

# CHIEF MEDICAL/HEALTH INFORMATION OFFICER SUMMIT

September 30, 2016

## Managing Clinical Decision Support and Improving Workflow



*Sponsored by Deloitte and prepared by Trudy Millard Krause, DrPH,  
UTHealth School of Public Health*

**Executive Summary:** Twenty Chief Medical Information Officers (CMIOs) and Chief Health Information Officers (CHIOs) of leading health systems gathered in Chicago to share best practices and lessons learned regarding clinical decision support (CDS) and improving clinical work flow. This report captures their discussion and shared insights.

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## SUMMIT PARTICIPANTS

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- > David Classen, MD\* – Pascal Metrics and University of Utah
- > Greg Forzley, MD – Trinity Health
- > Anupam Goel, MD – Advocate Health Care
- > Greg Hindahl, MD – BayCare Health System
- > Kim Jundt, MD – Avera Health
- > Michael Kramer, MD – Spectrum Health
- > Michele Lauria, MD – Eastern Maine Healthcare Systems
- > Thomas Moran, MD – Northwestern Medicine
- > Nnaemeka Okafor, MD – Memorial Hermann Health System
- > Theresa Osborne, MD – Spectrum Health
- > Jerry Osheroff, MD – TMIT Consulting, LLC
- > Luis Saldana, MD – Texas Health Resources
- > Anwar Sirajuddin, MBBS – Memorial Hermann Health System
- > Andy Spooner, MD – Cincinnati Children’s Hospital Medical Center
- > Peter Springsteen, MD – Munson Healthcare
- > Pete Stetson, MD – Memorial Sloan Kettering Cancer Center
- > Jeffrey Sunshine, MD – University Hospitals
- > Randy Thompson, MD – Billings Clinic
- > Paul Veregge, MD – Catholic Health Initiatives
- > Alan Weiss, MD – Memorial Hermann Health System

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# Introduction

The Scottsdale Institute CMIO/CHIO Summit was held in Chicago on September 30, 2016. The objective of the Summit was to foster collaboration among Chief Medical Information Officers (CMIOs) and Chief Health Information Officers (CHIOs) from prominent healthcare systems across the country, with the intention of learning from shared experiences, best practices and proven approaches.

The group was tasked with reviewing the maturity of the Clinical Decision Support (CDS) processes within organizations that responded to a pre-summit survey. Based on those findings a productive discussion evolved regarding CDS and lessons learned. Future visions and emerging trends and technologies were explored, along with the impact to CDS and the CMIO/CHIO role. The impact of future payment policies such as MACRA and bundled payments on information systems was also explored.

Throughout the Summit, underlying themes stressed the importance of CDS in patient outcomes, physician performance, organizational quality metrics and, ultimately, reimbursement strategies. This critical component thereby requires organizational commitment and support along with evolving strategies for system improvement and sustainability to meet future demands and opportunities.

## PRE-SUMMIT SURVEY RESULTS

In advance of the summit, the Scottsdale Institute circulated a survey among CMIOs and CHIOs regarding Clinical Decision Support (CDS) with the intention of collecting information to initiate fact-based discussion

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**"CDS evolution requires process engineering and accountability."**

**Nnaemeka Okafor, MD,**  
Memorial Hermann Health System

during the summit. The survey was written by Dr. Michael Kramer, Dr. Nnaemeka Okafor, Dr. Luis Saldana, Dr. Anwar Sirajuddin and Dr. Alan Weiss. Twenty-two responses were returned. The responses indicated there were varied levels of maturity in CDS implementation and design. A summary of responses follows:

- > The most frequently identified knowledge-management system used for CDS was an EHR tool such as Epic or Cerner, but other responses reported using tools such as Word, Excel, Tableau or others.
- > CDS project-management initiatives were most frequently organized by steering committees or councils, but the majority of responses varied greatly.



**"An effective CDS positively affects outcomes which can be demonstrated through targeted measurement."**

**Luis Saldana, MD,**  
Texas Health Resources



- > 59% of respondents reported that the CDS elements were not reviewed on a regular basis.
- > 65% reported that very minimal customization of the CDS tool was allowed across hospitals or practices.



## Billings Clinic



**Randy Thompson, MD,**  
Billings Clinic

“We all have learned the same lessons over and over. Our challenge as a group is how to transfer this knowledge.”

- > 68% stated that the organizational approach to alerts and CDS was a combination of “buy” and “build.”
- > Among the value-added decision support initiatives that showed a return on investment (ROI), Sepsis and VTE ranked as the top two.
- > Analytics for Radiology was the top area of CDS that was being considered by the respondents.
- > 73% felt that ACR Appropriate Use Criteria were the most appropriate for radiology.
- > 89% were not incorporating cognitive computing or artificial intelligence.
- > 50% reported limited activity around consumer related data integration such as patient monitoring.

