The Power of the Driver Diagram: A Conceptual Approach

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Driver diagrams are widely used as performance improvement tools. When performance improvement teams want to optimize the accuracy and performance of any quality metric, they often use a driver diagram to identify the main drivers to be considered for intervention. Consider a driver diagram approach for each metric, be it Agency for Healthcare Research and Quality (AHRQ) patient safety indicators (PSIs), mortality, readmission, or cost/efficiency metrics. Use of a driver diagram allows appropriate focus on areas of improvement identified by your data and difficulty level. Driver diagrams provide a visual representation that change management teams use to identify the factors that need to be addressed in bringing about durable change and improvement. These factors include structures, processes, tactics, and norms.

Figure 4.1 is a driver diagram that illustrates the relationship between first- and second-level drivers and actions for reduction of risk-adjusted mortality. Improvement science considers driver diagrams useful tools for generating a theory for improvement. It is generally possible to identify 3–5 main drivers, each of which may have secondary drivers. The last tier in a driver diagram identifies the actions that are taken to improve main drivers or secondary drivers.

The driver diagram's usefulness has its roots in W. Edwards Deming's teachings describing a System of Profound Knowledge that is necessary for successful

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A. Schubert, S. A. Kemmerly (eds.), *Optimizing Widely Reported Hospital Quality and Safety Grades*, https://doi.org/10.1007/978-3-031-04141-9_4

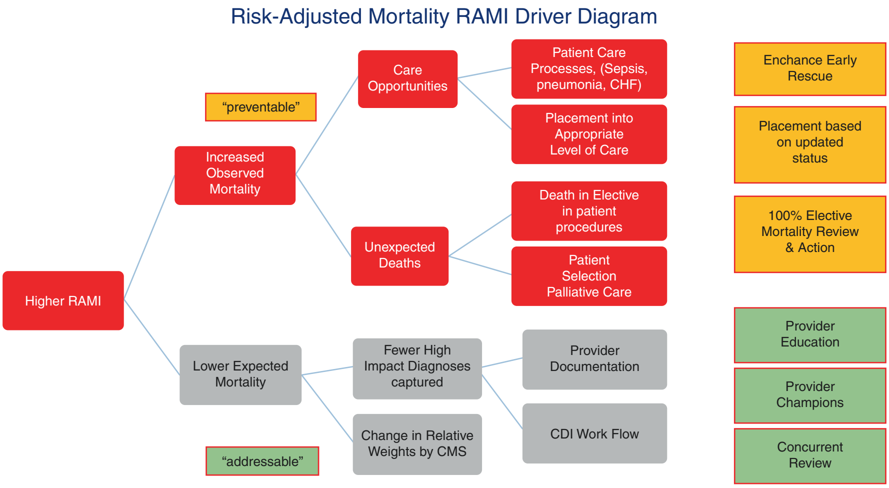

Fig. 4.1 Driver diagram for risk-adjusted hospital mortality (RAMI). Note: The green boxes denote drivers related to and addressable with accuracy in documentation and coding. (© Ochsner Health)

improvement. The four elements of this system are the appreciation of the system in which the improvement is to be made, the understanding of variation, psychology of behaviors (now also understood as change management), and theory of knowledge [1]. It is this *theory of knowledge* that driver diagrams aim to bring to life so that the theory can be tested in a series of successive improvement cycles, referred to as the Plan–Do–Study–Act (PDSA) cycles. It is not advisable to base individual PDSA cycles on the hope that all drivers can be simultaneously addressed.

Driver diagrams are based on the notion that a small and manageable number of factors can be identified to drive almost any performance improvement. This concept was embraced as a component of global influencing strategy described by Patterson and colleagues in the book *Influencer: The Power to Change Anything* [2]. They identify that changing only a few behaviors can result in solving some of the toughest and most complex problems.

4.1 Driver Diagrams and Performance Improvement

While PDSA cycles have become very well known in the parlance of performance improvement, many believe that without an understanding of all four elements of Deming's System of Profound Knowledge, performance improvement limited to PDSA cycles can be challenging and discouraging in its impact. The modern Model for Improvement [3], extensively described and taught by the Institute for Healthcare Improvement (IHI), brings additional concepts to the table. It incorporates the PDSA cycle and three questions to focus improvement. These three questions direct improvement teams' attention to all the components of Deming's System of Profound Knowledge. By calling out the specific aim of the improvement effort with the question of "What are you trying to accomplish?" the Model for Improvement addresses motivation and takes relevant psychology into account. By focusing on measurement with the question "How will you know a change is an improvement?" it introduces the study and analysis of variation. By asking the question "What changes can you make that will result in an improvement?" it insists that teams grapple with the theory of improvement, identify and commit to the actions, behaviors, and processes that need to be addressed in effecting positive change.

