



Trends in Healthcare IT and What it Means for Rural Healthcare Delivery

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Vice President, HIMSS*

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And Who Is HIMSS?

- HIMSS is healthcare industry's professional society exclusively focused on providing leadership for the optimal use of healthcare information technology (IT) for the betterment of healthcare
 - 24,000 Individual Members
 - 350 Corporate Members
 - 114 Healthcare Organizational Affiliates
- Offices in Chicago, Washington DC, Ann Arbor, Brussels and Singapore
- John P Hoyt, VP for Healthcare Organizational Services
 - Former COO, CIO
 - Manages the Healthcare Organizational Membership
 - Manages the Senior IT Executive community
 - Consults on HIMSS Analytics database

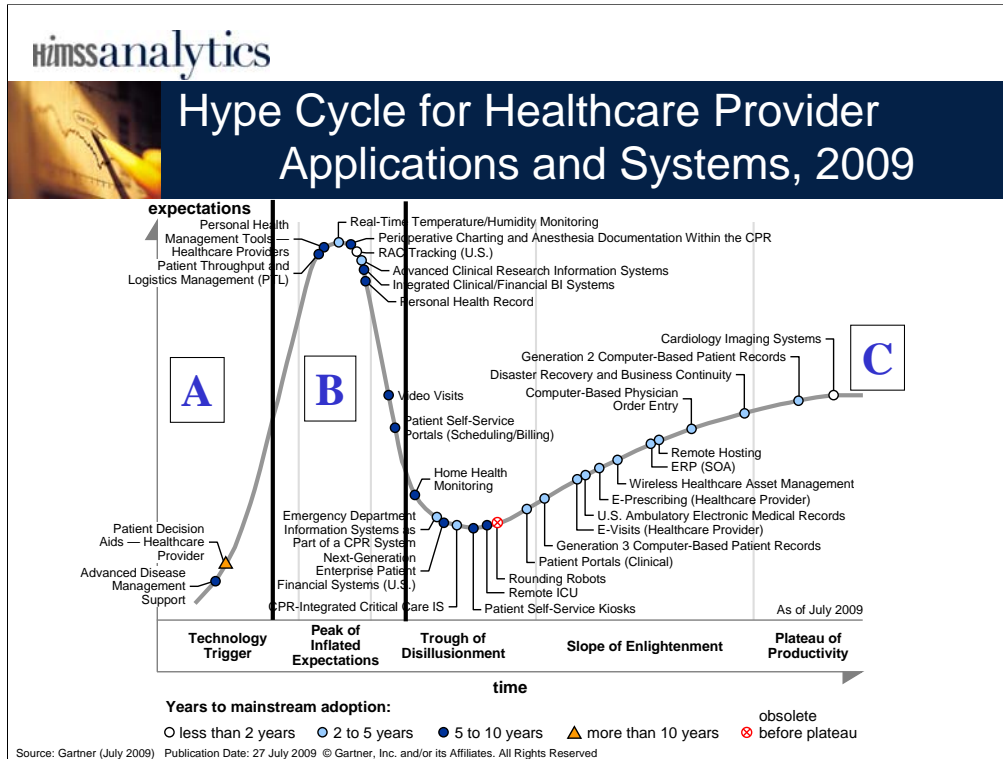


Definitions and Agenda

- **Market trends** – supported by data that shows true market movement toward or away from a certain technology or application.

Agenda:

- **Trends** – IT Budgets, PACS, Bar Coding, EMRs, CPOE
- **ARRA** – How the ARRA incentives relate to IT Strategic Planning



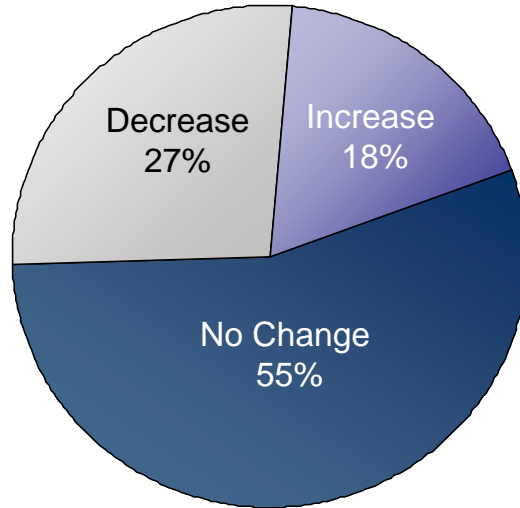
Gartner has used the Hype Cycle to explain the progress of technologies for years. It takes between 3 – 5 years, on average, for a specific technology to traverse the Hype Cycle, from invention and introduction to the market, to unrealistic expectations of capability and performance, to acute disappointment, and finally to a realistic understanding of capabilities and adoption by mainstream users.

The key to use of the Hype Cycle is to understand your healthcare organization's appetite for change and risk. Technologies that have not reached at least the Slope of Enlightenment and preferably the Plateau of Productivity are not good candidates for implementation at most HCOs. 85% of healthcare provider organizations are Type C, which in Gartner's definition means they are risk averse, slow to make decisions with cultures that are resistant to change. The technologies climbing the Hype Cycle, coming down the other side of the Peak of Inflated Expectations headed for the Trough of Disillusionment not only have risk associated with the technologies themselves, but also with the implementation in companies whose cultures are resistant to change. If your organization is a Type C, stay away from an implementation other than a pilot until technologies approach the Plateau of Productivity!



Trends: IT Budgets are moving up

2005



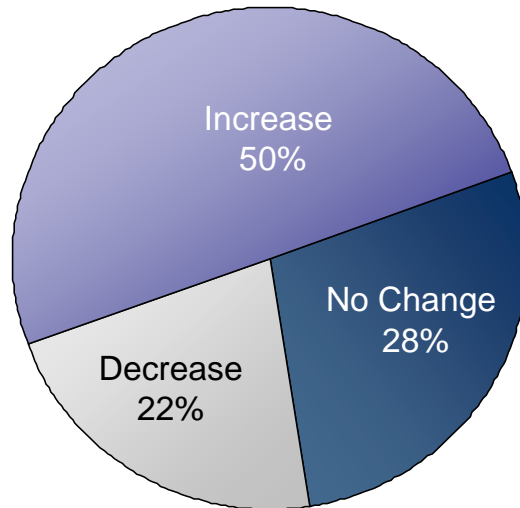
Based on IT Budget as a Percent of Total Operating Expense for the 155 IDSs that provided data in both 2002 and 2005
Source: HIMSS Analytics™ Database

