthetic allegedly also included a snapshot of the patient's vital signs on the monitor behind the anesthesiologist [13].

The 2014 New York case of Joan Rivers wherein the New York City medical examiner determined that Rivers died of brain damage due to the lack of oxygen after she stopped breathing during an endoscopy procedure at the Yorkville Endoscopy Center. Rivers' daughter Melissa Rivers filed a malpractice lawsuit against both physicians and the clinic alleging that the provider team were taking cellphone selfies while Rivers was unconscious on the operating table and allegedly failed to recognize the fact that Rivers was hypoxic [14].

The likelihood of pretrial settlement is based upon many considerations, including each party's assessment of the convincing weight that their evidence commands and the dollar amount in controversy. Since the dollar amount, or damages, potentially include economic losses as well as pain and suffering and even punitive damages, the egregiousness of the circumstances surrounding the alleged malpractice will drive the requested compensation. Carelessness, dereliction of duty, and gross indifference to the needs of a patient are allegations which drive large jury verdicts; a conscious choice to divert one's attention away from a patient must be weighed against the risk. Whereas professional interruptions may be necessary especially in emergencies, recreational interruptions will not be viewed favorably by a jury. However, the largest jury verdicts frequently require a successful institution indictment, and in the case of electronic distraction, as we will argue below, the path to institutional culpability can be surprisingly easy.

Theories of Human Error

Human error is typically attributed to either human performance variability or system failures. Historically, quality assurance paradigms typically focused on accusing and blaming individuals rather than institutions or systems. Increasingly, it is recognized that human fallibility can be avoided or mediated via system designs which emphasize standard operating procedures and redundant safety measures. James Reason has proposed the "Swiss Cheese model" wherein multiple layers of defense increase the probability that one of multiple redundant safety layers will "trap" an error before it causes an effect [15]. Therefore, failure to trap or catch an error can be attributed to either (1) active failures which were typically unsafe acts which are attributable to slips, lapses, fumbles, mistakes, and procedural violations or (2) latent conditions attributable to strategic design or externally imposed environmental conditions such as time pressure, staffing, equipment issues, fatigue, procedural design, or alarm failure. The most well-known of these are slips, lapses, and mistakes. Slips can be thought of as actions not executed as intended or planned, such as "Freudian slips" when speaking. Lapses are missed actions and omissions, frequently implicating memory and/or attention. Mistakes occur because of a faulty plan or intent, frequently because of inadequate or faulty data, or faulty interpretation of facts. The issue of medical errors was catapulted into the public domain via a report published by the Institute of Medicine (IOM) which in a 1999 report claimed that at least 44,000, and as many as 98,000 people, died annually in US hospitals as a result of preventable medical errors [16]. The IOM listed important errors to include adverse drug events and improper transfusions, surgical injuries and wrong-site surgery, suicides, restraint-related injuries, or death, falls, burns, pressure ulcers, and mistaken patient identities. Furthermore, the highest error rates with the most serious consequences were most likely to occur in high-intensity settings such as intensive care units, operating rooms, and emergency departments. More recent work estimates the number of premature deaths associated with preventable harm to patients to be even higher than that reported by the IOM. James estimated this number to be closer to 400,000 deaths per year and estimated the incidence of serious harm to be 10- to 20-fold greater than that of lethal harm [17]. Moreover, in 2016, Makary and Daniel published an estimated death rate due to medical error of 251,454, more than a quarter million deaths, per year [18].

In a 1987 work, Park had observed that relatively typical error rates can vary by orders of magnitude and are highly context dependent:

0.003	Error of commission (inappropriate action based on misread label)
0.01	Error of omission (inappropriate inaction without reminders)
0.03	Simple arithmetic errors
0.1	Backup failure in error recognition
0.25	Errors of all types with production pressure, critical situations, and high stress [19]

It is reasonable to conclude that those errors occur with much greater frequency where focus and concentration are critical and there is high risk of inputs from competing stimuli and associated distraction; at such times, the stakes are usually correspondingly high. High reliability organizations, such as NASA and the airline industry, are those which have developed cultures and protocols to enhance resilience to isolated failures, especially during times of stress.

Thus, medical errors can implicate providers but can also implicate members of the health care team as well as the institution. Institutional liability in the event of medical error is frequently premised upon a theory of failure to promote a culture of safety. Increasingly, there has been a recognition of systems failures that increase the probability of errors occurring and system failures which do not prevent the resulting harm (lack of redundancy and backup in the Swiss Cheese model), or mitigate the consequences via early warning and recognition. Where a plaintiff can demonstrate that the institution knew or should have known that unsafe working conditions or a risky culture existed either through failure to enact proper policies and procedures or through inaction after similar prior events, contributory corporate negligence may be successfully argued at trial. Characteristics of a corporate culture include tolerance for innovation and risk taking, attention to detail, outcome focus, and team focus. The Space Shuttle Challenger disaster is widely cited as one example of risk tolerance at NASA. It is widely recognized that corporations, group, practices, and hospitals can be held liable not only for their own direct negligence but can also be held vicariously liable for breaches in the standard of care by employed or contracted providers.

Team Performance and Team Culpability: Principles of Crew Resource Management

In 1977, two Boeing 747 aircraft collided on a runway on Tenerife, in the Canary Islands, killing 583 people. The subsequent investigation revealed that the crash was a result of a complex interaction of system failures, unsafe acts, and environmental circumstances; as a result, this incident has served as the textbook example for evaluating airline safety systems. In brief, delays at regional airports forced a large number of airline diversions to Tenerife causing backups on runways and taxiways; because of the delays, the flight crews stayed on duty much longer than normal, and the captains made decisions to refuel while parked, thus increasing aircraft weight; finally, as the flights were finally being cleared for takeoff, a dense fog rolled into the airport interfering with ground radar. A complex interplay based partly on nonstandardized Air Traffic Control phraseology as well as the lack of visual cues and intense time pressure imposed upon a weary flight staff together contributed to the largest commercial airline disaster in aviation history.

Less than a year later, in December 1978, United Airlines flight 173 crashed into a quiet residential neighborhood outside of Portland, Oregon, and became the tipping

point for changing the culture of aviation safety. During the plane's final approach, a warning light signaled a possible landing gear malfunction, which could not be definitively evaluated from within the aircraft. The captain continued to circle the airport and troubleshoot until the plane ran out of fuel, the engines flamed out, and the plane crashed. The National Transportation Safety Board (NTSB) determined, in the ensuing investigations based on cockpit voice recordings, that a significant contributor to the accident was the failure of the two other flight crew members to communicate the fuel situation clearly and assertively to the captain, who, in turn, was so distracted by the alarm malfunction that he cognitively blocked out critical information regarding fuel status. Until that time, there had been a strict hierarchy within the flight crew, and a tremendous deference was accorded to the captain with respect to the nature and intensity of communications, even in the event of emergencies.

When the failure of cockpit communications was highlighted as a key contributor to this airline incident, United Airlines became the first commercial airline to institute mandatory crew resource management (CRM), a team-based model of shared responsibility with emphasis on interpersonal communication, mutual respect, leadership, and decision-making while still simultaneously retaining command hierarchy.

CRM addresses information processing, fatigue and workload management, situational awareness, and communication and organizational culture [20]. Within CRM, it is widely accepted that one's attention can move rapidly between single data elements but can only focus on one item at a time; therefore, attention can be (1) selective, (2) divided, (3) focused, or (4) sustained. Selective attention is said to occur when one is monitoring several sources of sensory input, allocating greater attention to one or more data sources perceived to be more important. Psychologists refer to this as the "cocktail party effect" where, despite being engrossed in a conversation, one's attention can still be diverted when one hears one's name. Divided attention occurs when there is rapid time sharing between inputs and usually, when attention is divided, one task suffers at the expense of the other. Focused attention occurs when one's attention is focused upon a single data source and distraction is avoided; overly focused attention can result in the inability to perceive new and important data. Sustained attention refers to the ability to maintain attention in an alert fashion over long periods of time usually on one task such as studying or monitoring.

An important aspect of attention is the notion of situational awareness whereby one maintains a real-time mental model of one's current environment and even perhaps predicts possible future states. True situational awareness requires open mindedness, receptivity to unconventional data sources, and full utilization of all resources including all team members. Situational awareness cannot occur when one is either not paying attention or, conversely, over-engrossed in a single sensory input, such as the United Airlines pilot who was preoccupied with the landing gear indicator. Sensory input obtained via attention may result in decision-making which can occur deliberately or automatically based upon knowledge, experienced, training, expectation, and context. Decision-making is the generation of an alternative course of action based on available information, knowledge, prior experience, expectation, context, goals, etc. and selecting one preferred option.

There are many opportunities for distraction and divided attention in the clinical context attributable, for example, to the introduction of new technology such as monitors, alarms, and the electronic medical record, mobile technology, noise levels, unnecessary conversation, and other variables which distract or dilute the focus of team members because attention is shifted away from the primary task. The impact of the electronic medical record (EMR) as a distractor in the clinical context should not be underestimated. Required documentation and computer order entries especially during times of intense clinical activity itself require intense focus. Since the mind cannot completely focus on two separate cognitive tasks at once, EMR distraction may affect patient care just as significantly as can a cellphone call or text message.