## CLINICAL DECISION SUPPORT (CDS)

Discussion on the survey results pointed out the great variation in maturity in CDS system integration. Dr. Jerry Osheroff noted the CMS-recommended “CDS 5 Rights Framework” is a very helpful guide to shape CDS to drive performance and quality. The spectrum of maturity levels can be seen in each of the 5 CDS Rights dimensions. The challenge: “Make the RIGHT thing to do the easy thing to do!”

Dr. Michael Kramer noted that very few organizations assess all the 5 Rights during the development. Even less common is some form of evaluation to see if the rule continues to fire. In one example, a health system’s lab-test names changed but the rule was not updated. Important safety and quality outcomes can become unreliable without anyone knowing the system configuration has changed.

There was common support for a goal of finding non-interruptive methods in CDS. Alerts are a feature in the immature stage, whereas non-interruptive functionality would reflect the mature stage. Alerts can be seen as “guard rails,” designed to keep the user on track. However, they can eventually turn into “stop signs” that become interruptive and lead to “alert fatigue.”

## CDS 5 RIGHTS

To improve targeted care processes/outcomes, get all the RIGHT information to all the RIGHT people in all the RIGHT formats through all the RIGHT channels at all the RIGHT times.

## TMIT CONSULTING, LLC

“The challenge is to make the RIGHT thing to do the easy thing to do!”



**Jerry Osheroff, MD,**  
TMIT Consulting, LLC

Dr. Pete Stetson of Memorial Sloan Kettering Cancer Center noted that alerts are a form of data displays, but the real need is cognitive support through visualization and summarization—“finding what you need when you need it.” Dr. Michael Kramer said, “Good design means that best practice is hardwired into the workflow and the alert only fires when someone deviates from that standard. Good alerts are designed in the context of streamlined workflow and rarely trigger.” Dr. David Classen added that CDS alerts should be viewed along a continuum—they initially educate on evidence-based medicine guidelines and over time they become guardrails as clinical knowledge becomes learned behavior.

The discussion evolved into identifying a “mature” model of CDS, and agreed that a standardized maturity model does not yet exist.

Key elements in the maturity of CDS were listed as follows:



*“As practice evolves so should CDS. An alert should prompt a dashboard of options, along with a guardrail to avoid error.”*

**David Classen, MD,**  
Pascal Metrics and  
University of Utah

- > Definitions
- > Goals
- > Internal Alignment/  
Buy-In
- > Control/Management
- > Alerts/Order Sets
- > Process/Workflow—  
Future Vision
- > Tools
- > Accountability
- > Performance Management

Dr. Osheroff offered an example of the mature CDS approach that makes the right thing easy as the Society of Hospital Medicine’s recommended/proven approach to improving VTE prophylaxis (a top priority target of SI organizations, per the Pre-Summit Survey). They recommend powerful order sets that incorporate simple VTE risk stratification (directly linked to corresponding risk-appropriate orders), as well as an easy mechanism to document contraindications to chemoprophylaxis via check box within the order set. This makes risk assessment and risk-appropriate ordering, as well as signaling exclusion from quality measures in appropriate circumstances, all a seamless part of the ordering workflow.



## SPECTRUM HEALTH

*“Can your organization describe the rules that are currently active?”*

*Can you describe their purpose and the evidence behind them?”*

*Will you be able to do so a year from now or well into the life of your information system?”*

*If you make a change to the triggers and exclusions to these rules, does your IT team know to update the rule?”*



**Michael Kramer, MD,**  
Spectrum Health



*“We need to learn how to capture patient activities outside of the health system.”*

**Kim Jundt, MD,**  
Avera Health

Dr. Michael Kramer noted that organizations may have hundreds of rules. Many of these rules predate any informatics standards and what are now recognized as best practices. It is common to have rules become ineffective or incorrect as codes change or processes change. Ownership through event analysis and decision-logic tracking and documentation are critical to keep the CDS timely, accurate and useful. In order to avoid an “interruptive” CDS, the process should be amended to evolve from alerts and redundancies to a system that delivers analytics and improves workflows. Yet, it was agreed, most systems are still in the interruptive phase of CDS. To advance to workflow applications the organization must embrace data as part of the clinical mindset rather than alert response. To do this, the organization requires layered teams of academics, clinicians and practical users creating decision strategies as a group. At Texas Health Resources, Dr. Luis Saldana formed the CDS Team to manage the lifecycle of CDS knowledge, e.g., order sets and alerts, and to measure the resulting demonstrable impact.