© 2009 HIMSS Analytics



Trends: IT Budgets are moving up

2009



Based on IT Budget as a Percent of Total Operating Expense for the 100 IDSs that provided data in both 2002 and 2009
Source: HIMSS Analytics™ Database

© 2009 HIMSS Analytics

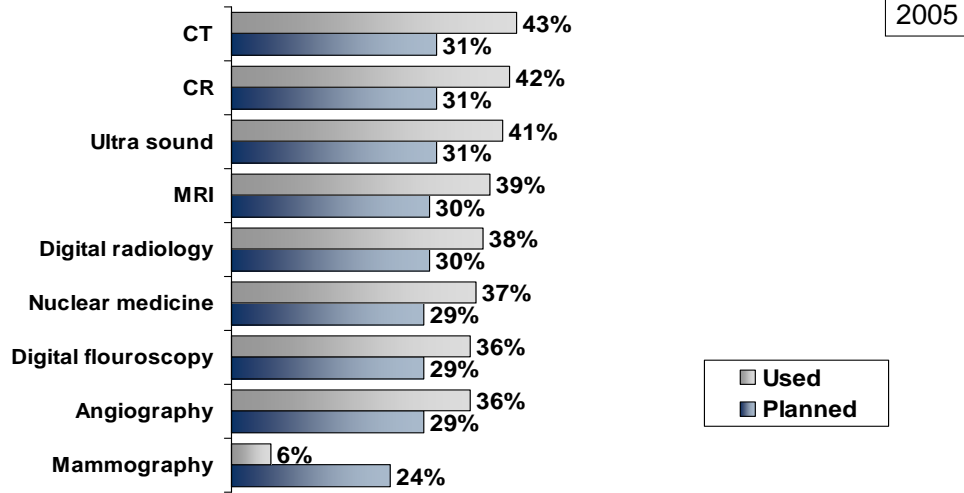
Budgets are creeping up. The data is based on 100 integrated healthcare delivery systems that reported percent of budget in the 2002 - 2009 databases. The results are just now, in the third quarter of 2009, starting to make sense.

Hospital and IDS CFOs have become more conservative with the funding of IT budgets. Our data shows that the midrange of growth is in the 2-2.9 percent range. The number of hospitals and health systems reporting spending in that range is increasing, but many of those health systems' budgets are declining from higher rates of spending. CFOs have few examples of positive return on investment for IT solution acquisitions. How many healthcare organizations have shown tangible return on investment for electronic medical record (EMR) products over the last five years?

The decline in the high range budgets can be attributed to the latter stage of the implementation cycle for many institutions that made large IT investments in their EMR. After paying for the license fees and initial implementation fees to install an EMR in the first 24 months of the project, the latter stages of the EMR implementation require less capital funding, but increased operational funding. Therefore, organizations that were on the high end of the IT budget statistics for capital spending are now moving down to the mid-range for capital budget spending. But, these same organizations are having to add higher skilled IT FTEs to support these EMR environments, and therefore, their operating expenses are increasing.



Trends: PACS — Not just for the Military Anymore



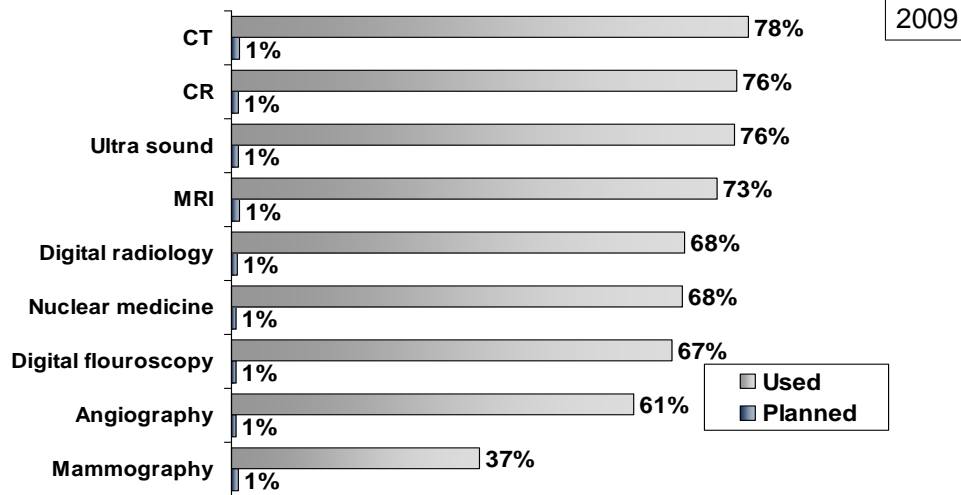
2005

■ Used
■ Planned

N=5,150
Source: HIMSS Analytics Databases



Trends: PACS — Not just for the Military Anymore



N=5,174
Source: HIMSS Analytics Databases

© 2009 HIMSS Analytics

The majority of modalities tracked in this data set are installed by more than two-thirds of the hospitals in our census study, with the exception of digital mammography, which is at 37 percent. CT is the most frequently installed modality.

PACS continues to demonstrate a rapid rate of adoption by radiology departments. This year, 75% - 80% of hospitals will have PACS implemented in the majority of their radiology applications.

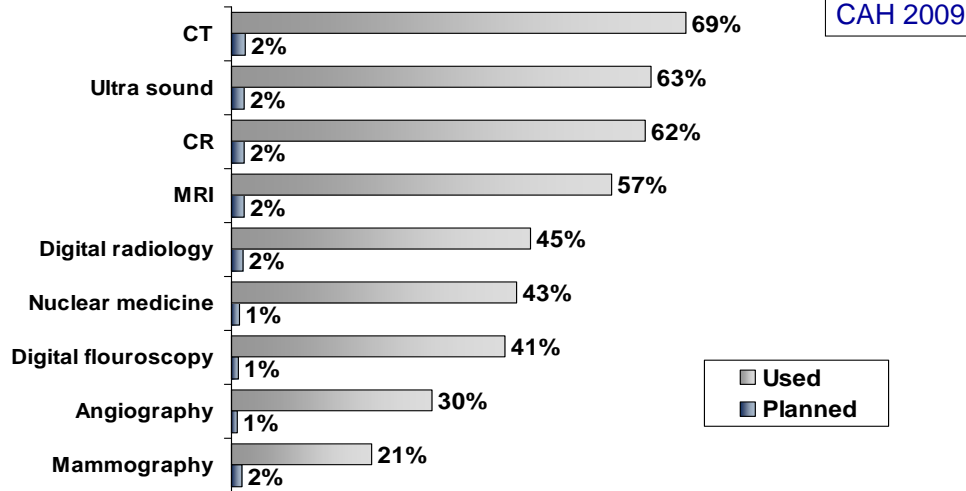
Most of the major enterprise healthcare IT vendors have PACS solutions or partners to provide PACS solutions as part of their clinical application portfolios. The top five PACS vendors at this point in time are GE Healthcare, AGFA/Gevaert, Siemens, Fujifilm Medical Systems, and McKesson.