Distractions in the operating room (OR) arena can be critically important to complication rates. Distractions may be from intrinsic sources such as equipment alarms or communications relevant to the procedure between members of the surgical team, or distractions may be from extrinsic sources such as pagers, phone calls, visitors, or interruptions from sources outside the OR. Such distractions can affect every member of the operative team including surgeons, anesthesiologists and nurse anesthetists, nurses, perfusionists, and surgical technicians. Cognitive workloads are both intense and temporally variable for each of these professionals, and the most cognitively demanding periods frequently vary for the different members of the team at different times, resulting in multiple nonoverlapping high-risk points in the course of an operative procedure. Anesthesiologists consider induction and emergence to represent the most critical phases of anesthesia [21]. Surgeons may have discontinuous periods of intense cognitive demands such as a critical dissection, creation of an anastomosis, or nerve localization. Focus challenges for nurses include medication verification, surgical counts, and specimen labeling [22].

The Pennsylvania Patient Safety Reporting System (PA-PSRS) retrospectively analyzed events reported from January 2010 through May 2013 and found 304 reports of events occurring in the OR in which distractions and/or interruptions were considered to represent a contributing factor. Of the complications related to surgery or invasive procedures, the issues reported with greatest frequency were incorrect equipment and needle counts, although specimen mishandling during the procedure and the use of expired products or implant materials were also significant [23].

CRM represents an institutional commitment to a culture of safety; where all team members fully subscribe to CRM, there is a significant chance that errors can be prevented and effects of any errors that do occur are rapidly contained or mitigated. Failure to promote a culture of safety, either through CRM or a similar program, can implicate corporate liability. The legal theory of *respondeat superior*, or vicarious responsibility, means that an employer or institution can be held legally accountable for the errors or negligent actions of an employee who was acting within the scope of his or her employment at the time that the error occurred. *Respondeat superior* is frequently alleged in litigation involving employees distracted by cellphones while working; in such situations the employer may have failed to enact proper teaching or policies and procedures or may have either implicitly or explicitly fostered a workplace culture which encouraged or even compelled employees to use cellphones or other electronically distracting devices while driv-

ing. In such cases, the process through which a plaintiff's attorney develops the case, discovery will specifically focus on policies, procedures, and reports. A plaintiff's attorney will use the discovery process to explore factors, which may then be used as evidence in court, which may have contributed to potential negligence, for example:

- Hospital policies regarding cellphone usage
- The record of a hospital or employer's monitoring and enforcement of any said policy
- Material witnesses who may observe a habit of regular laptop or cellphone use during patient care
- Cellphone or Internet records which may reveal the amount of time and on what days and dates one was using a device
- Cell tower records which can pinpoint with reasonable accuracy the places where the device was in use
- Texting records which may even include the actual texts
- However, when an employee engages in conduct intentionally and specifically for personal reasons, even if such conduct occurs during work hours at the work site, courts will not typically shift liability for injuries to the employer, and in such cases, the employee is likely to be liable individually.

Team Members Behaving Badly: The Sterile Cockpit Rule

Although communication serves an important role within the team to promote "distributed situation awareness" whereby a shared picture of events and their progression is built up by interactions between the team members [24], it can also cause loss of focus. An issue is the importance or value of the communication as against the risk interruption to the task at hand. The airline industry and the Federal Aviation Administration (FAA) have long recognized that distraction is especially detrimental to human functioning in situations requiring cognitive processing of large amounts of complex and rapidly changing information. Flight crew cognitive and manual workload varies, even during routine flights, from low to high, and can rise acutely in the event of unanticipated conditions such as aircraft malfunction or meteorological conditions. During episodes of higher workload, flight crews are especially vulnerable to error if their ability to fully and effectively focus attention on critical tasks is compromised by distraction. Moreover, in a multistep processes, a distraction or interruption mid-task is likely to result in missing one or more of the process steps. Investigations of airline mishaps have revealed that distractions have resulted in pilots forgetting to appropriately set flaps before takeoff, to deploy landing gear on approach, and to misinterpret instrument warnings and readouts. The Sterile Cockpit Rule exemplifies the issue of acute loss of situational awareness because our intrinsically human capacity for reacting to external stimuli requires the

intermittently precious resource of selective attention to be consciously fully allocated to critical stimuli (focus) during certain critical tasks.

The Sterile Cockpit Rule is an FAA regulation which requires commercial pilots to refrain from nonessential activities during critical phases of flight, such as taxi, takeoff, and landing, which normally occur below an attitude of 10,000 feet [25]. The regulations state that "no flight crewmember may engage in, nor may any pilot in command permit, any activity during a critical phase of flight which could distract any flight crewmember from the performance of his or her duties or which could interfere in any way with the proper conduct of those duties." The FAA has expanded the rule to prohibit pilots from using their personal tablets, smartphones, and laptops for personal use at any time during the entire flight.

Data suggests that health care providers commit twice as many errors when interrupted than when there were no interruptions (22% versus 11%, respectively) and that interruptions can increase the time to complete a task by as much as 27% [26]. Westbrook found that one episode of interruption can result in a 12.7% increased risk of a medication error and that that error rate tripled when a nurse was interrupted six times [27]. The issue is that the time for a full return of focus after a distraction can range from 45 s after a trivial distraction to along as 30 min after a more serious distraction. Clinical examples of situations where an interruption has caused incomplete or erroneous task completion include a retained guidewire during central vein cannulation [28], a resident physician miscalculating a Coumadin dosage [29], and incorrect insulin dose administration. Campbell and colleagues found that external events were more likely to be distracting if they violated a boundary, whether spatial, temporal, or professional, and if they occurred at an inappropriate time.

The American Society of Anesthesiologists (ASA) Closed Claims Project, in 2011, published that the majority (68%) of difficult airway claims arose during the induction phase (analogous to takeoff). The medical specialty of anesthesiology has widely adopted theory and techniques of the aviation industry in becoming one of the great success stories in increasing patient safety [30]. The use of simulators, protocols, and checklists and of systems analysis is a routine in both aviation and anesthesiology practice. The Joint Commission and the nursing profession have also embraced the Sterile Cockpit Rule within the clinical patient care setting where certain critical task areas such as where medication selection occurs are now designated as "No Interruption Zones"; in some institutions there is an associated high-visibility "No Interruption Wear," such as an orange vest, clearly advertising that a nurse or provider is engaged in a high focus intensity task and therefore to not be disturbed [31].

The standard of care to which a provider is held in a suit alleging medical malpractice is the level and type of care that a reasonably competent and skilled health care professional, with a similar background and in the same medical community, would have provided under the circumstances that led to the alleged malpractice. However, specialists are typically certified in their field of medical practice after completion of a rigorous training through nationally training programs which are administered in accordance with nationally recognized training standards; formal

certification and recertification are based on nationally recognized and administered certifying examinations. Therefore, specialists are held to a higher standard of care which is the degree of care which a reasonably competent specialist with similar training and experience would use under similar circumstances. The specialty of anesthesiology is widely touted as considering itself to practice in accordance with other high reliability organizations, specifically, the commercial aviation industry. The American Society of Anesthesiologists (ASA) is the nationally recognized organization, which speaks for the specialty of anesthesia, and has repeatedly advocated the analogy between anesthesiology and aviation. It would be expected, therefore, in a medical malpractice proceeding involving potential clinician distraction, a plaintiff's attorney would seek to introduce cognitive theory regarding distraction and use the aviation model to argue a breach in the standard of care using analogies and examples from aviation – examples that are easily comprehended by the jury with the context of common sense rules of the road. Since the crest of the ASA touts "vigilance," if it can be convincingly argued that the provider was neither focused nor vigilant at the critical moments immediately before an anesthetic mishap, the jury verdict or settlement is not likely to favorable.

Regulatory Liability

A related, but separate, area of liability for distracted care relates to the increasing potential for regulatory liability. Thus, far, there are no publicized cases, whereby a provider has been subject to federal prosecution simply for electronic distraction. However, three important federal statutes, the federal False Claims Act (FCA) [32], the Health Insurance Portability and Accountability Act (HIPAA) [33], and the Health Information Technology for Economic and Clinical Health Act (HITECH) Act [34] represent a potential legal threat to providers. Under the FCA, a provider is liable for submission of a false claim for services provided; it is conceivable that in situations where it can be proven that a provider was substantially distracted during the provision of care, so as to not have provided care as billed (such as might have been in the case of the Dallas anesthesiologist), the government might argue that full services were not provided; and, in the case of a patient insured through a federally funded program, a claim for services might be seen as unjustified by the federal government. Penalties under the FCA include civil and monetary penalties as well as exclusion from federally funded programs. Similarly, under HIPAA and HITECH, liability is incurred when there is the breach of patient privacy through a disclosure of personally identifiable health information. Under HIPAA, the government, through the Office of Civil Rights (OCR), will prosecute cases where patient privacy has been breached (such as, e.g., potentially in the Joan Rivers case where photographs were allegedly taken in a procedural area at a time she may have been under anesthesia). The liability implications for breaches of HIPAA and JHITECH are similar to those for liability under the FCA. Again, institutional liability may be also imputed if there is reason to show that the Institutional Compliance Program

failed to address digital distraction and communications in its compliance plan. Moreover, such claims are frequently brought by the government once the circumstances have already been explored in a civil medical malpractice trial.