## SPECTRUM HEALTH

**“We have to engage the organization to create an effective and sustainable CDS.”**

**Theresa Osborne, MD,**  
Spectrum Health





**“Cross-platform data integration facilitates knowledge sharing, but the real challenge is leadership—holding people accountable.”**

**Alan Weiss, MD,** Memorial Hermann Health System

Drs. Alan Weiss, Nnaemeka Okafor and Anwar Sirajuddin summarized their learnings at Memorial Hermann by noting the following key points:

- > Maturation of CDS requires support from the CEO, making it an organizational priority.
- > To advance the application, you must recognize the problems through smart data analytics, identifying trends, spotlighting causes and explanations, finding options for solutions and using reports to change behavior.
- > Strong analytics are needed to support improvements in both physician and patient outcomes.

Dr. Michelle Lauria from Eastern Maine concurred, noting that CDS supports consensus-building and alignment across clinical units, connecting specialties together, although establishing care guidelines across the full continuum is still in an early stage of development.




**“Maturation of CDS requires support from the CEO, making it an organizational priority.”**

**Anwar Sirajuddin, MBBS,** Memorial Hermann Health System



"It's easy to be distracted by new technologies while our basements remain a mess!"

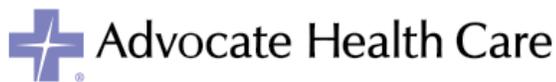
**Michele Lauria, MD,**  
Eastern Maine Healthcare  
Systems

Additional supporting comments centered around the challenges in leading diverse groups to a CDS consensus, especially if alignment across the organization is lacking. Additionally, maturity levels may vary across clinical teams: some systems simply providing documentation templates (immature) to alerts (moderate maturity) and to efficient decision-support messaging systems (mature). An efficient decision-support messaging system should recognize that some care protocols require absolutes and some allow variations.

Dr. Kramer asserted that the CMIO/CHIO's role should be to create visibility to such chaos and assign accountability to move forward to an improved quality focus both to legacy and new rules. CDS teams ensure there is a rigorous process to evaluate existing rules before adding more alerts to a system. The team should include subject-matter experts from the clinical

side and the informatics side for coordination and elimination of chaos. Dr. Kramer offered questions to consider (see p. 5), stating that the safety and reliability of care processes are at-risk if the answer is no to any of the questions. Informatics teams should lead rigorous knowledge management and regular evaluation of clinical decision support and partner with clinical-evidence-based experts and process owners. "Expensive? Perhaps. Such expertise and rigor are the table stakes of

managing our new models of hardwired and reliable systems of care," he said.



"Focus on what is not working for physicians and fix that."

**Anupam Goel, MD,**  
Advocate Health Care

The best strategy for an effective CDS system is Informatics + Analytics + Quality. Deployment for this strategic framework includes interdisciplinary management of the infrastructure, reduction of redundancies and alert fatigue and streamlining workflows through visualization to ensure predictive analytics that support clinical decision making.

The group acknowledged shared experiences and lessons learned from CDS implementation and management. Key concepts included issues related to the level of data required, the usability of the system, the need for monitoring, acknowledgement of organizational needs and acceptance of change. Fostering an environment where change is accepted and collaboration across organizations to create best practices are two key areas the group identified.



"CDS needs to support users in the way they learn and process information and understand factors of fatigue."

**Peter Springsteen, MD,**  
Munson Healthcare

The group acknowledged shared experiences and lessons learned from CDS implementation and management. Key concepts included issues related to the level of data required, the usability of the system, the need for monitoring, acknowledgement of organizational needs and acceptance of change. Fostering an environment where change is accepted and collaboration across organizations to create best practices are two key areas the group identified.

# Future Visions

CDS is an IT-enabled tool that has changed the way care is delivered. Effective mature CDS contributes to improved clinical outcomes for the patient as well as improved performance measures for the physician and the healthcare organization. A mature CDS incorporates elements of actual clinical practice and the human equation. According to Dr. Nnaemeka Okafor, CDS evolution requires process engineering and accountability. Process engineering studies the workflow and collects and analyzes data, then relates the findings to the CDS toolbox. Accountability applies the appropriate resources, assigns training and monitors utilization and practice.

