

Value-Based Healthcare in Residency Training: a Perspective from Singapore

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Abstract Value-based health care aims to achieve the best outcomes at the lowest cost. Many leading health systems worldwide have already begun to restructure care delivery guided by value-based concepts. Residency training programs will play a key role in the transition to value-based healthcare. However, incorporating value-based healthcare into residency programs has received little attention. This commentary introduces an approach developed in Singapore which encompasses structured teaching, clinical teaching, and evaluations. We elaborate on how educators can use avenues such as quality improvement initiatives and journal clubs to introduce concepts of value-based healthcare to residents. The curriculum is then reinforced by allowing residents to apply value-based concepts in their clinical rounds and multidisciplinary meetings. Lastly, we give examples of how residents can be assessed with a value-based healthcare component in their in-training examinations and posting evaluations. This approach contributes to a well-planned and smoothly executed educational program in value-based healthcare for residents, which will be a keystone in the long-term success of the value-based healthcare model.

Keywords Value · Value-based · Healthcare · Residency · International · Singapore

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As the leading nation in medical innovation, the United States (US) continues to influence healthcare delivery in developed nations worldwide. In recent years, debates on US healthcare spending and reform give pause for thought. Prior to introduction of the Affordable Care Act, the US spent \$9086 per capita on healthcare in 2013, expending 17.1% of its gross domestic product (GDP). This far exceeded the next highest spender, France, by 50% [1]. Yet despite this expenditure, the US reported poorer health outcomes comparatively, with shorter life expectancy and a greater prevalence of chronic conditions [2]. This raised several questions about the successes and failures of the healthcare system, and whether the various players in the system were getting the bang for their buck.

Leading US healthcare providers are now uniting under a new shared goal: value. What is value in healthcare? In our opinion, Michael E. Porter and Elisabeth Teisberg conceptualized value most clearly. In their framework, value is defined as the health outcomes achieved that matter to the patient relative to the cost of achieving those outcomes. Improving value requires either improving one or more outcomes without raising costs or lowering costs without compromising outcomes, or both [3]. Value-based health care delivery makes achieving high value its central tenet and aims to achieve the best outcomes for each specific medical condition at the lowest cost [4]. This is a paradigm shift from a traditional fee-for-service model which incentivizes higher patient volumes and looks at process measures which tend to reflect compliance to guidelines rather than health outcomes. A value-based model focuses on creating value for patients by increasing transparency of health outcome measures, streamlining work processes into multidisciplinary integrated practice units and bundled payment methods among other strategies [5]. A key distinction of this model from the fee-for-service model is its focus on patient centeredness, where the outcomes measured are more reflective of what truly matters to the patient—whether

they are likely to lose their vision or whether they are likely to walk again after surgery. Recognizing the arc of history, many leading health systems and academic centers in the USA and Europe have already begun to restructure care delivery guided by value-based concepts [6].

Although Singapore has managed to establish herself as a healthcare hub while keeping healthcare expenditure low, she too faces similar challenges. Like other developed nations, an aging population and advancing medical technologies are driving a healthcare inflation rate of 8–9% per annum [7]. Singapore's efforts to compete internationally have also led to the creation of academic medical centers, which require additional long-term investment in their missions of research and education. Projected government healthcare spending is expected to triple to SGD\$12 billion a year by 2020, up from SGD\$4 billion in 2011 [8]. These fiscal challenges highlight a need for greater cost and operational efficiencies in order to sustain provision of affordable medical services. In response, Singapore is beginning to introduce value-based concepts to enhance healthcare delivery methods for better healthcare outcomes while controlling rising costs [9, 10]. One aspect of our efforts that deserves emphasis is the residency training program.

Residency training programs will play a key role in the transition to value-based healthcare worldwide. While the vision of value-based healthcare is laudable, its implementation must be carefully managed for a profession already dealing with an exponential increase in electronic health data and a disruption of its traditional doctor-patient relationship. In this context, we believe the best place to initiate change is with residency training programs. Highly educated, young, and brought up in a digital and globalized age, residents are among the most adaptable personnel within the healthcare organization. It is thus crucial for change leaders to inspire these residents to be the early adopters and then empower them to find new pathways to measure and improve the value of healthcare. This bottom-up approach will no doubt take longer to produce results but is the keystone for long-term success.

We propose a multifaceted approach to incorporate value-based healthcare in residency training. This encompasses introducing concepts of value-based care through structured teaching, allowing residents to apply them in the setting of clinical work and then reinforcing their practice through assessments. We expand upon each component and share some existing practices in our healthcare institutions, as well as how they may be improved upon.