Conclusions

The impact of digital distraction in health care as in our everyday lives, is only now becoming recognized as a factor in cognitive dissonance and errors of varying types and magnitude. Simultaneously, the importance of mindfulness and focus are now recognized as being important to cognitive harmony and excellence in task completion. Drivers are prohibited by law from texting and driving, although the practice remains widespread. Providers and institutions will need to carefully assess these risks and determine the level of risk they are willing to tolerate within the patient care arena both with respect to the potential for patient harm and the consequent liability risk and with respect to cultural norms and risks to reputation and standing. The legal implications of digital distraction outside the automotive personal injury arena are only now becoming evident to counsel practicing in the litigation of medical and health care institutional liability.

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Chapter 16
Electronic Etiquette: A Curriculum for Health Professionals

Peter J. Papadakos

With the rise of personal electronic devices in our society, a new dynamic has become commonplace. Individuals have an ever-growing dependency on electronic interaction with their devices, constantly responding to alerts, Facebook, email, and tweets. According to widespread data, young people may consult their devices 150 times a day. The relentless prompts that stimulate us to check our electronic devices have greatly averted human interaction. The general public is so connected to their devices that any observation in a shopping mall, workplace, airport, or any public place reinforces the commonly held idea that human interpersonal interaction has been permanently changed. Adolescents and young adults are more likely to communicate electronically via texting, snap chat, tweets, Facebook, and an ever-changing list of social media sites than either face-to-face communication or real-time verbal communication via telephone. Older individuals have also rapidly embraced these forms of communication and have changed the workplace by the fact that the majority of business is now being done by email and texting. In this world of changed communication norms, medicine and the healing arts need to adapt and remain focused on human interaction which has been central to its practice since the dawn of time. No matter how much medicine has progressed in the last 100 years, one variable still remains the most important to the patient: the relationship between the patient and the healer. This bond of trust cannot be broken. It must evolve to integrate new technology into practice without losing the humanity so important in medicine.

Health professionals have always had the ability to connect with their patients and provide comfort, support, and hope. Without this sacred bond, medicine would lose its most important tool, the ability for patients to share their innermost feelings and secrets. This is also how the connection of trust is formed, allowing patients to

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believe and rely in their providers enough to undergo complex treatments which may be painful and sometimes life-changing. Over the last few years, it has become evident that the rise of technology has altered this time-tested way we practice. Not only is the practitioner distracted by the devices that have become so important in our lives but patients and their families have also. Many commentaries and observations have been reported in the lay press. The Pulitzer Prize-winning journalist Matt Richtel coined the term "distracted doctoring" [1] in 2011 and brought this practice of distracted health care to light. His article and many other reports that followed have been a wake-up call to all health-care providers that a major negative shift has occurred both in the relationship with patients and also in patient safety. Technology has also created a wall between our patients in the form of the electronic medical record (EMR). This mandated technology has forced health-care providers to interact with the record during all aspects of care, sometimes to the detriment of the patient. A major complaint that patients now have with their providers is that there is no human contact. It is common for patients to volunteer that their provider does not look them in the eye and state that their providers were focused on the computer throughout the visit. This has led us to coining the term i-Patient where the provider is interacting with the data and not observing and interacting with the patient. This shift from a "real patient" to a cyber patient can destroy medicine's core beliefs and lead to ignoring the key clinical tools of direct observation and interpretation of signs and symptoms. It also removes the clinician from observing the emotional aspects of how disease affects patients that may be key in treating patients and aiding families through trying times.

Curriculum Development

I thus believe that health-care educators must develop curriculum through the entire process of medical education across all fields of health care. The generational shift of human brought up dependent on technology affects all key players: physicians, dentists, psychologists, therapists, nurses, and technologists. The modern health-care experience also includes individuals not commonly included in health-care education such as office and ward staff. A distracted ancillary staff member can start the downward spiral of the perception by the patient that this facility and these health-care workers do not make "me" the focus of my care. I cannot emphasize enough how first impressions can derail the reputation of an institution, division, office, or the practitioner. Over the years I have attempted to develop an educational process that targets the concerns of both health providers and patients. This curriculum can of course be modified and customized to each distinct health-care environment from an office setting to complex operating room scenarios. It must be plastic enough to evolve as each new year brings in even more technology to health care. We can never revert to the era of rotary phones and paper charts but must adapt the environment and the practitioner to better serve the patient and society.

Table 16.1 University of Rochester Modified CAGE Questionnaire

1.	Have you ever felt you needed to cut down on the use of your PED?
2.	Have people annoyed you by criticizing your use of your PED?
3.	Have you felt guilty about your overuse of your PED at work?
4.	Do you reach for your PED first thing in the morning?

PED personal electronic device, including smartphone, tablet, and minicomputer

Personal Self-Awareness

At the core of staff education is a new unique aspect that health professionals must grasp prior to developing proper etiquette in dealing with patients, their own dependency on personal electronic devices. The addictive qualities of personal electronic devices and social media are widely known and are outlined in several chapters in this book. Neuroscientists and psychologists have elucidated how these devices and social media work by affecting both "top-down" and "bottom-up" triggers that force us to focus on our personal devices throughout our working hours [2]. In the introduction to a comprehensive electronic etiquette curriculum which I have developed, we first illustrate how dependent we are to technology. We collect the professionals' devices at the start of the class and later on discuss how the student comfort level is modulated without the ability to interact with their devices. Many in the audience readily volunteer how "uncomfortable" or lost they are without their device at hand. Students tell me how much anxiety they have that they cannot contact the hyper world. "What if a disaster occurs? How I will learn of it?" is a common irrational complaint I have heard over and over. Students are totally unaware of the core reason they have this anxiety: the addiction to the devices they carry.

A highly validated tool for alcoholism and addiction treatment has been the CAGE questionnaire [3] in use since the 1970s. We at the University of Rochester have modified this tool and use the term personal electronic device (PED) in place of drink [4] (Table 16.1).

This tool is usually administered prior to class and acts as an initial starting point of discussion. Experience at multiple national and international presentations have shown response ranges from 30% to 50% positive for addiction on each of the four questions for addiction. This is highly eye-opening to the audience. Many have never realized how life-changing their device is and how it is at the center of their life. They are shocked to learn how dependent they have become on that little box they carry with them at all times. The vast majority cannot even explain why it is the first thing they pick up in the morning and the last thing they put down at night. This discussion between health-care providers is a wake-up call to many in the audience which then allows them to start behavior modification both in their personal and professional life. They now have begun the journey to tame technology and modify their practice.

Device Use in Professional Environments

Professional schools must begin the process of electronic etiquette education at the beginning of the educational process. The current generation has grown up surrounded by and interacting with their devices while growing up. They must be educated that the habit of constant interaction with PEDs during the course of the day may affect job performance, patient perception, and patient safety. Throughout the educational process and later when in practice, it must be constantly reinforced that the health-care environment is not a place to be lax in proper electronic interaction and that improper interfacing with technology may impact negatively on the care of patients.

One of the most important aspects of patient care is the development of relationships with patients and their support systems of friends and families. In my many meetings with patients and families, I have surveyed them on their perception of health-care providers using PEDs at work. The vast majority of them have volunteered a fear that health-care providers will not do their jobs and that this will have a negative impact with their care process. This fear comes from a root behavior that has been identified throughout the workplace. Employees now use their PEDs and work computers to entertain themselves and get out of work. This of course can be terrifying to patients as they observe health professionals in hallways, workstations, and elevators constantly focused on their screens. They easily project their own behavior of task evasion onto their caregivers, thus developing an aspect of fear which now pervades the patient caregiver relationship. This aspect of fear needs to be addressed with all levels of health-care providers [5, 6]. Many of our contemporaries in medical education are only now realizing the negative aspects of this new fear patients are developing and how it impacts the core belief of health care that patients must be able to trust their caregivers. This breakdown of trust leads to overquestioning of care plans by patients and families. Patients in survey after survey have always wished to be the primary focus of their caregiver's attention. It is horrifying that patients truly believe that they are going to be ignored by the people caring for them. This belief, however, is reinforced by reports of providers doing such things as checking Facebook and surfing the Internet during critical times both on the ward and in the operating room.

Education programs need to bring this new fear of patients to the forefront in discussions of professionalism. I integrate patients into the discussion with my students. They are amazed to hear patients discuss how PEDs and computers are major distractors in the workplace. They realize all too soon how their behavior in front of patients – as they text, check updates on social media, and engage in other nonwork activities during the workday – may be perceived by patients and visitors. The students also come to the self-realization that, by using such devices, they may be escaping work.

Education must reinforce good work habits and behavior modification during business hours. Staff must be able to have open discussions about the need to modulate the PED and computer use in patient care areas. Patient safety must be addressed

with health-care staff in an open manner. Multiple reports of distraction by PEDs in health-care settings should be openly debated within among professionals and at all levels of health-care administration. The ever-growing number of high-profile cases of distracted health care leading to negative outcomes needs to be at the center of orientation programs in all health-care facilities. The University of Rochester Medical Center and a growing number of health-care facilities have organized such staff orientations. These meetings bring together health providers, administrators, and legal affairs staff. Such meetings provide an open forum, so staff understands that their distraction not only impacts the patient in real time but also leaves an electronic footprint that is discoverable in the future. This footprint can lead not only to legal action but to charges of professional misconduct.