Therefore, the driver diagram represents the improvement team's shared theory of knowledge. It is a tool to identify which hypotheses the team will test in their improvement efforts. The driver diagram should incorporate and integrate the team's understanding of the system they wish to improve, knowledge of available baseline data, behavioral and motivational considerations, as well as process and technical knowledge. The team's shared theory of knowledge is best developed by including members representing the entire team and affected stakeholders. Concerted efforts should be made to include a comprehensive view of patient-facing personnel. Inputs into the development of the shared theory of knowledge around the system they wish to improve include knowledge from experts, relevant beliefs of team members regarding team workflows and motivational factors, as well as published evidence. It is critical that sufficient time and effort are devoted to develop the team's theory of knowledge by consensus. This represents their shared understanding of, agreement on and commitment to the nature of the problem to be solved and the factors that need to be addressed to improve the outcome of interest.

Because the driver diagram is also a visual tool, it can be very useful in communicating the "why" of the needed changes, thereby influencing the behavior of team members. The diagram is represented as a series of boxes and arrows outlining the key (primary) and secondary drivers (often identified as actions) that are thought to influence the outcome directly (primary drivers) or indirectly (by acting on primary drivers).

4.2 Examples of Driver Diagrams as They Relate to Publicly Reported Quality Metrics

Many publicly reported quality and patient safety metrics depend as much on accurate documentation and coding as they do on adoption of best clinical practices. Therefore, driver diagrams intended as tools to improve such metrics need to incorporate these important drivers of outcomes, such as hospital-acquired infections (HAIs), severe pressure ulcers, falls with harm, or any of the AHRQ PSIs or hospital-acquired conditions.

Our improvement teams have successfully included structural elements in the concurrent review and documentation process as well as practice changes to reduce such harms as iatrogenic pneumothorax, postsurgical sepsis, central line-associated bloodstream infections (CLABSIs), catheter-associated urinary tract infections, hospital-acquired severe pressure ulcers, postprocedural retained foreign objects, postoperative dehiscence, and accidental punctures and lacerations. The reader is referred to the individual chapters for these harms, as well as the chapter on performance improvement based on case review and analysis of outcome metrics.

Drivers for Patient Safety Indicators For metrics such as the AHRQ PSIs, collaborative review and documentation teams are aware of the primary and secondary drivers, allowing them to concentrate on the most appropriate action. As in the RAMI driver diagram, high-level primary drivers are clinical practice and provider documentation (see Table 4.1). The concurrent review and feedback process constitutes another high-level driver. Drivers for specific quality metrics generally dictate the approach to concurrent review. Concurrent review aims to identify whether the medical record and/or the preliminary coding profile accurately reflect the patient's clinical condition. To be most effective, this is done early in the patient's hospital course and, at the very latest, prior to submitting the patient's coding profile for payment.

A PSI example is our driver diagram for severe hospital-acquired pressure ulcers (Fig. 4.2). The primary drivers of PSI-3 are (1) early recognition of the skin lesion

Table 4.1 Drivers of accurate impactful documentation

Drivers	ED/Prehospital	Admission	Hospital course	Discharge
Documentation that supports generation of a medical record query for POA status	Clinical indicators supporting the diagnosis to be POA	Mention of the diagnosis in the admission note		
The diagnosis is added to the coding profile as POA		The diagnosis was mentioned as certain, likely, probable, or suspected to be POA	Confirmatory documentation is found in the medical notes	The discharge summary again indicates that the diagnosis was POA
An exclusion diagnosis is added to the coding profile if satisfying MEAT criteria		An exclusion diagnosis is documented	Such a diagnosis is confirmed, and evidence for MEAT documented	The discharge summary again mentions the exclusion diagnosis
A diagnosis triggering a complication code is omitted from the coding profile			The diagnosis is documented as having been ruled out	A medical record query is answered, ruling out the diagnosis
Circumstances that allow compliant medical record query generation		There is unclear or conflicting provider documentation	There is unclear or conflicting provider documentation	There is unclear or conflicting provider documentation

