INFORMATICS INTROSPECTIVE: WHAT'S WORKING AND WHAT'S NEXT

EXECUTIVE SUMMARY

During the Scottsdale Institute 2018 Annual Conference, 13 Chief Medical Information Officers (CMIOs) convened to review what IT improvements have truly moved the needle on health outcomes the past 10 years, what learnings they will apply to the next 10 years, and where are the greatest opportunities for the next generation of informatics.

INTRODUCTION

The promise and potential of information technology (IT) has been a major theme in healthcare for the past decade, with widespread investment in and adoption of electronic health records (EHRs) and other information systems. Aspects of these IT initiatives have yielded better health outcomes for patients, while others have yet to prove their value. "In what ways have our informatics efforts improved health, and what learnings can we apply to the future?" asked Dr. Jeffrey Rose of Hearst Health.

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On April 26, 2018 at the Scottsdale Institute Annual Conference in Scottsdale, Arizona, a group of 13 CMIOs convened to reflect on what IT advancements have hit the mark in improving health and healthcare, and use those reflections to anticipate the best ways of moving to the new informatics world. As participant Dr. David Liebovitz of University of Chicago Medicine noted, "We're very focused on our medical care environment, but ultimately our product is healthy patients. We need to address effective solutions in that domain."

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PROGRESS MADE TO IMPROVE HEALTH

Contemplating the enormous activity in health information technology this past decade, the group cited several specific areas where they see that IT directly impacts the end goal of improving human health.

EMBEDDING A STANDARD OF CARE

"We have used the EHR as a reason to standardize care, and I'm not so sure we could have gotten there without it," said Dr. Mary Ann Turley of HonorHealth. Codifying processes has spurred discussion and consensus within organizations and helped align practice in areas where there is unwarranted clinical variation in care. "In our cultural synergistic approach, docs understand 'Why do I need to do this?'" said Houston Methodist's Dr.

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Nicholas Desai. Incorporating evidence-based guidelines and clinical decision support into the workflow has been instrumental in raising the standard of care. Desai added, "Leveraging evidence-based medicine to lead to better clinical decision support has allowed us to give physicians something that makes a measurable difference in care." He described how building in guardrails for ordering based on practice patterns may not

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always be visible to the physicians, but can improve the quality of care. "The ability to incorporate guidelines and protocols directly within the EHR and not have to go look them up is such an improvement," added Dr. Jennifer Singer from UCLA Health.

In addition to continuing to strive for a higher standard of care, an opportunity has emerged to preserve the patient relationship and cultivate more human interaction. Dr. Greg Hindahl from BayCare Health System said that, in the years since implementing the EHR, "We've seen great improvement in quality metrics, physician satisfaction and team-member satisfaction. But every single day I hear our physicians saying they want the patient-physician interaction back."

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> – **Greg Hindahl, MD**, BayCare Health System

ENHANCING MEDICATION SAFETY AND APPROPRIATENESS

The most profound IT-enabled improvements in health are in the area of medications. Documented improvements in quality and safety have been achieved with the use of clinical decision support, computerized provider order entry (CPOE), e-prescribing of controlled substances, opioid therapy management, electronic medication administration records (eMARs) and barcode medication administration, smart pumps and antimicrobial stewardship. "We have seen a validated reduction in med-safety events," said Dr. Ferdinand Velasco of Texas Health Resources. "Even just migrating to an electronic MAR we saw a drop in medication events that was further augmented by CPOE, with the issues of legibility now being eliminated and with the implementation of decision support."

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INFORMATICS ENDEAVORS THAT HAVE ENABLED MEASURABLE IMPROVEMENTS IN REAL-WORLD HEALTH OUTCOMES:

- Clinical decision support
- CPOE
- Legibility of orders inherent to CPOE
- e-Prescribing of controlled substances
- Embedding CDC guidelines for opioid therapy management
- eMARs, especially with barcode medication administration
- Deployment of smart pumps
- Antimicrobial stewardship

In addition to the organization-specific safety improvements achieved by the roundtable participants, Dr. David Classen of Pascal Metrics and the University of Utah summarized national data from The Leapfrog Group over the past 10 years. Categories where medication safety has improved include drug allergy problems, drug-drug interactions and wrong route. "But then there are some categories that have barely budged over the last 10 years,"

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he said. "We don't do really well adjusting doses for kidney dysfunction. We really don't do well in terms of diagnostic-therapeutic mismatches; that is, when we have a patient with asthma, not giving them—for example—a beta blocker. And, sadly, we have a real problem with pregnancy. We have people test if their employees pick up a fetal-fatal drug, and we only get around 20 percent of those right."

National data from The Leapfrog Group over the past 10 years shows categories where medication safety has improved and where closer attention is needed:

AREAS WHERE WE HAVE IMPROVED	AREAS NEEDING CLOSE ATTENTION
Drug allergy problems	Adjusting doses for kidney dysfunction
Drug-drug interactions	Recognizing diagnostic-therapeutic mismatches
Wrong route	Avoiding therapies contraindicated in pregnancy

INCREASING INFORMATION ACCESS FOR PATIENTS

Improving the access a person has to their clinical information is helping empower consumers to be more informed decision makers with a greater understanding of their health picture. Access to their own information can also buttress their confidence in their health and health care. "Patients have benefited from portals because they are able to see their results and communicate with their clinicians in a way they couldn't before," said Dr. Daniel Stein of Memorial Sloan Kettering Cancer Center. "We are now able to give patients more feedback about how they're doing based on the data we have collected, so they know they're okay and they're on the right path. That new way of interacting with the patient gives them more of a sense of control over their health."