**“Sustainability requires both monitoring and managing to keep alerts accurate, relevant and effective.”**

**Pete Stetson, MD,**  
Memorial Sloan Kettering  
Cancer Center

Dr. Jeff Sunshine said we should engage CDS to provide feedback on clinical choices that inform the physician, for example, of the percentage of clinicians who had previously selected each option or to offer predictive outcomes of the choices for that patient. Dr. Andy Spooner added, “Ideally you want the relevant knowledge presented at exactly the point a decision

is about to be made—but how do you accurately predict that?”



**“We should engage CDS to provide feedback on predictive outcomes of clinical choices.”**

**Jeffrey Sunshine, MD,**  
University Hospitals



**“You want relevant knowledge at exactly the point of decision. But how do you accurately predict that?”**

**Andy Spooner, MD,**  
Cincinnati Children's Hospital  
Medical Center

An ideal future development would be the cross-system application of CDS so that one vendor system could “talk” to another vendor system across platforms. The reality is that patients cross systems and collaboration across platforms would contribute greatly to coordinated patient management. As Dr. Alan Weiss noted, “Cross-platform data integration does facilitate knowledge sharing, but the real challenge is leadership—holding people accountable for behavior change is key—how do we make that easy?”

## EMERGENT TECHNOLOGIES

It was generally agreed that technological advances are only useful if they contribute to the organizational objective by providing valuable new options for getting the CDS 5 Rights correct through enhanced information, channels and formats. The current reliance on reports can lead to data overload without actionable strategies. If the purpose of reports is to change behavior then they need an appropriate display to create a culture of change. Retrospective reporting needs to change to real-time prospective predicting.



**"CDS done poorly fatigues physicians and takes them away from medicine, which contributes to burnout."**

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

Some helpful technological advances could focus on the following:

- > Natural language processing (NLP) and voice recognition to convert speech to text and trigger real-time relevant alerts, recognizing that speech creates a better patient story;
- > Data mining to continually identify the most commonly used notes to simplify and standardize documentation;
- > The Internet of Things, which represents an opportunity for real-time alerts based on data streaming;
- > Patient, or consumer-generated data, inclusive of patient-reported outcomes, biometrics and notifications, allows patients to become part of the care team, which could be transformative, with tools such as Open Notes and Patient Portals that garner greater patient satisfaction;
- > Patient-aggregated information, which can challenge privacy issues and result in external data in the record that is not vetted or validated, leading to new risks;



**"Some aspects of the CDS include inappropriate simplification, for example the Patient Medication List—who owns that and is the patient in partnership with the clinician?"**

**Greg Forzley, MD,** Trinity Health



**"Technology is not the disrupter. We are the disrupters!"**

**Thomas Moran, MD,**  
Northwestern Medicine

- > Patient engagement outside of the encounter is a top priority for the organization, yet a real challenge to the provider, who must avoid the potential data tsunami of too much information.

Data overload was recognized as a real risk, with the related new technologies potentially becoming distractions from the real goal of improvements in clinical decision making. Dr. Thomas Moran said, "Technology is not the disrupter, we, the physicians need to be the disrupters!" The CMIO and CHIO must activate the catalyst for change. To do so, the CMIO and CHIO must have credibility, must have a seat at the C-Suite table and must relate actions to ROI.

**"You need to determine the overall 'alert burden index' to manage the effectiveness of the system."**

**Luis Saldana, MD,**  
Texas Health Resources

## WHAT CMIOs/CHIOs CAN DO TO PREPARE FOR MACRA AND NEW PAYMENT MODELS

MACRA will revise payment models by combining meaningful use and quality for the MIPS scale. The goal of CMS is a drop in resource utilization. In order to be prepared for MACRA the group agreed that certain strategies can be implemented in advance:

- > Build MACRA provider planning and tracking capabilities to ensure a clear understanding of the annual MIPS or APM path that each provider will follow.
- > Identify quality measures and build displays for those measures at the provider level even if using group reporting.
- > Base performance assessment on Hierarchical Condition Coding (HCC) levels with Alternative Payment Model (APM) and Quality and Resource Use Report (QRUR) adjustments.
- > Work toward a methodology to identify a true cost of care for specific services that will be bundled, such as total hips and knees for 2018.
- > Identify clearly in advance decisions on shared payments per episode and reach those decisions via collaboration.
- > Understand that risk adjustment, quality measures and payment may be dependent on documentation quality and accuracy, including the use of HCC codes and comprehensive problem lists. The care-planning process must include both medical and social problems to have the greatest impact. Risk-based APM's may depend on managing non-medical problems.

"Alerts have in essence become denials, which is different from the intent of an alert—a stop sign instead of a guard rail."

**Andy Spooner, MD**, Cincinnati Children's Hospital Medical Center

## DATA QUALITY AND DOCUMENTATION QUALITY

Data quality and documentation quality are related but present different challenges. When performance measures drive compensation, the baseline data is critical and must be accurate.