POA present on admission, *MEAT* monitored, evaluated, assessed, treated

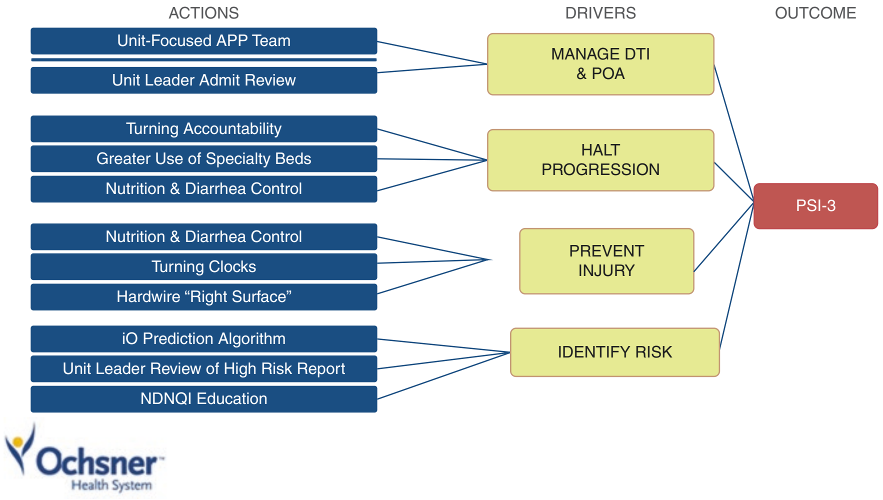

Fig. 4.2 Driver diagram for severe hospital-acquired pressure ulcers (PSI-3). POA Present on admission, DTI Deep tissue injury, PSI-3 AHRQ Patient Safety Indicator 3, NDNQI National Database of Nursing Quality Indicators. (© Ochsner Health)

and documentation of its correct diagnosis, (2) measures to prevent progression of the lesion, (3) preventive measures such as frequent turning, and (4) proactively identifying and acting upon indicators of high risk. It is easily seen that driver #1 aims at optimal accuracy in describing and diagnosing the skin lesion, while drivers #2–4 relate to clinical practice.

Improvement activity for AHRQ PSIs is aided by the use of driver diagrams, as illustrated in the figure. The driver diagram can be adapted to virtually any PSI. For example, PSI-6 is the AHRQ PSI for the occurrence of iatrogenic pneumothorax. Primary drivers include clinical practice, documentation, and concurrent review. Secondary drivers of clinical practice might include robust central line insertion training, technology-guided placement of small-bore feeding tubes (whose placement is associated with iatrogenic pneumothorax), and greater utilization of peripherally inserted central catheter lines.

Drivers for provider documentation accuracy for PSI-6 include documentation of the condition on admission, assessment of clinical significance, and documentation of clinical context. Clinical context in turn might be driven by how well the procedural description depicts whether the pneumothorax development was inherent in the procedure (such as during some abdominal procedures that involve the diaphragm) and whether there were any clinically significant exclusionary diagnoses (such as pleural effusion; see Chap. 14).

Drivers for Hospital-Acquired Infections Our clinically based teams have used driver diagrams successfully for improving performance, especially at the hospital

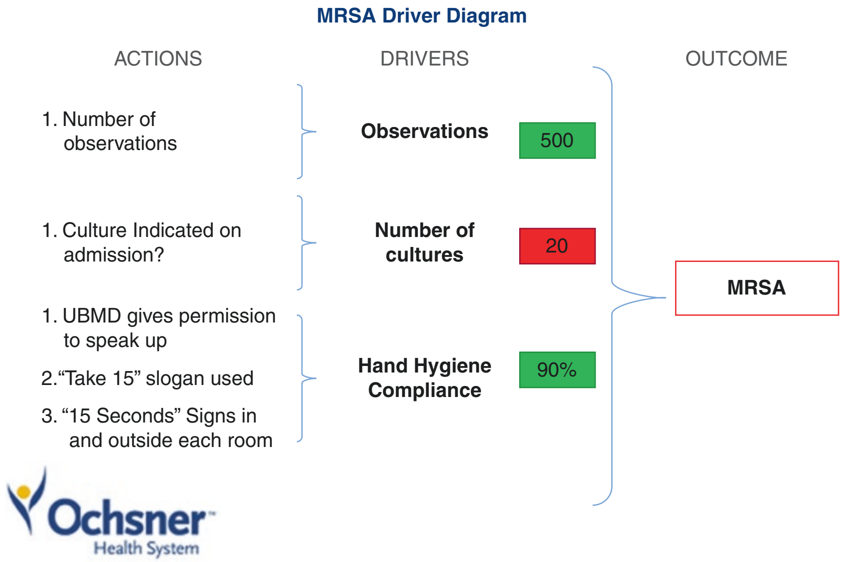

Fig. 4.3 Driver diagram for hospital-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections. UBMD Unit-Based Medical Director, POA = Present on admission; DTI = Deep tissue injury; PSI-3 = AHRQ Patient Safety Indicator 3; NDNQI = National Database of Nursing Quality Indicators. (© Ochsner Health)