Proper Interaction with Electronic Medical Records

Due to federal guidelines, there has been a migration to electronic medical records. This technology holds many benefits for both the patient and the health-care provider. Timely recording of data that can be shared across multiple providers and the ability of real-time collection of vital signs and updating of records has been a boom in the emergency room, ICU, and operating room. The patient is also able to review his records and input data which gives the health-care provider the ability to change therapy in real time. But despite all these benefits, the electronic medical record has introduced many problems.

In a generation brought up in a virtual world, there is a temptation to interact with a virtual patient. The so-called i-Patient has come to life where the patient's data is more important than the actual physical patient. Many patients have shared encounters with health-care providers in the commentary in Mr. Richtel's article on distracted doctoring that highlights this factor. Patients state that their physician never made eye contact, never greeted them, and never faced them but only recorded information into the computer. In my observation of patient rounds, I too have noted large groups of health-care providers clustered in front of computers looking and trying to type into their devices, never speaking to their patients or their families. This process dehumanizes care and breaks down the inherent bond of trust.

Staff must be educated on how to integrate technology into patient care. First and foremost in teaching electronic etiquette is an emphasis on facing the patient. Thus all interviews between patient and caregiver should be done without the computer. The patient and caregiver must have direct eye contact, and physical contact must be made by such means as a greeting or a handshake. Health professionals should also introduce the computer as the third person in the room. Patients should be oriented as to why the computer is used as both a record generator and as a medical tool. If the patient and family understand that the computer is a key medical tool, they are less likely to feel detached in the exam room. The problem lists and medication history should be reviewed with the patient during every interaction since errors may have been entered by others. A very useful tool that I have found helpful

is to review imaging and labs with the patient and approved family members. This process allows the patient/surrogates to see key data on the monitor and thus understand why health-care providers are studying their screens – not to get out of a human relation but to access important medical data that will be used to develop care plans. I believe using such simple techniques can greatly aid in the reattachment of patients and care providers in this digital age.

The integration of technology should also be modified during patient rounds. In our center we try to minimize the number of individuals having computers on rounds. The leader of rounds should not have a device and thus be focused on both reviewing verbal information and interacting with team members and patients. Instead, we usually have only two computers, one reserved for the presenter who uses it to access lab data, images, and medication. Another team member is the designated individual to write orders, change medication plans, etc. A very useful safety technique is that, when we reach each new patient, we confirm that each computer record is open to that specific patient using two identifiers. Multiple patients should not be open on any computer as this may easily lead to medical errors. By minimizing the number of computers, we also stimulate medical education so other members of the team can focus on the patient and treatment at hand. Downsizing the number of computers also can stimulate bedside education. Students, residents, and staff are now able to ask specific questions on a specific patient and their treatment plan. This focusing of individuals is very important because data has shown that people who believe they can multitask and view other patients on their devices or medical sites are prone to making errors. A study during ICU rounds [7] showed that team members were distracted during attending rounds by their PEDs and were not focused on the task at hand. We can easily understand how individuals on rounds can be distracted by staff surfing on computers during rounds and thus not participate in the care of patients and expand on their clinical education.

Proper Electronic Record Documentation

The admission note still remains at the core of all patient care. The note will be referenced and studied by many individuals caring for patients and the many consultants who may also be consulted to address a specific need. The first note, therefore, should not be a templated checklist note but a narrative note that clearly states the evolution of the process that brought the patient to interact with the caregiver. This note does not replace any required templated notes that are required by hospital or health-care agency policy but adds to them as a primary medical information note. This primary narrative note should also highlight any key imaging and laboratory data that may be lost in automatically populated notes which download entire laboratory and imaging files to notes.

The cut and paste features found in many EMR's may provide a disservice when caring for any patient. Your individual investigation and composition may uncover a

key finding missed by others that may contribute greatly in the creation of a care plan. When using checklists to generate required notes, it is important that you are vigilant and not either omit key information or add false information. Touch screen technology is prone to such errors as many hospitals use smart tablets to enter data. These are so-called click errors and have greatly increased errors in medical notes. Recheck the list prior to accepting it as you would in placing an order on the Internet. If not, this may be a major nidus of medical errors and may lead to possible legal entanglements. Notes should never be copied and brought forward from day to day in that they may contain outdated information and decay the caregiver's reputation, suggesting that he did not evaluate the patient on that day and only copied a previous note.

Order Writing

This is a highly template-rich environment in the majority of EMRs. Great care needs to be taken, in that long lists of alternatives may provide great potential for errors. First and foremost, read through these included templates to see if they meet your patients' needs. You may wish to free text patient-specific unique orders. Also, remember there may be specific areas where these orders are contained in a special compartmented area. Examples of this may be unit-specific orders, such as postanesthesia care orders that will not be honored in the ICU or in another unit even though appropriate. Another aspect that you should review is the entry of laboratory collection times that may be necessary for specific drug levels, electrolyte levels, etc., which may not meet templated times for lab draws that are built into the EMR. Specific tests or imaging studies should also be ordered and checked to maximize patient care.

One of the most common problems in EMRs is contained in pharmacologic order-writing subprograms. The long lists of prewritten dosages and alternative medications may create an environment for entering incorrect medication or dosages, if not properly checked. Dosage errors are common, and floating zeros can easily be generated, for example, 5 mg of morphine becomes 50 mg of morphine. These templates may contain safety stops that are soft and only act as warnings, thus allowing for overdosages or sub-therapeutic dosages. Fatigue can easily occur in overriding warnings that are soft such as "the patient is allergic to codeine, develops nausea and vomiting." With the po as a warning for all narcotics, you may override the warning about the 50 mg of morphine as you click. Thus, care must be taken when entering the dosage. Spend a second to check first, as you would when ordering online on Amazon for a personal order. (You do not wish to receive 20 red plaid shirts when you only ordered two!) Work psychologists have found that individuals can more easily make errors with clicking and typing on screen than writing with pen and paper. Thus, great care must be taken in this section of EMRs since massive pharmacologic errors can be generated by a lack of vigilance in clicking on long lists of medications and dosages. Proper use of order-writing programs must therefore be part of any mandatory educational program to providers.

Policy Development

Each faculty must develop an electronic etiquette program that is specific to individual patient care units. The program should be developed by all levels of the care team. Administration and legal affairs should be included in both a leadership and consultative role. When the program is developed, it should be reviewed by major stakeholders in each individual unit that will provide buy-in. I have also utilized patient groups' input to help develop such policies, since sometimes we do not take into account the patient's perspective. The patient's role in electronic etiquette education and practice cannot be underestimated.

Once such policies are approved, they should be introduced to staff as a key component of orientation programs before patient exposure. The policy should be reinforced during the year through ongoing in-service programs. At the University of Rochester, for example, we include these electronic etiquette guidelines during the mandatory yearly in-service program for all employees. Staff should also be able to be empowered to correct staff if they observe a breakdown in electronic etiquette. Staff should be made to feel comfortable to correct fellow staff on how to look and act professional during patient care with technology. Staff must be made to understand that human-to-technology interfacing is an important aspect of patient care as an understanding of physiology and pharmacology.

Summary

I believe educating health-care providers in proper human-to-device interaction will improve professionalism and increase patient safety. We must all strive to stop "distracted doctoring" in our practices and facilities. Patients should have the expectation that they are the center of practitioners' attention at all times. Staff should use technology to improve care and provide a safe environment in health care. Staff and the public should be taught the negative aspects of technology at work and to limit its improper use both in private and professional life. The chapters of this book clearly elaborate on key-specific topics in electronic distraction, and this information can be effectively integrated into ongoing educational programs that educate staff on the subject of electronic etiquette.

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Chapter 17
Mindful Practitioners, Mindful Teams, and Mindful Organizations: Attending to the Core Tasks of Medicine

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We miss more by not seeing than by not knowing.

(William Osler)

Attending – directing our limited attention toward what really matters – is at the moral core of medicine. By virtue of attending to a person and her illness, clinicians bring the best of themselves to the care of the patient. They can avoid errors by being more astute and aware of signs and symptoms of disease, especially if these are unanticipated or surprising. They can be technically more adept and thus be more effective in the operating room or the procedure suite. They can honor the intrinsic value of the suffering person as a *person*, not merely a patient. In doing so, clinicians can help patients feel whole even if parts of them are missing or malfunctioning; clinicians can also make themselves feel whole by bringing the best of who they are and what they can do to the care of each patient. In this chapter, I will focus on how clinicians can work at their best in an environment rife with distractions, and I will propose individual, team, and organizational changes that are necessary to establish the patient as the central focus of the medical enterprise. In doing so, I will consider distractions that come from the external world as well as distractions that emanate from our own minds.