PACS technology has begun to penetrate the cardiology service arena, but we do not anticipate the growth of the cardiology arena to approach the rapid adoption curve for another three to five years.

Integration of PACS and radiology information systems has not achieved the optimal benefits envisioned by healthcare organizations at this time. We expect improved integrated solutions over the next 24 months.



Trends: PACS — Not just for the Military Anymore



N=1,249
Source: HIMSS Analytics Databases

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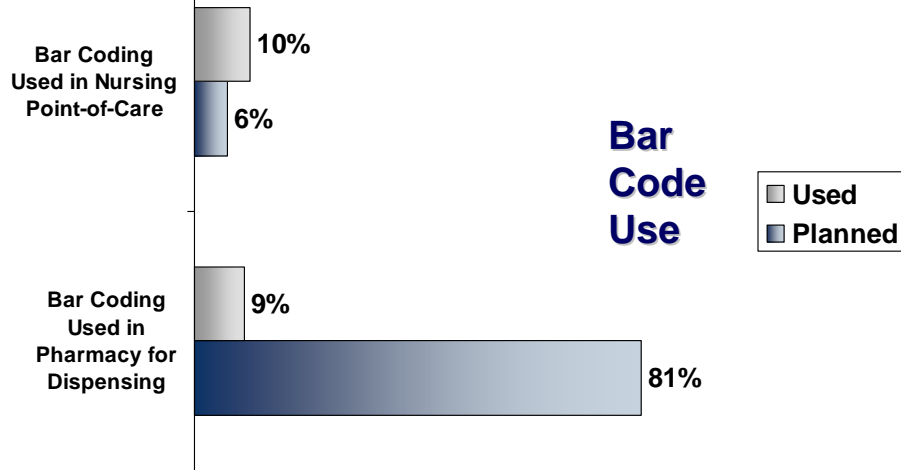
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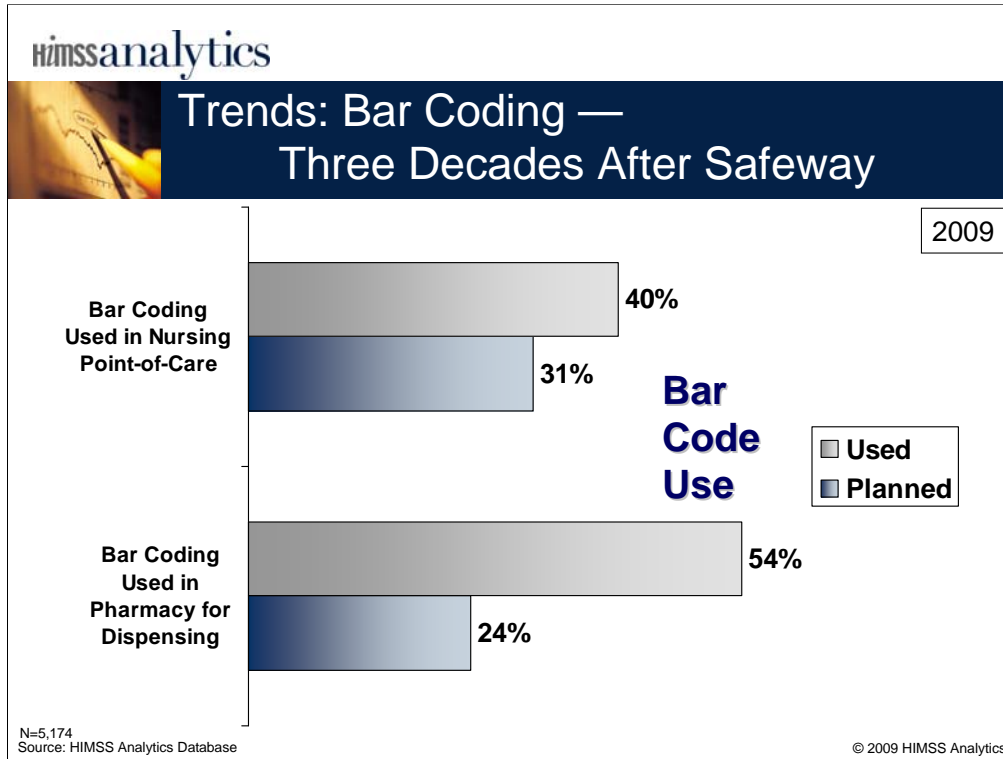
Trends: Bar Coding — Three Decades After Safeway