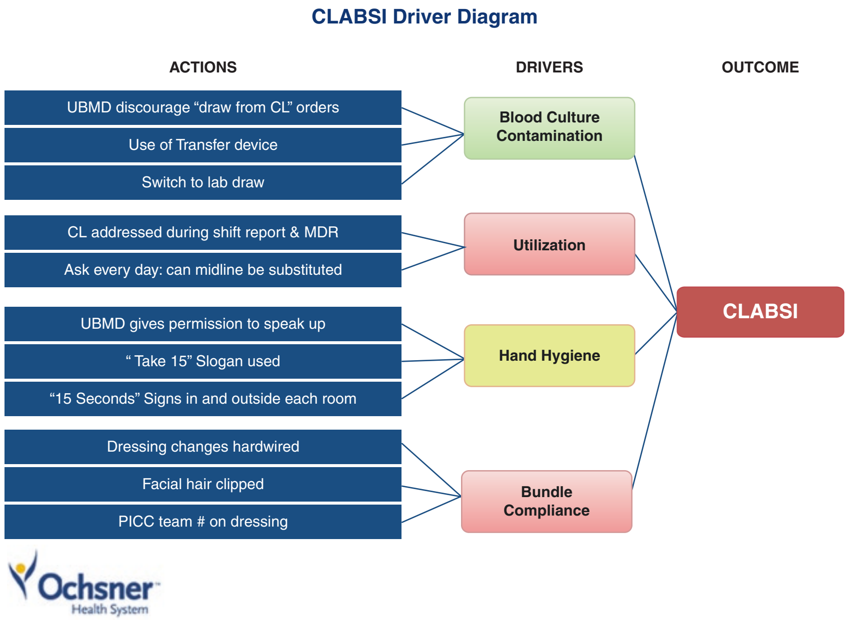

Fig. 4.4 Driver diagram for hospital-acquired central line-associated bloodstream infections (CLABSI). CL Central line, UBMD Unit-based Medical Director, PICC Peripherally inserted central catheter. (© Ochsner Health)

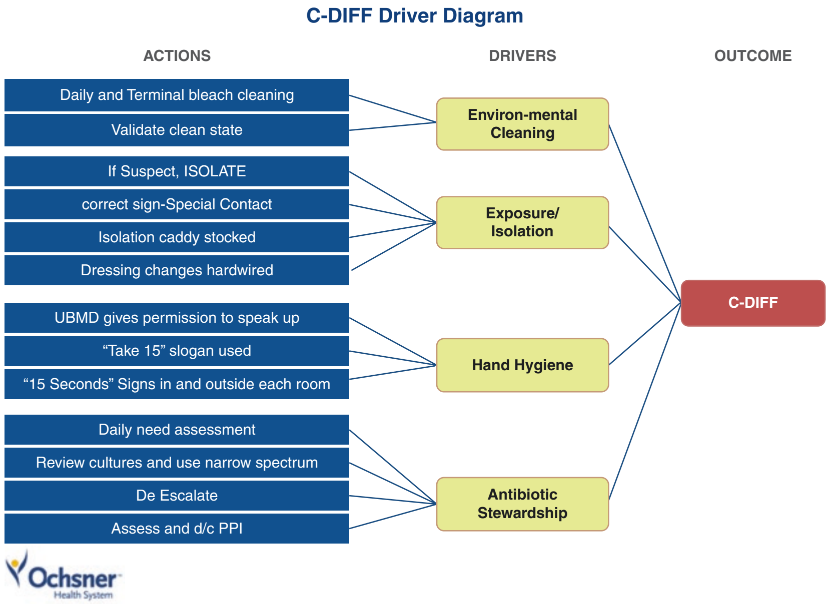

Fig. 4.5 Driver diagram for hospital-acquired *Clostridium difficile* (*C-Diff*) infections. UBMD Unit-Based Medical Director, PPI Proton pump inhibitor, D/C Discontinue. (© Ochsner Health)