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Qualities of Mindful Clinicians: Attention, Curiosity, Beginner's Mind and Presence

Attention

To attend fully to patients and colleagues requires the capacity to balance top-down attention, purposeful focused attention to that which we seek out, with all of its predictability, as well as bottom-up attention, open attention to that which catches us by surprise [1]. In one sense, distraction is an imbalance between the two forms of attention. Unbalanced top-down attention may lead to being so focused on a task that the unexpected remains unseen. A clinician recounted to me that, while he was looking something up in the electronic record, he started to explain a lab result to a patient only to realize that she had left the room to go to the bathroom. Unbalanced bottom-up attention may lead to having our attention hijacked by every new stimulus such that any sense of continuity is lost. Electronic media often lay this type of claim on our attentional resources. With each flash on the screen or warning sound, our train of thought is temporarily interrupted, and there is always a delay before getting back on track, if it ever happens [2]. In contrast to popular notions, no one truly multitasks, and each task involves large parts of our brains – rather, we alternate between tasks and there is always inefficiency with each task switch. Interruptions are more problematic when switching between unrelated tasks and those that involve different parts of the brain (e.g., looking up a lab test result on the computer and listening to a patient's concerns) and are less of a problem when tasks are interrelated [3].

Attention is more than just top-down or bottom-up. We learn and make choices about what merits our attention, and doctors make those choices, albeit implicitly, throughout their workday; primary care physicians tend to pay closer attention to chest pain than to generalized fatigue, and oncologists pay closer attention to physical symptoms than psychological ones [4]. Some triggers for bottom-up attention appear to be innate – red blood, bared teeth, loud noises, and bright lights. This self-protective mechanism can backfire in busy clinical settings, though unexpected loud noises (an ambulance passing by) are not always personally salient. Other triggers are "salience dependent"; we pay attention to that to which we assign meaning or significance and, for physicians, those things that we feel we can address – for physicians unfamiliar with the workings of IV pumps, auditory stimuli that should be salient (beeping sounds) often are ignored. Thus, all distractions are not the same and do not necessarily have the same outcome.

Mindful clinicians need more than a capacity for focused and open attention to things occurring in the world, outside of themselves [5]. They also need to pay attention to thoughts, feelings, and sensations emanating from their own interior experience. One consequence of the fast pace of twenty-first century medicine is the vanishing of reflective time during which clinicians can have access to that which is just beneath the level of awareness and informs good practice. A good

pediatrician knows when a child "looks sick" before the data are available to confirm his or her impressions. This gut feeling, "the intelligence of the unconscious" [6], is more like a "fuzzy trace" [7] than a focused observation. According to psychologists Gerd Gigerenzer and Valerie Reyna, these gut feelings and fuzzy traces can guide action even before being unpacked at some later point – the child is pale, listless, and breathing a little faster than she should. In the absence of the fuzzy trace, though, the clinician is doomed to a fragmented diagnostic process – assembling pieces of data – and only later seeing the whole picture. Clearly, it is desirable to bring both impressionistic and analytic thinking to challenging clinical situations [8, 9]; in environments where there is a high cognitive load and multiple distractions, though, the brain tries to simplify, limiting the ability to think holistically [10, 11].

Curiosity

Curiosity about people can sensitize clinicians to the patient's diagnosis as well as the patient's experience of illness [12]. Curious clinicians discover what is unique about each patient, recognizing that, for any disease, only a minority of patients may have a "classic" presentation. Curious clinicians consider context. Many errors in medicine can be attributed to failure to see the patient's context, a problem of tunnel vision. Consider the common situation of continuing to prescribe statins to patients with advanced cancer despite evidence of ineffectiveness and possible harm [13]. Curious clinicians avoid the overgeneralization of seeing only the population when attention should also be directed to the unique individual. When signs and symptoms don't quite add up, they don't satisfice by grasping at the most readily available diagnosis; they keep inquiring until their level of certainty reaches an acceptable threshold, or they seek additional help in thinking problems through.

Being curious can help clinicians know whether a patient is depressed, worried, or fearful. This is because we not only view patients' emotions from afar; as humans, we resonate with them [14]. That resonance can be diagnostic, not only for diagnosing mental health issues but also for general medical and surgical problems. Clinicians' curiosity about their own feelings of sadness, anxiety, and fear helps them use emotional resonance effectively as a diagnostic tool. Clinicians may have emotional blind spots, things that they tend to pass over. With training, for example, oncologists – normally much more attuned to physical symptoms than to the emotions that naturally accompany patients' lived experience of cancer – can become better able to recognize patients' emotions and offer empathic responses [4, 15]. Yet, it can be difficult for clinicians to be emotionally aware and available in current health care environments. When clinicians make mistakes, feel burned out, or don't have anyone with whom to share their feelings, they often report not feeling supported [16]; they shut down emotionally and are less able to recognize and harness their own emotional reactions to patients.

Beginner's Mind

Mindful clinicians exhibit *beginner's mind*, the ability to set aside certainty and expertise to see a familiar situation with new eyes, considering facts to be merely conditional and contextual – not absolute [5, 17]. Mindful clinicians adopt a freshness from which new perspectives can emerge. They consider facts about a patient to be conditional, contextual, and evolving, even if the patient has a particular and well-characterized diagnosis. They can entertain the possibility that the patient with shortness of breath and documented obstructive lung disease might also have heart failure. The alternative – seizing on the first diagnosis that comes to mind – is a tendency that comes out when clinicians are cognitively overloaded [9], especially in fast-paced clinical environments that have no down time [18]. Mindful clinicians have learned ways of decluttering the mind even when in highly unpredictable, stimulating, and information-rich environments.

Presence

Mindful practitioners are present. They tolerate and turn toward suffering, in contrast to the human tendency to look away when confronted with the horrors and depredations of illness [19, 20]. Presence means being able to be in the moment rather than feeling constrained by prior actions and anxieties of the future. Because presence is an interior and intersubjective experience, it has proven elusive to study [21, 22]. But patients know. They say, "She was really there for me," even if they have difficulty describing just what it was that the clinician did to be "really there."

What Research About the Brain Teaches Us About Being Mindful

Recent research in cognitive and social neuroscience has helped us understand how attention manifests in the brain and how training can make a difference. Attention is not just one quality, and psychologists are learning that different kinds of attention training promote different kinds of attention [23].

Salience-dependent attention is, by definition, learned, albeit often below the level of awareness. Medical students learn to recognize some turns of phrase – "chest pressure" – that then automatically capture their attention. Over time, salience dependence becomes more nuanced such that "a feeling – I can't really describe it, but it's right here (pointing to his chest)" elicits a similar response; experienced clinicians drop what they've been doing to rule out a potentially perilous situation. Yet this automatic response can lead clinicians astray, such as when the patient has unrecognized anxiety, unless the clinician has honed recognition of anxiety disorders

to the same degree as physical symptoms. The most effective clinicians are aware of and self-regulate their own "salience filter" so that the most important events are raised to the level of awareness, and false alarms are recognized before the clinician is led astray. Even reactions to other stimuli that naturally capture our attention – loud noises, red blood, or sharp objects, for example – need to be downregulated so that we don't over-activate fight or flight responses [24]. When under high cognitive load or emotional stress, clinicians' ability to recognize their own salience filters diminishes and they are more likely to act automatically, unaware of their own decision-making processes [25]. While this form of unexamined practice will get things right the majority of the time, this is not good enough; greater self-awareness and self-regulation can enhance quality of care.

Recent research now points to different modes of brain function, which can be naturally occurring or willingly elicited. For example, even when at rest, daydreaming or not involved in a particular task, our brains are highly active in a rhythmic cyclic pattern of activity known as the "default network" involving midline structures [26, 27]. Highly trained focused mental activity, such as that which occurs during focused meditation practice, elicits a very different pattern, more lateralized. There are likely other patterns that can be consciously enacted that not only have practical importance for clinicians' ability to attend to what is most important but also to their sense of subjective well-being. For example, exercises that promote the expression of positive emotions (compassion, gratitude, etc.) can set the stage for greater openness, acceptance, problem solving, attentive listening, and well-being [28–30], all important in cultivating strong relationships with patients.

How Can Clinicians Become More Mindful?

Without self-awareness, greater clinical experience merely leads to clinicians becoming "experienced non-experts," according educators Bareiter and Scardemalia [31], in contrast to "adaptive experts" [32] or "true experts" who are adept at self-awareness, self-monitoring, self-regulation, and self-compassion.

There are many means to help clinicians cultivate self-awareness. Beginning in the 1950s, British psychoanalyst Michael Balint would meet with small groups of general practitioners to explore how they were affected by their encounters with patients and how patients were affected by the practitioners' presence, aside from any pharmacologic or surgical interventions [33, 34]. Balint was prescient, considering the effective use of the self of the practitioner as a potent tool as most of the therapeutic agents available at the time. Through group meetings over time, practitioners became more familiar with their own psychological predilections and recognized how their own perceptions and emotions could influence their care of patients. They become more adept at identifying the sources of their feelings in their families of origin [35, 36] or prior life experiences [37].

These insights, however profound, would often occur after the fact. Clinicians still needed some way of bringing the awareness of their own mental processes into

the clinic at the moment of the encounter with the patient. This is no easy task, and the means to achieve it seemed elusive. Yet some clinicians were able to develop skills of self-awareness and could practice with greater clarity, purpose, effectiveness, flexibility, and compassion even when under high cognitive load and emotional stress [38]. The set of skills of self-awareness, self-monitoring, and self-regulation may call on a solid medical knowledge base but are clearly distinct from knowledge and retrieval. Curious clinicians have a deep knowledge of medicine, humanity, and themselves. I first described these qualities in a 1999 paper for the *Journal of the American Medical Association* as "mindful practice" [39].