2005



N=5,169
Source: HIMSS Analytics Database

© 2009 HIMSS Analytics

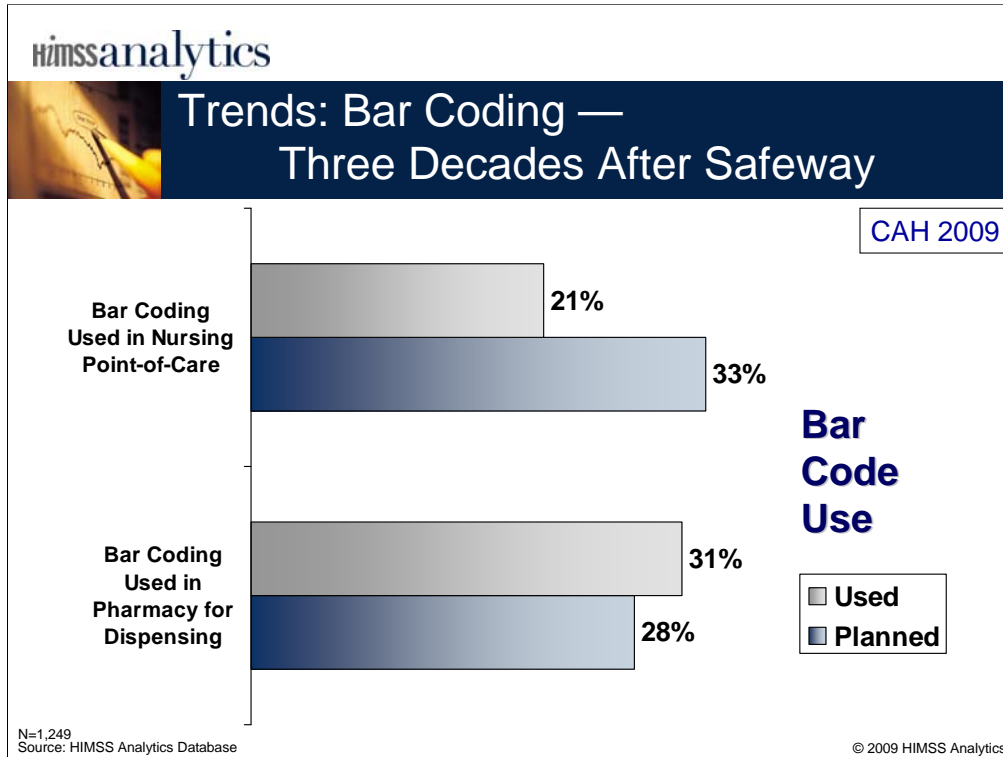


Slightly more than half of respondents presently use bar coding for medication administration. Another quarter say they will use bar coding in this area for the future. We project it will accelerate in the next several years, as the vast majority of hospitals that do not presently use bar coding in this capacity are evaluating this type of utilization.

And ironically, it's to make it "safer" for the patient! Bar coding will become another rapidly adopted technology as the FDA drives enforcement of its bar coding standard over the next three years. By 2010, bar coding becomes an embedded and required technology for patient care/patient safety applications.

The reason it has taken healthcare this long to adopt a proven technology such as bar coding, is that once again, the industry stakeholders failed to cooperate in identifying a standard. Once again, the US government enters the scene to drive us toward the use of a technology that will save lives and lower healthcare delivery costs.

Over the next 10-15 years, radio frequency technologies will displace bar coding technologies as these technologies will not only identify the patient or the medications, or the care givers; but they will also be able to track them! We'll discuss RFID in the Glimmers section of this talk.



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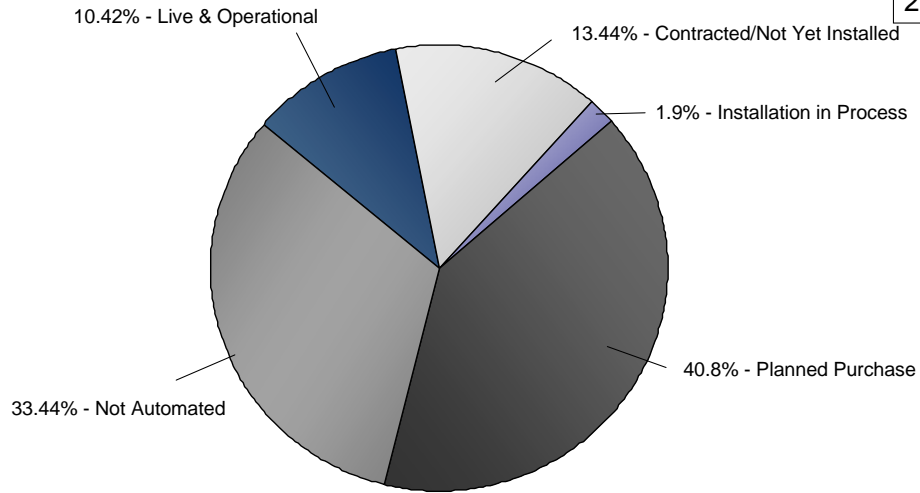
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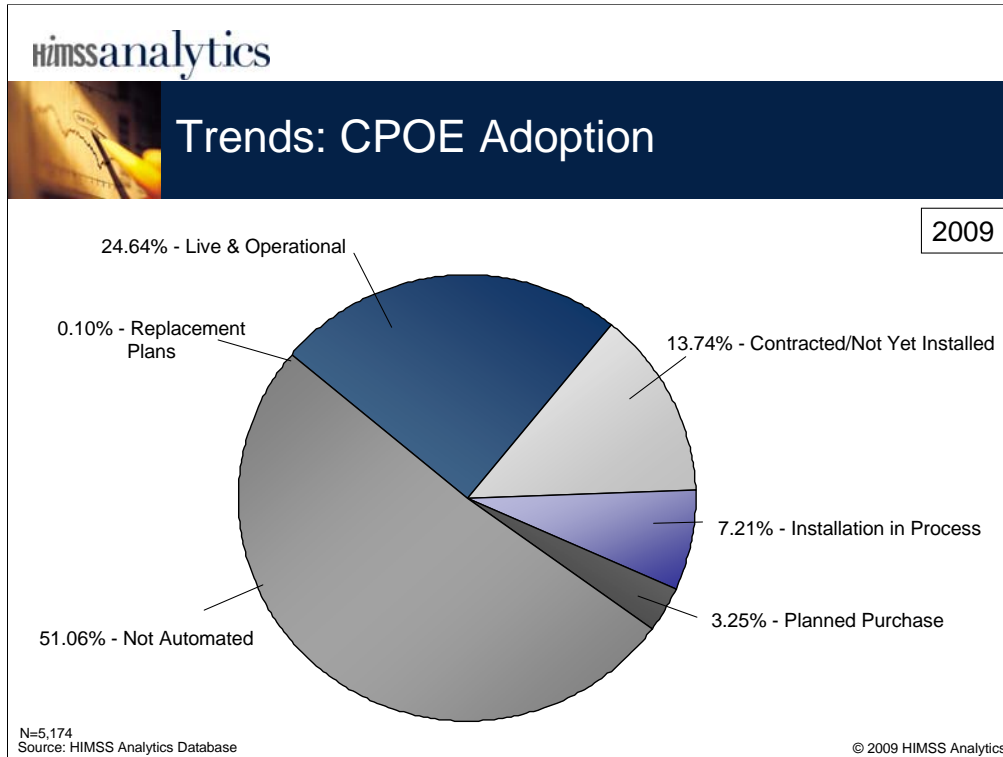
Trends: CPOE Adoption

2005



N=5,146
Source: HIMSS Analytics Database

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Market hype has not driven wide adoption of CPOE at this time, but there's enough movement to call it a "trend." Many care delivery organizations require infrastructure investments, including a nursing documentation application, before they can successfully implement CPOE.