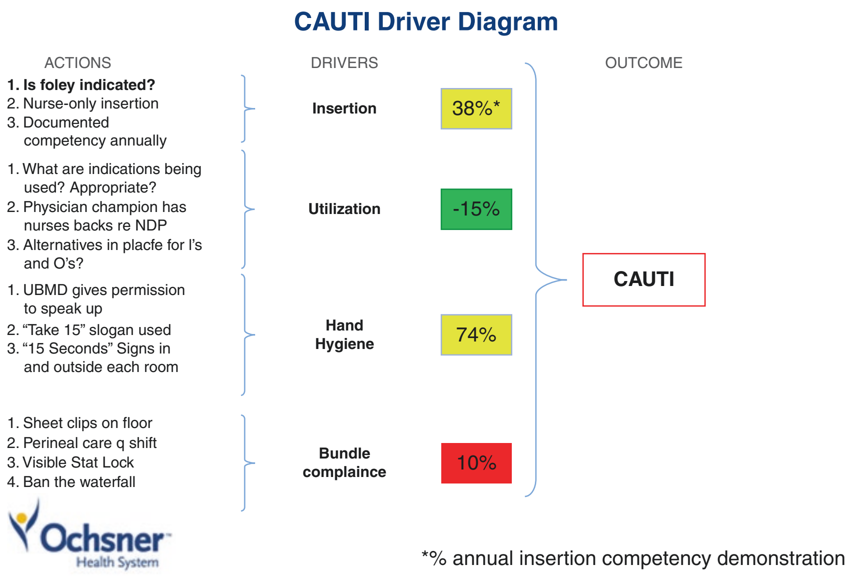

Fig. 4.6 Driver diagram for hospital-acquired catheter-associated urinary tract infections (CAUTI). Note: the numbers next to the drivers represent process performance related to the drivers. I's & O's inputs and outputs, UBMD Unit-Based Medical Director, NDP Nurse-driven protocol. (© Ochsner Health)

unit level. High-level drivers for HAIs are testing stewardship, clinical practice, hygiene measures, and documentation, and, at the organizational level, concurrent review. Figures 4.3, 4.4, 4.5, and 4.6 are real-life driver diagrams used by our teams. HAIs are confirmed after review by infection preventionists based on National Healthcare Safety Network (NSHN) definitions and criteria (see Chap. 10). While some CDC definitions of HAIs are strictly based on culture results, documentation can be important in some cases. For example, if bacteremia can be attributed to a source of infection other than the central line, NSHN guidelines allow excluding the case as a CLABSI event. Clear documentation of timely workup and identification of the source of bacteremia aid in accurately describing the source of infection and thereby avoiding a default attribution of the bacteremia to the central line, which would result in the reporting of the CLABSI event to NSHN. Such documentation facilitates the ability of the infection prevention team to accurately reflect the source of the bacteremia and thus avoid reporting a CLABSI.

Risk-Adjusted Mortality Risk-adjusted mortality, introduced earlier in this chapter, is another use case for the use of the driver diagram. As mentioned previously, Fig. 4.1 represents a driver diagram that illustrates the relationship between first- and second-level drivers and actions for reduction of risk-adjusted mortality. Please see Chaps. 25 and 43 for a more complete discussion of this topic.

Drivers for Accurate and Impactful Documentation Drivers can also be identified to generate a theory for improving the accuracy of medical record documentation. Table 4.1 identifies various drivers of accurate documentation. They are stratified by the phase of the patient's hospital course.

4.3 Involving the Medical Staff

Being aware of the drivers of accurate and impactful documentation can inform and direct education activity for the medical staff and medical staff documentation champions. The challenge always is to create memorable learning opportunities and cognitive aids that allow the members of the medical staff to achieve documentation accuracy with a minimum of additional effort. At the authors' organization, physician documentation accuracy champions have been recruited for all major clinical practice groups. They use a variety of cognitive aids to help their colleagues, including pocket cards, preference lists for identifying diagnoses in the electronic medical record, and advanced practice providers specifically educated to document and answer medical record queries accurately. Teaching the science of improvement, including the theory of improvement and the use of driver diagrams, can be a useful tactic to engage the medical staff. Medical staff are more easily motivated to participate in improvement efforts when evidence-based approaches are used. We teach that the driver diagram is an essential element in identifying the optimal approach to testing the team's hypotheses for improvement. Members of our medical staff are interested in the IHI Model for Improvement in part because it is grounded in the science of performance improvement, including Deming's teachings. When we brought a 3-day course on the subject of improvement science to our facility, at least a dozen senior physicians and their care teams participated in the entire course and most completed a performance improvement project within 6 months.

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