While patient portals have been pivotal in giving patients access to their own information, the group emphasized more progress is needed to make it as easy for patients to access their medical record as it is for clinicians, such as through OpenNotes. "It's philosophically really hard," Singer said, "for physicians to understand that people own their medical record. They can get them if they go to the medical records department. Why can't they just have it an easier way? It's a concept that people have trouble getting their heads around. The notes don't belong to us: They belong to the patient."

LEARNINGS FOR THE FUTURE

With the rich history and experience now gained, the group identified several important lessons that will shape the way they approach informatics going forward:

✅ **Focus on What's Most Important.** "Rather than enforcing order-set usage, oftentimes there are one or two specific interventions that have effective evidence behind them that will translate into outcomes," said Liebovitz. "So our focus is on real-time identification of deviations around those specific points, rather than focusing on the order set at large."

✅ **Identify Value and Measure It.** Dr. Christopher Sharp of Stanford Health Care advised that before making changes to the system or to processes, it is important to think clearly about the problem to be solved, then build in the metrics. "Prospectively identify what to measure to know whether what you have done has demonstrated value. Think about the KPIs and get a baseline."

✅ **Prioritize UX Design.** Watching and measuring how providers work in the EHR helps inform how workload and efficiency can be optimized. "Initially we had the 'I hate change' attitude," said Dr. Hu Blake, II of Northern Arizona Healthcare. "Now we're working on the 'I'm spending too much time with a computer' attitude." Being more intentional around usability testing is a best practice that can prevent inefficiencies and defects from being deployed, Velasco noted. UX design also influences clinical decisions. "We can't forget the simple things," said Dr. Kim Jundt of Avera Health. "Our infectious disease docs tried for a year and a half to get us to use levofloxacin less. We just put it at the bottom of the order-selection list, which solved it instantly. There are so many simple things we can do, we don't have to spend $30 million to solve that one problem."

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✅ **Build Less, Champion More.** While the growing problem of physician burnout is largely blamed on inefficiencies in the EHR, the group noted that many physicians are not taking advantage of features and efficiencies already built into the system. "We need to do a better job of communicating the good things we are doing in the EHR to streamline and improve the system," said Dr. Matthew Zimmie of Beaumont Health. "Sometimes it just takes our teams going out to the offices, elbow-to-elbow with the docs."

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✓ **Communicate with Stories and Data.** To win the hearts and minds of stakeholders,

one must appeal to both the emotional and logical elements of the issue. "You need to use both stories and data to bring the organization along. And you must always have both," said Sharp.

NEXT GENERATION INFORMATICS

Continuing the tradition of new technology holding promise and potential for healthcare, predictive analytics, machine learning (ML) and artificial intelligence (AI) have attracted attention as technologies that could overcome many of the industry's information challenges. However, CMIOs were mixed in their perception of how—or whether—these capabilities will deliver transformative value. While some viewed large-scale investment in predictive analytics, ML and AI as near-term imperatives, others considered much of the activity in this domain to be similar to developing clinical risk scores, which have been used for decades but without consistent operational or workflow utility. Others suggested that new technologies are most fruitful when applied in a focused way to specific problems. Notably, BayCare Health System was able to get a head start on managing readmissions by using predictive analytics to identify which Medicare patients would code as CHF, COPD or AMI with 92 percent accuracy, compared with 52 percent accuracy of case managers' predictions, which has contributed to their lowest rate of readmissions in five years. Liebovitz described how analytics helped the University of Chicago Medicine's infusion centers optimize patient flow by matching scheduling templates to patient attributes, like infusion-therapy durations, to better match staffing throughout the day. Stanford Health Care created a very quick and inexpensive ML model to identify patients who would likely benefit from palliative care, validated by human review, and has been able to better serve its population in a timely manner.

Perhaps the greatest breakthrough machines can bring is to elicit the most pertinent information from the medical record. "We now have babies born into the record, and they will be seniors one day," said Stein. "We will have that whole life history, of diagnoses, of problems, of genomic information—not to mention patient-generated information and information from other healthcare systems aggregated through health information exchange. We as human clinicians are not going to be able to review these charts effectively. How are we going to be able to make an informed medical decision based on a record like that, without the assistance of an AI that can help sort out the pertinent details?"

PURSUING A GREATER GOAL

Informatics has made progress in advancing health and healthcare through organizing and activating information. As more and more information is aggregated and incorporated into medical records, the next frontier may be to address the quality of the information itself. "Our clinicians and our researchers are trying to come up with new therapies and new ways of treating cancer, and they're telling us that despite the fact we're entering all this information, the phenotype data that's in the EHR that they're trying to match up with their genotype data has limited usefulness. They can't answer the scientific questions they need efficiently with the quality of the data that we're getting out of the clinical record," said Stein. "There is a bigger mission here that goes beyond centralizing a record. It's about making that data more useful, not just for one patient, but to develop new treatments and to get new learning and insight into why people get sick and whether and why certain treatments work."

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Observed Dr. Jeffrey Sunshine of University Hospitals, "We need to think about where informatics needs to go next for us to be successful, and how is it different than what we've already been doing. We must shift beyond responding to patients' health issues to anticipating them to allow earliest intervention and support."

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ABOUT THE SPONSORS

The **Scottsdale Institute (SI)** is a not-for-profit membership organization of prominent healthcare systems whose goal is to support our members as they strive to achieve clinical integration and transformation through information technology (IT). SI facilitates knowledge sharing by providing intimate and informal forums that embrace SI's "Three Pillars:"

> Collaboration
> Education
> Networking.

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