Funding challenges and infrastructure requirements that necessitate tight integration with pharmacy and nursing medication applications will reduce the speed at which hospitals can implement an effective CPOE solution. By the 3rd quarter of 2009, approximately one-quarter of hospitals had implemented a comprehensive CPOE application that delivers the goals and objectives used to justify the funding/purchase. CPOE will become a mainstream hospital application in 2010, not in small part due to the pending "meaningful use" regulations that are part of ARRA.

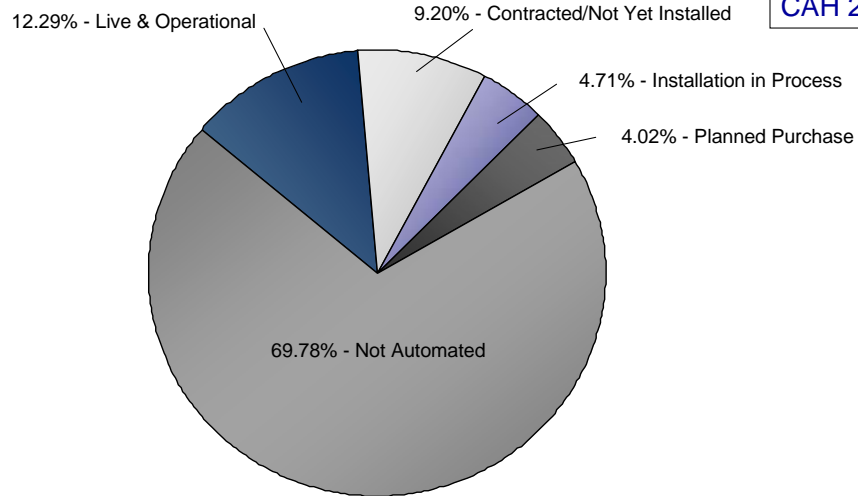
Adoption of CPOE by physicians will be driven by ease of use via an intuitive application design that minimizes the disruption of the physician's workflow. The hiring of hospitalist and intensivist physician specialists by IDS and hospital organizations will also drive the adoption of CPOE over the next five years.

All of the enterprise healthcare IT vendors have first generation CPOE application products. Because CPOE requires a stable EMR foundation to be successfully implemented, the current enterprise vendors with the largest market share of EMR foundation applications will become the leading CPOE vendors after 2010.



Trends: CPOE Adoption

CAH 2009



N=1,249
Source: HIMSS Analytics Database

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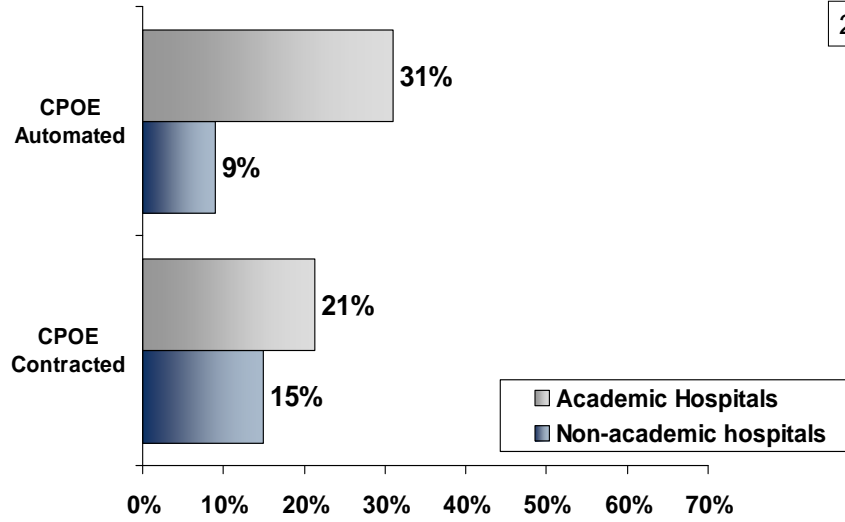
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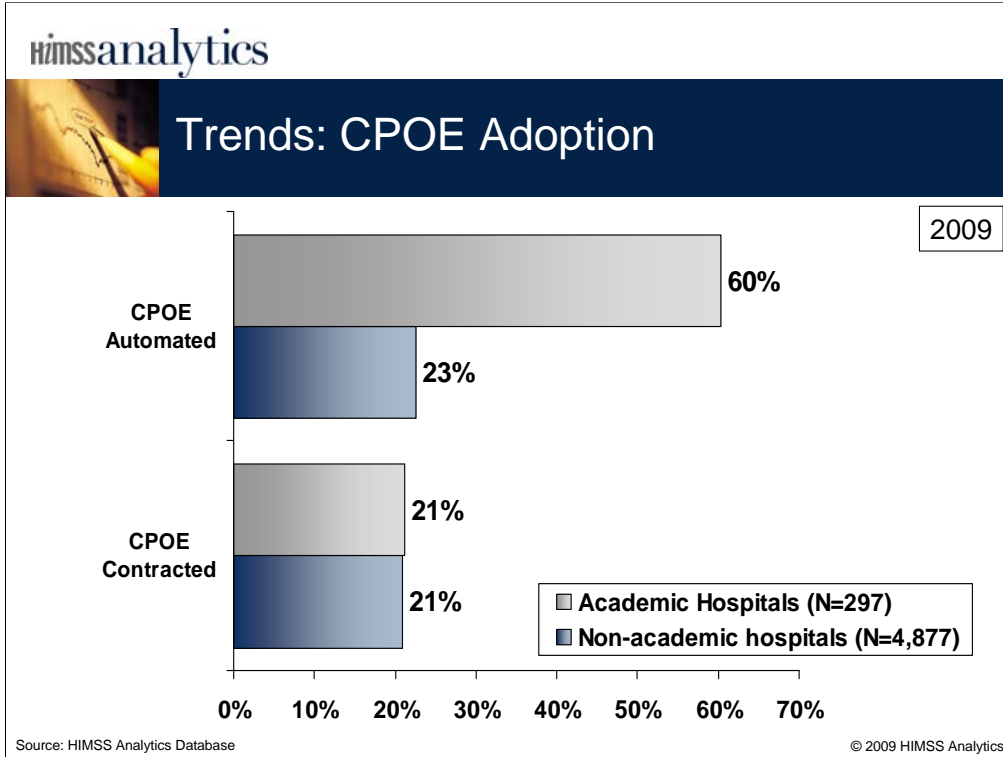
Trends: CPOE Adoption