Those who are able to self-regulate effectively generally have secure attachment styles [40], in contrast to others who tend to be fearful or avoidant when around others. Thought to be fostered by a loving, consistent home environment during childhood, when they become adults, more securely attached people are more curious, willing to take small risks and be interested in others; as adults they are better able to act in accordance with their values and adapt to adversity [41, 42]. They are better able to focus on well-being, their own and that of others and are less likely to be distracted by that which matters less. Flexible, adaptive self-regulation is in contrast to mental rigidity – shutting out that which we'd rather not see, hear, or deal with in order to lower anxiety and maintain consistency [38]. However, early childhood experience is not the only factor affecting individuals' ability to self-monitor, self-regulate, and be flexible. The social environment can reduce or enhance individuals' capacities in these domains. Evidence points to the importance of social epigenetics, that is, the degree to which the social environment is supportive affects genetic control over key neurotransmitters and receptors in the brain. A supportive environment, then, can compensate, in part, for less secure attachment styles.

Those who self-regulate effectively are able to recognize distractions and stressors and gently navigate, maintaining an eye on the most important outcomes. It is possible to practice and learn mindful self-regulation during adulthood [38], yet there are few opportunities for clinicians to do so. In mindful practice workshops, which we offer to practicing physicians, learning mindful self-awareness, self-monitoring, and self-regulation is an explicit goal [43, 44]. We invite participants to engage in contemplative practices – formal sitting meditation for anywhere from 5 to 30 min and "informal" practices such as pausing to take a breath during key moments during the workday (such as when putting your hand on the door handle before entering a room to see a patient) – and mindful writing, story-telling, interviews, and dialogues to develop not only *intra*personal mindfulness but also *inter*personal mindfulness. They learn that self-regulation depends on self-monitoring: "How stressed am I right now and where do I feel that stress?" "What am I feeling about this patient?" "What am I assuming that might not be true?" In solitary practice, as well as in dialogue with others, we invite participants to observe the sensations, thoughts, and feelings that arise. Among other findings, after a year-long workshop, we found that clinicians were more focused, less distractible, more attuned to the patient's experience, better able to know and respond to emotions (their patients' and their own), more empathic, and more resilient. They reported lower levels of burnout and greater sense of well-being [43–45]. Although we knew

that all clinicians would not necessarily commit to a workshop of this intensity – 2.5 h weekly for 8 weeks followed by monthly sessions for 10 months – we were able to prove that highly skilled, highly stressed physicians with well-developed habits and routines could, in fact, learn to be more mindful – they became more self-aware, self-regulating, self-monitoring, and compassionate. The lesson here is not that our approach is the only way, but as far as I know, no other approach can yet make those claims. Shorter workshops in other settings using the same approach have had some of the same, but more limited, effects on clinicians [46–48] and possibly on patient-physician relationships [48]. Longitudinal sessions that build over time create a sense of community that can reinforce and sustain change [43].

However, individual practice is not sufficient in the current health care environment. Second-generation electronic health records have not taken into account the "cognitive ergonomics" that can optimize human-computer interactions. Rather, they place increased cognitive load, with more meaningless stimuli that further stress individuals' ability to focus on what is most important and enjoy interactions with patients. Teams and organizations need to do their share.

What Can Clinical Teams Do to Promote Mindfulness?

Increasingly, medicine is evolving from a solitary endeavor to team-based care [49]. In emergency rooms, primary care clinics, inpatient settings, and specialty procedure suites, sequential care (handoffs, referrals) and shared care are the norm. Clinical teams are conceptualized as micro-systems in which interacting individuals can ideally deliver better care than those same individuals acting alone [50]. The noted "To Err is Human" [51] and "Crossing the Quality Chasm" [52] reports from the Institute of Medicine outlined both the promise and the perils of health care teams based on the quality of communication, self-monitoring, and shared goals among the members. Implicit in these documents is that expertise (and the responsibility for error prevention) is collective, not individual [53]. No one team member could possibly know all of the information nor possess all of the skills needed to care for the patient. Similarly, engaging patients in care is a team effort, and mindfulness on the part of scheduling secretaries, technical staff, nurses, and other personnel ideally support the effectiveness of the clinician in building strong therapeutic relationships.

In the early conceptualizations of team structure and function, mindfulness got short shrift. Using the analogy of highly structured high-reliability settings – such as aircraft carriers and control towers – conclusions were made about the importance of protocols, checklists, role and job definition, and blame-free error reporting that did not fully account for the limits of human cognition. As information needs and access changed radically in the past 15 years, the limitations of top-down protocols have become more apparent, and organizational visionaries such as Karl Weick have called for more horizontalization of hierarchy and greater anarchy, with the assumption that tight control of group process might actually impede effective

team functioning [54]. The premise of the field of "team science" – how teams work together – is that teams have shared mental models [50], a step toward shared mind: when two or more people share cognitive processing in an efficient and cohesive fashion such that two minds are greater than one [55–58]. Shared mind – and its derivative, collaborative cognition [59, 60] – compensates for the blind spots and cognitive foibles of any individual. Particularly useful in complex situations in which clinicians feel that they are navigating without a map, shared mind distributes cognitive load across two or more people, allowing for greater focus on that which is most important [61]. Science has only begun to describe how shared mind happens [62].

Well-functioning clinical teams can also promote curiosity. Several sets of eyes and ears, in a well-functioning team, extend the senses and sensibilities of any one individual. A team member might say, "Did you notice she's looking a bit yellow?" or "She seems to be more confused today than yesterday" or "I don't think that we're all on the same page." A new observation then leads to doubt, reconsideration, and revision of initial impressions. Distractions are less likely to affect all members of the team in the same way. Recently, I was paged in the middle of doing a physical exam. Having lost my train of thought, I forgot to examine the abdomen of a patient who was acutely ill. The astute medical student, sensing what my next move should have been, mentioned that he thought that there had been some abdominal bloating, which triggered me to confirm his impressions. Left to my own devices, my care for this patient would have been less mindful and possibly compromised. The lesson here is that well-functioning teams can attenuate some of the ill effects of distractions [50].

What Can Health Care Systems and Organizations Do to Promote Mindfulness?

With the increasing centralization, bureaucratization, production orientation, and informatization of health care, health care organizations increasingly set the parameters within which optimal human functioning must occur. Yet, health care organizations fall short. In contrast to other industries, health care has been slow to realize the limits of human cognition, engage in creative engineering [63] to help workers be as productive as they can be, and recognize the links between the flourishing of the health care workforce and the quality of care that they deliver. Mandated changes, such as work hour restrictions, have had mixed effects and in many situations have increased cognitive load and emotional stress as a result of multiple handoffs and frequent changes in team personnel. In addition to introducing errors, increased cognitive load leads to decision-making based on stereotypes and demographics rather than clinical factors [64], inadvertently contributing to health care disparities [65]. Medicine is a human endeavor, and the widgetization of medicine – managing health care workers as interchangeable parts and patients as widgets to be

processed – is a failed model; it erodes workers' feelings of control over their workplace and leads to burnout. Burnout is a final common pathway for those who have a high degree of responsibility and a low sense of control (likely mediated by learned helplessness [66]) and is manifest in emotional exhaustion, feeling disconnected from work and people and feeling ineffective and cynical about the possibility of change [67]. Organizations can promote mindfulness in individual workers by providing opportunities for professional growth, such as seminars and workshops that build skills to address important challenges faced during daily work as a health professional. Team training for those who work in intensive care, operating rooms, and emergency departments is now standard in most health care institutions. Often missing from this training is skill building in self-awareness, how to take small moments during the workday to check in with oneself as a sentient, cognitive, emotional, and social being. Checking in, the individual equivalent of mandated time-outs in the OR or huddles in primary care, does not have to be time-consuming and is an opportunity to calibrate individuals' attentional focus.

Beginning in the 1990s, Karl Weick, at the University of Michigan's Ross School of Business, described the qualities of so-called high-reliability organizations, those in which a small error spells catastrophe [68]. In the beginning of one of his articles, he asks the reader to imagine life on the flight deck of an aircraft carrier [69]. Planes take off and land on a slippery flight deck at half the intervals that would be allowed at a civilian airport. This is all happening on a ship that is rocking from side to side with radar turned off to avoid detection – and the whole operation is run by a group of 20 year olds. One glitch and the pilot, the airplane, and the ship go up in flames. Yet, errors are rare. However, in medicine we do far worse, with over one hundred thousand deaths per year due to medical error [51].

Organizations, according to Weick, can be considered organisms. Like individuals, organizations seek, manage, and respond to information, act to solve problems, have habits, and create culture, and they stand to gain by becoming more attentive, responsive, and reliable, and they get distracted from their core mission. Like individuals, organizations stand to gain by becoming more attentive, responsive, and reliable and by learning to balance routine with innovation. Weick and his colleagues have showed how, by encouraging flexibility and beginner's mind, organizations can function better [70]. Weick advanced five basic principles of what he called "collective mind," "organizational mindfulness," and "organizational attention" [71].