**Memorial Sloan Kettering Cancer Center™**



**Pete Stetson, MD**,  
Memorial Sloan Kettering  
Cancer Center

"The PDQI-9 tool is used to assess clinical documentation quality and is easy to use and freely available."

The care team relies on both clinical documentation and quality assessors in the EHR. Yet everyone agreed clinical documentation often is of poor quality, generally from cut-and-paste behaviors and redundancy. Dr. Stetson suggested the use of the Physician Documentation Quality Instrument (PDQI) as a simple means of assessing quality and providing feedback for improvement. Dr. Michelle Lauria suggested that physicians be required to do note-review on peers to identify issues and foster improvement. Dr. Jerry Osheroff described a new checklist tool to ensure that quality-measure data are accurate and trustworthy (recently published within a guide to improving care processes and outcomes). Dr. Alan Weiss said that part of the problem is the physician hasn't defined data quality based on purpose—purpose related to influencing medical decision-making and clinical value.

# Lessons Learned: How CMIOs/CHIOs can Advance CDS

1. Stress documentation reform to make records medically meaningful for the patient benefit. Change data documentation and collection from a reimbursement focus to a patient outcome focus.

“CDS systems tend to be built fast to “go live” and are problem-focused. Instead they should focus on sustainability including workflow, usability, knowledge management and human factors.”

**Michael Kramer, MD,**  
Spectrum Health

2. Synthesize the experiences and strengths from the organizations within the Scottsdale Institute to identify what the future of CDS could look like.
3. Articulate the value proposition of the CDS Informatics Team to lead to role clarity and improved collaboration.
4. Develop a maturity model for CDS levels, along with a recommended staging process and a corresponding benchmarking process facilitated by the Scottsdale Institute.

5. CMIO/CHIOs should take a critical role in translating health reform such as MACRA and other value-based contracting efforts into a value platform that leverages people/process/technology best practices.

6. Teach responsible clinical documentation skills and etiquette in medical schools as a requirement for delivering quality care.

7. Apply pressure to vendors to standardize CDS tools and maintain CDS as a core function of the EHR. Knowledge management and analytics to ensure CDS reliability should be part of the standard EHR CDS package from vendors. Informatics teams should be able to easily report on alert fatigue and gaps in the annual review process with subject-matter experts.

“You need to remind people why alerts exist and the consequences of ignoring them. Meaningful options need to be built into the asynchronous workflow of the entire care team.”

**Thomas Moran, MD,**  
Northwestern Medicine

8. Continue to expand CMIO/CHIO and Informatics resources and personnel in health systems, with senior-level decision-making, to realize the ROI on CDS.

“We could improve the system by getting unified care messaged across the continuum for conditions such as COPD, Hypertension, Diabetes, etc.”

**Jeffrey Sunshine, MD,**  
University Hospitals

9. Build a culture of innovation throughout the health system.
10. Build informatics capability that includes ongoing review and prudent development of CDS alerts. This process should include assessment and monitoring of CDS effectiveness against negative factors like alert fatigue.

# Resources

The 5 Rights of CDS: [http://library.ahima.org/doc?oid=300027#.V\\_kJdSTvb20](http://library.ahima.org/doc?oid=300027#.V_kJdSTvb20)

PDQI Tool: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3347480/>

Checklist for QI Data: [Checklist for Analyzing Performance Measure Data](#)

Guide to Improving Care Processes and Outcomes in Healthcare Centers: <http://hiteqcenter.org/Resources/HITEQResources/TabId/122/ArtMID/718/ArticleID/108/Guide-to-Improving-Care-Processes-and-Outcomes-in-Health-Centers.aspx>

Improving Outcomes with Clinical Decision Support: An Implementer's Guide, Second Edition: HIMSS Book Series by Jerry Osherooff, Jonathan Teich, Donald Levick, Luis Saldana, Ferdinand Velasco, Dean Sittig, Kendall Rogers, Robert Jenders: <http://www.himss.org/library/clinical-decision-support/guidebook-series?navItemNumber=16571>

“Analysis of clinical decision support system malfunctions: a case series and survey,” Adam Wright, PhD, Associate Professor of Medicine, Harvard Medical School, et al, JAMIA, March 28, 2016: <http://www.scottsdaleinstitute.org/docs/summits/2016-09.CHIO-CMIO.JAMIA.pdf>

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SI facilitates knowledge sharing by providing intimate and informal forums that embrace SI's "Three Pillars:"

- > Collaboration
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- > Networking

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