2005



N=5134
Source: HIMSS Analytics Database

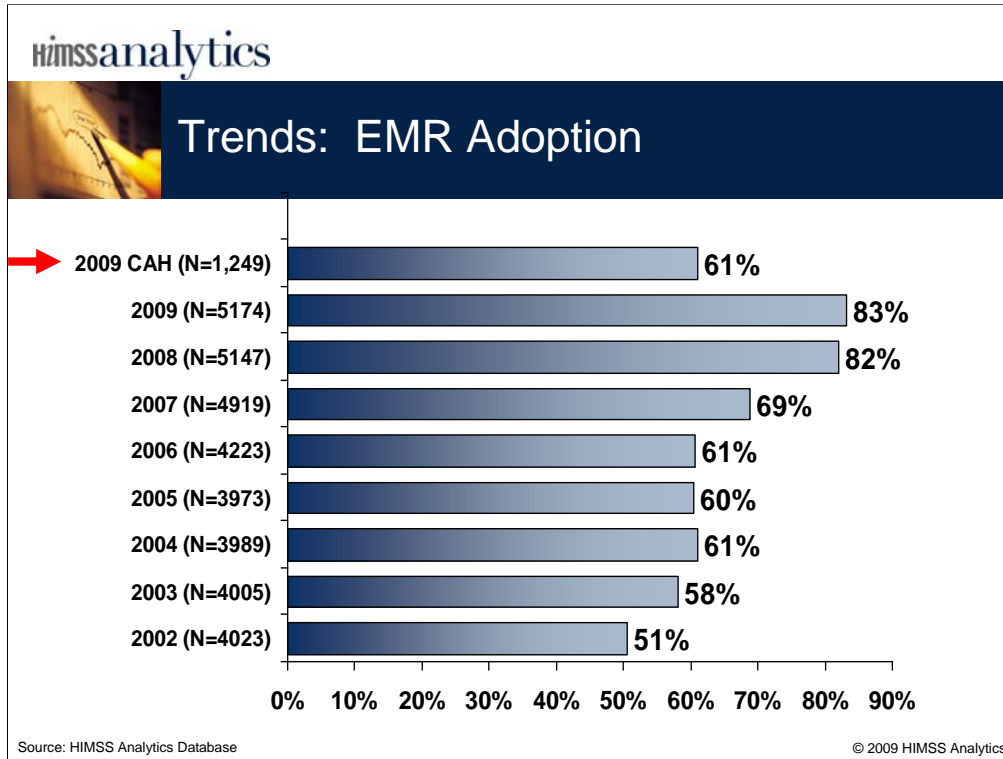
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More than half of academic/teaching hospitals use CPOE, compared to 23 percent of “non-academic” hospitals. However, non-academic hospitals appear to be gaining ground in CPOE adoption.

CPOE adoption has traditionally been higher at medical teaching facilities where residents are required to use these applications. But, the hiring of intensivists and hospitalists by hospitals and IDS organizations will begin to drive the adoption of CPOE in non-academic healthcare settings.

Newly graduated physicians and specialists are also more willing to adopt CPOE as they have been exposed to more IT applications in their training.



The majority of healthcare IT spending in acute care delivery systems is in the clinical arena after decades of spending on patient billing, accounting, materials management, and ADT systems.

The diagram on page 16 depicts the electronic medical record system components. Many care delivery organizations have clinical data repositories, orders systems, and results reporting, but very few have comprehensive clinical decision support systems supported by controlled medical vocabularies. Few also have electronic documentation for clinicians and even fewer have practitioner order entry (CPOE).

Having said all that, 83 percent of the hospitals we survey claim to have at least the beginnings of an EMR, and many more are making plans for EMR applications. It's a trend that can only accelerate with all the attention being paid to electronic health records, interoperability standards, and pay for performance reimbursement.

2008- 2009 EMR Adoption Model Trends

		2008 Final	2009 Q3
Stage 7	Medical record fully electronic; HCO able to contribute CCD as byproduct of EMR; Data warehousing/mining	0.3%	0.5%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	0.5%	1.2%
Stage 5	Closed loop medication administration	2.5%	4.8%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	2.5%	4.1%
Stage 3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	35.7%	40.4%
Stage 2	Clinical Data Repository, Controlled Medical Vocabulary, CDSS inference engine, may have Document Imaging	31.5%	29.8%
Stage 1	Ancillaries – Lab, Rad, Pharmacy – All Installed	11.5%	7.1%
Stage 0	All Three Ancillaries Not Installed	15.6%	12.1%

Source: HIMSS Analytics™ Database

N = 5,170/5,172

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Understanding the level of EMR capabilities in hospitals is a challenge, in the U.S. healthcare IT market. The EMR Adoption Model identifies the levels of EMR capabilities ranging from the initial clinical data repository (CDR) through a paperless EMR environment. HIMSS Analytics has developed a methodology and algorithms to automatically score the 5,172 U.S. hospitals, as well as the 681 Canadian hospitals in our database relative to their progress in implementing the components of an EMR and to provide peer comparisons for care delivery organizations as they strategize their path to a complete EMR and participation in electronic health record (EHR) initiatives. The stages of the model are as follows:

Stage 0: Some clinical automation may be present, but all three of the major ancillary department systems for laboratory, pharmacy, and radiology are not implemented.

Stage 1: All three of the major ancillary clinical systems (pharmacy, laboratory, radiology) are installed.

Stage 2: Major ancillary clinical systems feed data to a CDR that provides physician and other clinician access for retrieving and reviewing results. The CDR contains a controlled medical vocabulary (CMV), and the clinical decision support/rules engine (CDSS) for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage. Hospitals are able to communicate data, albeit limited, from their CDRs to health information exchanges.

Stage 3: Nursing/clinical documentation (e.g. vital signs, flow sheets) is required; nursing notes, care plan charting, and/or the electronic medication administration record (eMAR) system are scored with extra points, and are implemented and integrated with the CDR for at least one service or one unit in the hospital (could include the Operating theaters). The first level of clinical decision support is implemented to conduct error checking with order entry (i.e., drug/drug, drug/food, drug/lab conflict checking normally found in the pharmacy). Some level of medical image access from picture archive and communication systems (PACS) is available for access by physicians via the organization's intranet or other secure networks outside of the confines of the radiology department.

Stage 4: Computerized Practitioner Order Entry (CPOE) for use by any clinician is added to the nursing and CDR environment along with the second level of clinical decision support capabilities related to evidence based medicine protocols. If one patient service area (not counting the Emergency Department) has implemented CPOE and completed the previous stages, then this stage has been achieved.