- *Preoccupation with failure*. Because there are just too many ways that things can go wrong, each unique and often unpredictable, one cannot anticipate them all. Weick and Sutcliffe stress the importance of learning how to manage the unexpected – being prepared to be unprepared. Specifically, education in the cognitive psychology of distraction should be part of medical training [72]. If collective vigilance is the norm, individual distraction will have less of an impact.
- *Reluctance to simplify*. Just as individuals are derailed by using mental shortcuts, teams and organizations do too. In the ER, for example, an underlying organizational culture in which having a quick answer – any answer – is rewarded at the

expense of deeper cognitive processing is clearly shortsighted. Attention and presence are a collective attribute, not just individual.

- *Sensitivity to operations* or situation awareness. Here, as I mentioned above in the section about health care teams, there has been progress. Clinical teams in the OR, the ICU, and other settings undergo team training to help members speak up when they observe a problem. In this context, safety should be prioritized over efficiency – not just in word but also in deed.
- *Commitment to resilience*. Weick and Sutcliffe's fourth principle, includes effectively managing failure so that catastrophic errors as well as near misses are learning opportunities. Knowing that, in health care, people commonly work outside their comfort zones whenever something novel or unexpected occurs, ideally workers should learn and grow from crises. Resilience, the opposite of rigidity, is a quality of *adaptive* experts, not protocol-driven technicians [38, 73, 74].
- *Greater anarchy in organizations*. In healthy organizations, Weick and Sutcliffe claim, decisions should be made by the most appropriate member of the hierarchy, loosening the boundaries just a bit so that more decisions are made by the people closest to the problem, rendering routines and structures in the organization more fluid.

These principles have some empirical support. For example, in nursing units scoring higher on a mindfulness survey that assessed the five components defined by Weick and Sutcliffe, there were fewer patient falls and medication errors in those units whose members *collectively* scored higher [75].

Health care organizations should consider not only physical ergonomics but also cognitive ergonomics and social ergonomics when designing clinical workspaces. Busy crowded units are the norm in medicine; the decibel level is high and it takes considerable mental effort to block out ambient sounds so that clinicians can pay attention to patient needs. Mindful workspace design can make paying attention more possible. Designers should recognize and address problems of interruptions and distractions and should actively promote social interactions among members of clinical teams. Similarly, information technology should be designed in collaboration with cognitive and social ergonomists who can advise regarding reducing cognitive load, nuisance work-arounds, meaningless work, and unnecessarily distracting error alerts. Unfortunately, the trend is in the opposite direction; the more functionalities in an electronic health record, the more disconnected clinicians become from their work [76].

A Moral Choice

Ultimately, health care institutions have a moral choice. They can create – or undermine – the conditions for caring and compassion. Part of those conditions include moving from a command-and-control leadership style to one that is more relationship centered [77, 78], honoring the unique individual contributions of each

member while helping them contribute to the overall mission. The most toxic form of distraction, taking this view, is distraction from the ultimate purpose of the medical enterprise and confusing throughput with meaningful clinical care. In that climate, it is not surprising that the overall environment in health care is seen as unsupportive by the majority of those who work there [79]. Considering a health care organization as constituting a collection of conversations among people with a shared mission, for example, sets the stage for enhanced motivation and self-awareness, effective teamwork, and a collective sense of vision, purpose, and meaning [80]. Creating such an environment will lead to clinicians being more effective, connected, and satisfied with their work lives. Increasingly, health care institutions have actively promoted teamwork and community in the service not only of error reduction but also to promote patient- and family-centered care. Notable among these programs are Schwartz Rounds, in which a patient's multidisciplinary care team talks openly about the difficulties they have encountered caring for the patient. Often powerful, these sessions lead to deeper insight, better communication, more effective responses to patients' needs, and health care workers were more energized about their work [81].

More and more, health professionals are tending to the soil in which their focused attention, curiosity, creativity, compassion, and resilience can grow. Yet, they are doing this in spite of their organizations. Creating mindful organizations starts with strong leadership that models respect for the clinicians who work there [82–84]. Organizations should provide opportunities during the workday for clinicians to grow professionally and not make those offerings add-ons to an already overcrowded day. At some institutions, self-awareness and mindfulness constitute an essential part of the required curriculum for students and residents [85], and these institutions frame self-awareness as essential to good patient care.

Helping clinicians focus their precious attentional resources is an imperative in this era of distracted doctoring. Creating communities of colleagues, peers, and others who share a vision of mindful practice – and enlightened leadership – is needed to make this possible. Mindful practice – an intention to focus on what's most important by knowing oneself better – is an aspiration of an increasing number of individuals and large educational and corporate institutions that comprise our society [86] and promoting mindfulness in individuals, teams, and organizations in health care is a pressing need.

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Afterword: "Physician, Heal Thyself, and Make Haste, Slowly"

Burke A. Cunha

In examining and analyzing the many factors distracting the doctor in the digital age, Drs. Papadakos and Bertman have performed a valuable service to medicine for its practitioners and their patients.

What has befallen medicine in the digital age mirrors society's intellectual and cultural decline. Physicians have become distracted as an extension of the effect of technology on society. The public has viewed technology as the solution for all ills without considering the untoward effects in this Faustian bargain. The incessant drive for the latest technology is linked to society's ever-increasing demands for speed because faster is always assumed to be better. Advances in information technology (IT) feed this insatiable demand for more speed in IT and everything else [1]. The response is to do more things faster as in multitasking, but multitasking means doing nothing well [2]. Society doesn't want a thoughtful discourse or discussion of issues or problems. Instead of grappling with the eternal problem of "how to lead a good life" as did the ancient Greeks, society, instead of thoughtful analysis or creative thought, prefers to be distracted or entertained [3–5]. This preference is reflected in time allocation, exemplified by the more than 8 h a day many adults and children devote to electronic devices such as iPhones, computers, electronic tablets, and television.

As a consequence, there is no time left for nonelectronic thought or pursuits, no time for reading printed books, and no time for reflecting on life's timeless questions, such as who you are, what you are doing here, and where you are going. Even educational television or computer-based learning systems in the main require no preparatory study to better understand the key concepts of a program [6–9]. Educational content is predigested and demands no thought or analysis. Marshall McLuhan's observation that "the medium is the message" has a point, for if the

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"educational presentation" is, for example, via PowerPoint, it is so technically slick that key educational concepts are easily missed or overlooked [10–12].

With the preeminence of speed in everything and the worship of all things technological, it's no wonder that the digital age has all too easily diffused into the practice and teaching of medicine. As a result, technology has diverted and distracted the physician from the patient – to the detriment of patient care, medical teaching, and the physician personally [13, 14].

The deleterious effects of overreliance on technology to solve problems is manifested in medicine on many levels but is particularly keenly felt in two major areas, patient care and medical education. In medicine, physicians are tasked with one or more of three clinical obligations. First, cure if you can. Second, if cure is not possible, relieve suffering. Third, if cure and relief of suffering cannot be achieved, then help the patient die as humanely as possible when the first and second objectives have failed.

The main emphasis in medicine has always been to diagnose accurately in order to treat disease properly, for treating the disease properly is predicated on first arriving at a correct diagnosis [15, 16]. Indeed, aside from a humane approach to the patient, the essence of the art of medicine is best demonstrated in arriving at the correct diagnosis. If the diagnosis is not known, treatment is necessarily incorrect. Without an accurate diagnosis, the result is rampant empiricism, i.e., a different treatment for each diagnostic possibility in the differential diagnosis (DDx). Before the definitive diagnosis is confirmed, the physician's pressing main task is to clinically derive appropriate DDx based on clues from the patient's history and physical findings. From the DDx, the physician further narrows diagnostic possibilities based on recognizing characteristic findings of the diseases in the DDx. Equally as important is to try and determine if any "diagnostic eliminator" is present, i.e., the absence of characteristic findings that effectively rules out the diagnosis. All of this takes time and clear, non-distracted, clinical analysis. Speed, however, is the enemy of carefully considered thought [17, 18].

Throughout the history of medicine, Master Clinicians distinguished themselves by careful study, by the "insightful experience" of diseases, to determine the most important "characteristic" clinical findings associated with each disorder. This critical element, "insightful experience," allows a Master Clinician to rapidly arrive at a patient-relevant DDx, narrowing diagnostic possibilities to the two or three most likely possibilities. It is not for nothing that the Master Clinician, Sir William Osler, stated "the value of experience is not in seeing much, but in seeing wisely." He and others realized that correct diagnosis is based almost entirely on patient history and physical examination (95%) and the rest (5%) on tests to make or rule out the remaining illnesses in the DDx [19, 20]. Yet, how does the physician gain "insightful experience?" It takes many years of astute clinical correlations and careful study of the original classic disease descriptions to fully appreciate the significance of clinical findings [21].

Today, however, the distracted doctor is hard pressed for time. Time with the patient in the office or hospital is limited by time requirements imposed by the electronic medical record (EMR). Not only is the essential doctor-patient relationship

distanced and diminished, but the doctor spends more time filling in the EMR than in obtaining key clinical details from the patient's history and physical exam. The presumed advantage of the EMR is note legibility, but the EMR comes at a price, for it takes time and is often irrelevant to the patient's problem. EMR notes are often a compilation of previous "cut and paste" entries, many of which are often no longer relevant to the current clinical problem. The EMR is dominated by extensive check lists, unrelated to the problem at hand, which must all be ticked off or the EMR is incomplete! By the time the physician has completed the data entry process in the EMR, there is little time or inclination for a thoughtful synopsis of the patient's present chief complaint. Often, bland platitudes related to "pending lab/imaging results" end the EMR note [22].