Structured Teaching

Since the Accreditation Council for Graduate Medical Education (ACGME) was introduced to Singapore in 2010,

our institutions have encouraged residents to attend Quality Improvement (QI) courses and participate in QI initiatives. These were initially small-scale, resident-led projects over 6 months which had limited sustainable impact on patient care. However, the enthusiasm of residents greatly encouraged senior leadership. In institutions such as Singapore Health Services (SingHealth), Resident Quality Improvement (RQI) projects have been made a mandatory exit criterion in some programs since 2012. This has led to a streamlining of RQI initiatives with department and hospital strategic agenda for larger clinical impact via the set-up of a representative committee and intranet feedback portal. Moving forward, we suggest future curriculums should incorporate an overview of value-based concepts and an appreciation of international standard sets of outcome measures such as those developed by the International Consortium for Health Outcomes Measurement [11]. The VALUE framework as proposed by Patel et al. is also a useful teaching aid: emphasizing validity, affordability, long-term effects, utility, and potential errors in assessing the value of potential interventions [12]. Journal clubs provide excellent opportunities for residents to use the VALUE framework to assess which best practices may be of value to the local population and this platform for teaching value-based healthcare is being explored in some of our institutions.

Clinical Teaching

Daily ward rounds are the platform on which our residents apply value-based healthcare in their management decisions. Senior clinicians play a pivotal role in setting the example for the resident in routine practice, uncovering their blind spots and encouraging reflection. For example, prices of laboratory investigations and medications are published on our electronic medical order system for residents' and senior clinicians' awareness and discussion before orders are made. Multidisciplinary meetings where patients with challenging clinical problems are presented provide opportune moments to debate the value on interventions performed and may identify useful cross-disciplinary research topics. Similarly, morbidity and mortality rounds where patients with unexpected or poor outcomes are discussed prompt review of a center's outcome measures and system design flaws that may be need to be addressed. We believe increasing focus on improving value will also provide impetus for more of such multidisciplinary programs and initiatives at an earlier stage in training, fostering a collaborative culture in future clinician leaders. These relationships and skills are essential for the partnerships needed in the advancement of value-based medicine.

Assessments

In Porter and Lee's "Strategy That Will Fix Health Care," the authors propose that the measurement and reporting of patient outcomes serves to improve efficiencies and transparency in the system, thereby leading to higher value [5]. Similarly, making value-based healthcare part of assessments will enhance the incorporation of the value agenda in residency training. Current in-training examination includes questions on high-value care and can contribute to assessment of resident's knowledge base on value-based healthcare [13].

Taking the concept of outcomes measurement one step further, keeping track of important outcome indicators of patients under the direct care of senior residents would provide an objective gauge of the resident's clinical performance. For example, a senior resident in surgery performing appendectomies would get reports on his or her average intraoperative time, intraoperative blood loss, time-to-discharge and rate of surgical site infections among others. Residents in medical specialties can also track outcomes of patients with common conditions such as diabetes and heart disease under their follow-up. In particular, clinical utility of expensive diagnostic tests and medications ordered should be reviewed by clinical supervisors during feedback sessions. While this may sound like something beyond today's medical practice, certain centers of excellence such as Hamburg's Martini Klinik have already invested in a system that does so with their staff, giving faculty members biannual reports of their patient outcomes compared to those achieved by themselves in previous years as well as with their colleagues. A subset of outcome data including complications is also publicly disseminated in their annual report and website. These crucial components in their care improvement process are described in greater detail in a fascinating Harvard Business School case study [14]. Managed fairly by enlightened leadership, increased transparency provides impetus for improving value in the resident's provision of medical care which translates into better immediate and future care for patients.

The main challenges our institutions face is the lack of faculty well-versed in concepts of value-based healthcare. Health economics is a neglected topic in the traditional medical school curriculum in Singapore. As a result, issues of healthcare affordability and access encountered in daily clinical practice are often relinquished to medical social workers. However, the selection and training of quality improvement champions within medical departments has significantly raised awareness of value in healthcare and hastened its adoption. Initial concerns of broadening the residency curriculum at the expense of traditional competencies have also been largely dispelled as value-based healthcare concepts have not required much structured teaching time, and their use in day-to-day clinical work has proven intuitive for most residents. Dedicating the manpower and finances to support the

conduct of training and data registries will be a challenge that healthcare educators and leaders will face from incumbent authorities. However, successful pilots of value-based models in leading international centers [5, 6] should encourage educators to work with administrators to build the foundation for value-based healthcare in their practice for residency and medical school curriculums.

Conclusion

For a healthcare system that prides itself on being economically viable but is slowly edging towards rising costs, the incorporation of value-based healthcare in Singapore's residency training promises several returns with respect to health outcomes and costs for patients. We encourage other healthcare educators worldwide to surmount challenges in their institutions to commit to the value agenda. As healthcare worldwide transitions to a value-based model, future success will depend on the residents of today being able to understand and create value for their patients.

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