Stage 5: The closed loop medication administration environment is fully implemented in at least one patient care service area. The eMAR and bar coding or other auto identification technology, such as radio frequency identification (RFID), are implemented and integrated with CPOE and pharmacy to support the five rights of medication administration (right patient, right medication, right dose, right route, right time), thereby maximizing point of care patient safety processes.

Stage 6: Physician documentation/charting (using structured templates) is implemented for at least one physician document type for at least one physician. Level three of clinical decision support provides guidance for clinician activities related to protocols and outcomes in the form of variance and compliance alerts. A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images. If a hospital has cardiology PACS or digital mammography, extra points are given.

Stage 7: Hospitals in stage 7 are completely paperless and their EMR has both discrete data and scanned document components. They are using the discrete data from the EMR to create outcomes reports, and to conduct research on outcomes and protocols so that the CDSS environment is being constantly updated and modified. Analysis of data is being done with data marts or on-line analytical processing applications that feed business intelligence tools. Hospitals at this stage can share their patient records collected in the hospital Emergency Department and hospital-based outpatient environments with inpatient units and inpatient data can be accessed and shared with ED and outpatient environments. Hospitals in this stage can also send and receive patient clinical data to other care modalities that treat the patient (that are not associated with the hospital) using the Continuity of Care Document (CCD), CDA, CCR standard or a transaction standard that is designated by their state.

2009 EMR Adoption Model Trends

		2009 Q3	2009 CAH Q3
Stage 7	Medical record fully electronic; HCO able to contribute CCD as byproduct of EMR; Data warehousing/mining	0.5%	0.0%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	1.2%	0.1%
Stage 5	Closed loop medication administration	4.8%	1.9%
Stage 4	CPOE, Clinical Decision Support (clinical protocols)	4.1%	1.9%
Stage 3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	40.4%	22.7%
Stage 2	Clinical Data Repository, Controlled Medical Vocabulary, CDSS inference engine, may have Document Imaging	29.8%	28.4%
Stage 1	Ancillaries – Lab, Rad, Pharmacy – All Installed	7.1%	13.4%
Stage 0	All Three Ancillaries Not Installed	12.1%	31.6%

Source: HIMSS Analytics™ Database N = 5,172/1,249 © 2009 HIMSS Analytics

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Regional EMRAM Numbers 3rd Q

Segment	Mean	Median	Number
Hospital Type Segment			
Academic/Teaching	3.6494	3.3220	297
NonAcademic	2.5165	2.3600	4,875
General Medical/Surgical	2.8882	3.1470	3,120
Others	2.1153	2.1730	2,052
Rural	1.7405	2.0700	1,312
Urban	2.8674	3.1470	3,860
IDS	2.8138	3.1340	3,102
Independent Hospital	2.2335	2.2100	2,070
Critical Access	1.6880	2.0390	1,294
Bed Segment			
0-100 Beds	1.9874	2.1145	2,620
101-200 Beds	2.9427	3.1600	984
201-300 Beds	3.2325	3.2520	623
301-400 Beds	3.2732	3.2520	396
401-500 Beds	3.4317	3.2670	225
501-600 Beds	3.5390	3.2640	141
600+ Beds	3.6513	3.2970	183



Regional EMRAM Numbers 3rd Q

Segment	Mean	Median	Number
Regions (U.S. Census Defined)			
East North Central	2.7763	3.1340	809
East South Central	2.4779	2.2650	446
Middle Atlantic	2.8927	3.1390	495
Mountain	2.2231	2.2350	405
New England	3.2936	3.2190	203
Pacific	2.7514	3.0720	571
South Atlantic	2.8902	3.2070	778
West North Central	2.1650	2.2100	693
West South Central	2.1760	2.1620	772
All Hospitals			
Total	2.5816	3.0640	5,172



ARRA

Stimulus Funds for Healthcare IT

\$20.8 Billion

with strings attached



General Construct of the Incentives

- Available to eligible professionals (physicians) and hospitals for the “meaningful use” of *certified* EHR technology
 - Incentives offered FY2011- 2014 for physicians
 - Incentives offered FY2011- 2015 for hospitals
 - Both will see a reduction in their Medicare reimbursements if they are not “meaningful users of certified EHR technology” by the last year
- Those that adopt first will benefit the most due to declining incentives



Key Points on “Meaningful Use”

- Requirements should be made *increasingly stringent* in three phases of two year increments
- The final phase should include four attributes:
 - A functional EMR certified by CCHIT*
 - Electronic exchange of patient data with clinical & administrative stakeholders
 - Clinical decision support providing clinicians with clinical knowledge
 - Capabilities to support process that drive improvements in patient safety, quality outcomes, and cost reductions

* or by HHS itself – still unclear



Policy Priority Categories

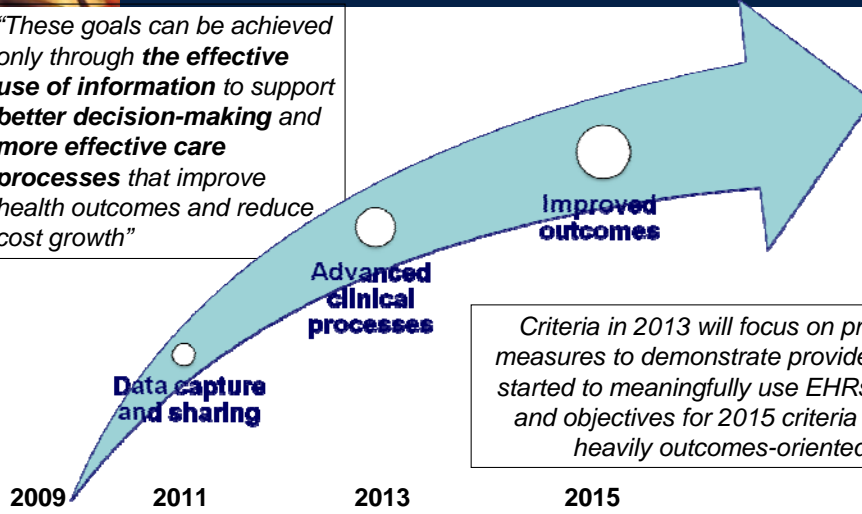
1. Improve quality, safety, efficiency and reduce health disparities
2. Engage patients and families
3. Improve care coordination
4. Improve population and public health
5. Ensure adequate privacy and security protections for personal health information

Policy Priority → Objectives → Measures



Bending the Curve Towards Transformed Health

*“These goals can be achieved only through **the effective use of information** to support **better decision-making** and **more effective care processes** that improve health outcomes and reduce cost growth”*



Criteria in 2013 will focus on process measures to demonstrate providers have started to meaningfully use EHRs. Goals and objectives for 2015 criteria will be heavily outcomes-oriented.