Importantly, the key clinical problem gets short shrift and the essential question "What is the diagnosis?" remains. The EMR leaves little or no time for thoughtful clinical analysis of the patient's findings. The physician's response all too often is overreliance on lab tests/imaging to make a diagnosis. The non-clue-directed workup and "shotgun testing" result in unnecessary expense and delayed diagnosis or uncover unrelated and irrelevant findings that may mislead diagnostic efforts. An alternate response to time-restricted diagnosis is to shift diagnostic responsibility to another physician (who has no time either) through excessive or unnecessary consultations [23].

Instead of a carefully considered diagnostic approach, "shotgun testing" is the default approach. This means the physician doesn't have to commit to a "presumptive clinical diagnosis" but can explain to the patient/family and colleagues that the "tests are in progress and we'll see what they show." Such an approach is overly expensive, wasteful, and, worse, may be misleading. Without insightful clinical experience, physicians are easily misled by "abnormal laboratory tests" taken out of the clinical context. This invariably leads to more unnecessary or misdirected testing or imaging studies. Thoughtfully ordered imaging studies relevant to the clinical presentation are, on the other hand, often helpful. However, all too often physicians are misled by imaging findings that are unrelated to the patient's problem. What's missing is confidence in a clinical diagnosis based on a seasoned clinician's judgment, insight, and experience. Instead there is often concern about irrelevant clinical findings that can be digitally investigated quickly.

When not based on history/physical clues, the diagnostic process is non-focused and totally reliant on chance findings from nonselective laboratory and imaging tests. This non-clue-directed approach invariably leads to unnecessary and/or overtesting. There are some practitioners who say they order so many tests to protect themselves medicolegally. Fear-based medicine, however, is not excellent medicine, one that is based on experience and considered judgment. All too often, unexpected CT/MRI scan results expose the unwary physician to unexpected findings that could have been discovered if sufficient time had been given to the history/physical examination. The doctor, in fact, can become a victim of his own devices, with tests providing lawyers with information that can be used against the practitioner. Worse yet, patients themselves have become devotees of technology and speed and often demand all sorts of irrelevant and unnecessary tests, e.g., titers, PCR, or imaging tests. Their attitude reflects a lack of confidence in the diagnostic ability of

the doctor and the importance in their minds of making a technology-based diagnosis [22–24].

Testing begets more testing, and all too frequently non-diagnostic results prompt further testing which may not be necessary or may be potentially harmful. For example, to screen for subacute bacterial endocarditis (SBE) in a patient with native heart valves, a transthoracic electrocardiogram (TTE) is sufficiently sensitive/specific to rule out or in endocarditis. About 10–15% of patients having a TTE have nonspecific valvular abnormalities, i.e., endocarditis "cannot be ruled out." Therefore, a more expensive and potentially dangerous test is ordered, a TEE, to be the tiebreaker. There is no time to carefully analyze the intensity/duration of the bacteremia, nonspecific laboratory tests associated with endocarditis, or physical findings related to ruling out or favoring a diagnosis of endocarditis. Often, even before blood cultures are obtained, TTE or TEE are ordered in the name of speed and diagnostic accuracy. Similarly, in chronic osteomyelitis, bone changes are present for months. A plain film of the area of suspected chronic osteomyelitis becomes abnormal after 2 weeks. Nearly always the physician orders a CT or MRI scan or bone scan. All of these imaging modalities have their place but in chronic osteomyelitis are expensive and unnecessary [25].

Furthermore, tests displace patient-doctor interaction time. The doctor tries to save time by ordering batteries of tests, i.e., "trolling through the laboratory and hoping for a bite." Tests are ordered to save time. However, at the end of the day, the result is abbreviated patient contact times and abbreviated time for a clinically relevant history/physical and clue-based selective diagnostic testing. Decreased patient time is also one of the perils of the EMR [23].

As workdays become longer, physician fatigue and stress become evident. Long-term physician "burnout" is often the result. Doctor burnout is not only bad for the physician and patient but also impacts the doctor as role model and teacher of medical students and residents. Traditionally, clinical medical education has been based on mentoring and inspired, enthusiastic teaching, but when we are burned out and fatigued, there is no time or desire to pass the torch to our younger colleagues [26].

In addition, medical students and residents think they don't need clinically insightful experience and judgment since they have instant IT sources of "information." They can more rapidly (since faster is always better) get on their iPhones or electronic tablets and instantly access a variety of medical databases for information. But they have missed the point and will be less for it, while their patients will suffer accordingly from test-driven impersonal care [1]. Mistakenly, they confuse information with knowledge and knowledge with experience. Only prolonged clinical study can result in insightful experience, which is the key to clinical wisdom [3, 15].

> *Each case has its lesson – a lesson that may be, but is not always learnt, for clinical wisdom is not the equivalent of experience. A man who has seen 500 cases of pneumonia may not have the understanding of the disease which comes with an intelligent study of a score of cases, so different are knowledge and wisdom.*
>
> Sir William Osler, MD

Accordingly, test results obtained out of clinical context should be put in proper clinical perspective by a seasoned clinician. Otherwise, uncertainty or nonspecific laboratory inquiry test abnormalities invariably prompt more tests and/or additional consultants [18–20].

Physicians, like their nonmedical counterparts, are enamored of IT sources of medical information, with speed again prevailing over careful clinical analysis. No one goes to the library to read textbooks with classic descriptions of disease. As long as "information" is instantly available, the veracity and quality of the information is never questioned. Instead of relying on the experience-based judgment of seasoned bedside clinicians, the resident or junior doctor will instead quickly consult electronically an online source or "guideline" related to the problem. Few physicians assess the clinical relevance of the data supporting the information. Since there is little time or interest in learning clinical reasoning, the junior physician is lost if the problem is not addressed by IT sources or guidelines, whereas diagnostic reasoning taught by Master Clinicians provides insight into the relevant clinical variables and formulates a diagnostic approach based on experience [27].

The solution is not at all clear. Haste makes waste, and every attempt must be made to minimize the intrusions and inaccuracies of the legible, but often irrelevant, EMR [23]. Physicians must devote time to reflecting on perplexing cases or there will be no acquisition of insightful experience. Senior clinicians must lead by example and point out the failings of the EMR and the shortcomings of IT data. We must always remember that information is not knowledge, knowledge is not experience, and experience is not wisdom [27].

> *Medicine is learned by the bedside and not in the classroom. Let not your conceptions of the manifestations of disease come from words heard in the lecture room or read from the book. See, and then reason and compare and control. But see first. Live in the ward.*
>
> Sir William Osler, MD

And what of medical education in our speed-crazed, digitally driven medicine? [22, 28, 29]. To offset the tide of instant medical information access and impersonal, abbreviated patient encounters, the only counterbalance in medical education is the clinical mentor.

Since ancient times, medicine has always been taught by actual, not virtual, teachers and been based on preceptorial instruction and mentoring. In clinical medical education, there is no fast alternative or substitute for mentoring. Arguably, mentoring is medicine's greatest achievement. Medical education is largely based on the clinical mentor. The mentor is a role model on how to become a caring and insightful clinically excellent physician [3, 26]

The mentor is a guide in our chaotic world to help the life-long student survive and thrive as a person and physician. The mentor should also stress the importance of the humanities in medicine and in a balanced life. Medicine is not simply a job but a life course and "calling." Clinical excellence with a humane concern for patients and inspirational medical education are the physician's best defenses against suboptimal care and burnout in the digital age [26, 30].

Master Clinicians must continue to serve as mentors and role models for medical students, residents, and junior physicians. Besides leading by example and shadowing learners, “the way” in medical education, they should always point out the perils and shortcomings and remind learners of the differences between real and electronic patients [3, 26, 27, 30]. Omnipresent technology has profound positive benefits, but also underappreciated are its human price and negative ramifications, and the dangers of a speedy descent into the abyss for the unwary distracted doctor.

Our culture has become fast-moving and greed driven, with everything measured and judged as good or bad in terms of its speed or economic impact. In this respect, technology has greatly impacted medicine. The art of medicine, however, has to do with applying clinical experience in a humanistic way to the individual needs of each patient. Clinical excellence requires insightful experience based on years of careful clinical correlation of instructive cases. Clinical excellence and humanistic medicine both require time, a factor undermined by the EMR.

Sad to say, we are seeing the end of Master Clinicians. Precious few of today’s physicians have the passion and perseverance over years of insightful clinical experience to become Master Clinicians – unlike the past when clinicians were respected and revered for their clinical skills. It is currently assumed that the answer to all clinical questions is only a click or guideline away. Why consult an excellent diagnostician? What could he or she possibly have to offer? Today, only speed and financial imperatives, not clinical excellence, matter most in medicine.

The influence of speed in the digital age of medicine is a cautionary tale. Be careful what you wish for. The distracted doctor, forever on the run, may not know what’s wrong with the patient or what to do about it, having precious little time to render humane care, but can quickly order a multitude of unhelpful and often misleading, irrelevant additional tests for the patient. Yet, there is no substitute for excellent clinical diagnostic reasoning. Our interpersonal relationships are digitally damaged. Quick responses are not the optimal solutions to clinical problems. Time is not on the patient’s or doctor’s side.

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