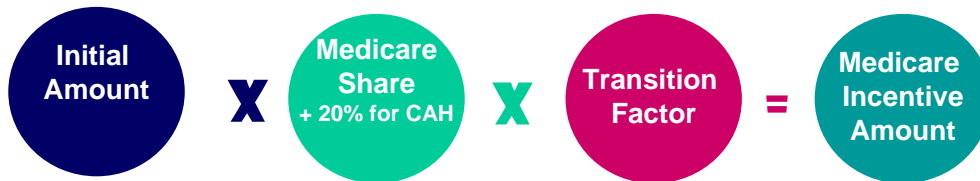
2009 **2011** **2013** **2015**

Connecting for Health, Markle Foundation “Achieving the Health IT Objectives of the American Recovery and Reinvestment Act” April 2009



Medicare Incentives for Hospitals

- Formula is Initial Amount times Medicare Share times *Transition Factor*
- “Initial Amount” is \$2M plus
 - \$200 for each discharge between the 1,150th to 23,000th discharge in a 12 month period
 - \$0 for first 1,149 discharges and \$0 for each discharge after 23,000





Phase 1 Commencing FY11

- Use objectives:
 - 10% of all orders entered by authorizing provider
 - Basic drug to drug and drug to allergy checks for all orders
 - Ability to perform e-prescribing – no target % established yet
 - Maintain an up to date problem list
 - All Lab results as structured data
- Report key basic quality measures:
 - % diabetics with A1c under control
 - % hypertensives with BP under control
 - % patients with LDL under control
 - % smokers offered smoking cessation
 - % females receiving annual mammogram



Phase 2 Commencing FY13

- Use objectives:
 - 100% of all orders entered electronically by authorizing provider
 - Use evidence based orders sets
 - Utilized closed-loop medication administration and e-MAR
 - Use CDSS at point of care for rules & alerts
 - Record clinical documentation in EHR
 - Access to PHR for all patients
- Additional quality measures:
 - % of all orders entered by authorizing care provider
 - Additional quality reports using HIT enabled NOE



Phase 3 Commencing FY15

- **Use objective:**
 - Medical device interoperability
 - Multi-media support (PACS)
 - CDSS for national high priority conditions
 - Electronic reporting on “experience of care”
- **Additional quality measures:**
 - Clinical outcome measures
 - Efficiency measures
 - Safety measures
 - Quality measures related to patient and family engagement



What Does This mean to a CIO?

Discussion of Planning Implications



IT Planning Impacts

- Do you know your EMR Adoption Model score?
 - Does the Executive Committee know your EMR Adoption Model score?
- Move aggressively to take advantage of the ARRA incentive schedule – earlier is better
 - Re-craft IT Strategic Plan to mimic the ARRA incentives
 - http://healthit.hhs.gov/portal/server.pt?open=512&objID=1325&&PageID=16490&mode=2&in_hi_userid=10741&cached=true
- Are you are within “striking distance”?



IT Planning Impacts

- Specifically:
 - CPOE
 - Start with employed physicians... is it in their contract?
 - Medicine has far more orders, will move you to 100% faster
 - The CIO cannot do this alone, must have Medical Staff driving
 - Closed Loop Medication Administration
 - Significant investment in technology and processes
 - Are you now bar coding the unit dose medications?
- HIMSS Analytics' data shows that Stages 4 & 6 have the highest costs associated
 - Significant involvement of physicians in process redesign
 - Often involve consultants in training and implementation



IT Planning Impacts

- Are you ready to generate e-prescribing?
 - Are the pharmacies in your market ready? This could be an issue in very rural areas
- Networked Medical Device interoperability
 - The ability of monitors and pumps to receive an order and to write results to the EMR
 - Are you buying the right equipment now? Is your Clinical Engineering department ready for this?
- Writing pertinent clinical results to a Personal Health Record
- Electronic submission of “the experience of care”
 - If you use an outsourced patient satisfaction vendor, be certain they can meet reporting requirements

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Thank You!

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Regional EMRAM Numbers 3rd Q

All Hospitals			
Total	2.5816	3.0640	5,172
United States			
Alaska	2.3716	3.1260	17
Alabama	2.5323	3.0700	103
Arkansas	2.1235	2.0905	84
Arizona	2.6565	3.1320	76
California	2.8452	2.2890	375
Colorado	2.4014	3.0870	83
Connecticut	3.6850	3.3530	34
District of Columbia	3.2441	3.2590	7
Delaware	3.3174	3.3160	9
Florida	2.8336	3.2440	233
Georgia	2.5715	3.1240	155
Hawaii	1.4750	2.0900	25
Iowa	2.4242	2.4400	119
Idaho	2.0865	2.1580	42
Illinois	2.8702	3.1470	196
Indiana	2.9768	3.1835	128
Kansas	1.6741	2.0775	132
Kentucky	2.6079	2.2680	106
Louisiana	2.1710	2.1090	139
Massachusetts	3.1657	3.1330	82
Maryland	3.4793	3.2590	49
Maine	3.3862	3.2440	36



Regional EMRAM Numbers 3rd Q

All Hospitals			
Total	2.5816	3.0640	5,172
United States			
Michigan	2.6937	3.0640	157
Minnesota	2.5353	3.0400	133
Missouri	2.7585	3.1840	127
Mississippi	1.9663	2.1010	95
Montana	1.1909	0.6825	56
North Carolina	2.9177	3.1920	121
North Dakota	1.5030	2.0225	44
Nebraska	1.8414	2.0700	87
New Hampshire	2.9722	3.2305	26
New Jersey	2.9416	3.2070	87
New Mexico	2.3294	2.0940	37
Nevada	2.4574	2.2560	39
New York	2.9709	3.1390	211
Ohio	2.6772	3.1365	192
Oklahoma	1.8690	2.0840	116
Oregon	2.9088	3.1320	61
Pennsylvania	2.7873	3.1320	197
Rhode Island	3.7885	3.3130	11
South Carolina	3.1018	3.2520	67
South Dakota	1.5108	2.0300	51
Tennessee	2.6837	3.0855	142
Texas	2.2701	2.2250	433
Utah	2.2115	2.1455	46
Virginia	3.2879	3.2520	86
Vermont	3.0616	3.2115	14
Washington	2.6825	3.1920	93
Wisconsin	2.6872	2.4475	136
West Virginia	2.4135	2.3950	51
Wyoming	2.3489	2.2045	26

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