EVALUATION OF AN ELIGIBLE HOSPITAL'S ELECTRONIC HEALTH RECORD BUILD AND IMPLEMENTATION WITH RESPECT TO STAGE 2 MEANINGFUL USE REQUIREMENTS

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CERTIFICATE OF APPROVAL

This is to certify that the Master's Capstone Project of

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1 Abstract

Objectives: Hospitals are facing increasing pressures for the rapid adoption and implementation of Electronic Health Records (EHRs), as well as regulatory requirements to meeting certain 'meaningful use' standards. The objective of this project was to evaluate a specific hospital's EHR implementation, and assess the considerations and changes necessary for the hospital to address Stage 2 meaningful use requirements.

Methods: This project assessed a single not-for-profit regional referral center with respect to its EHR implementation, and the requirements for it to meet the Stage 2 Eligible Hospital meaningful use objectives and measures.

Results: A detailed assessment of the hospital's current EHR implementation was made regarding the 16 core and 6 menu set objectives for Stage 2 Meaningful Use, as well as their associated measures. Current hospital performance was assessed, based upon available reports from the EHR system, and workflows were evaluated. Five of the 16 core objectives were defined as 'high effort' due to the requirement for additional EHR build, lack of clarity regarding how the EHR will be reporting against these measures with respect to nursing and provider workflows, or the requirement to engender behavior change in patients or with providers who are not associated with the hospital's ambulatory EHR implementation.

Conclusions: Hospitals should not assume that the successful implementation of Stage 1 meaningful use criteria allow Stage 2 implementations to occur with minimal work effort. The lack of clarity regarding exact EHR implementation and reporting methodologies for Stage 2 meaningful use are leading to a delay in actionable information. In addition, the

requirement for hospitals to engender behavior changes in patients, current inpatient medical staff, as well as referral physicians who are not affiliated with the hospital's ambulatory EHR greatly increase the complexity and risk associated with meeting Stage 2 meaningful use requirements.

2 Introduction

2.1 Background

Hospitals in the United States have recently undergone enormous pressure to rapidly adopt and use health information technology in clinical practice. This rapid adoption, and the pace of new and more expansive regulatory requirements, has pushed hospitals to implement health information technology (HIT) in clinical settings that were recently devoid of such tools.

The adoption of HIT by an organization is complex, both from a technical computer science standpoint as well as from the requirement to understand clinical requirements and workflows. In addition, there are complex human behavioral issues that can arise in these organizational systems. It is such complex systems, where the balances of regulatory requirements, system capabilities, clinical medicine, and organizational behavior collide, that informaticists can be most helpful in creating successful outcomes.

This Capstone project is an investigation of a single hospital, and the requirements it is currently facing in transitioning to the next stage of regulatory requirements in federal fiscal year 2014; otherwise known as Stage 2 of 'meaningful use.' This hospital has already successfully attested to meeting Stage 1 of meaningful use, and is now facing a breadth of new requirements that it must accomplish over the next one and a half calendar years.

This project reviews the high level requirements for any organization to attest to meeting Stage 2 meaningful use, and then specifically addresses each of the objectives and measures that this hospital needs to potentially meet. By reviewing current performance and current

workflows this project is designed to provide a high level 'roadmap' of where the organization needs to prioritize its efforts and limited resources over the subsequent 18 months.

There are many unknowns for any healthcare organization that is peering forward towards practices more than a year away; not the least of which is how their electronic health record (EHR) vendor is going to modify its product to meet certification requirements. In addition, each vendor independently decides how it going to measure behaviors within its own system, in order to produce reports for providers and organizations regarding whether they have met the 'meaningful use' requirements. As we will find it is often the EHR's report design that drives subsequent workflow modifications and organizational decisions, rather than the verbiage of federal regulation.

2.2 American Reinvestment and Recovery Act of 2009 and the HITECH Act

The American Reinvestment and Recovery Act of 2009 (ARRA of 2009) was signed into law (Public Law 111-5) in February of 2009 as a federal economic stimulus package. [**1**] Title XIII and title IV of division B of that act are referred to as the Health Information Technology for Economic and Clinical Health Act, or HITECH act.

Among a number of items, the HITECH act changed the landscape of Healthcare Information Technology (HIT). The HITECH act has greatly supported the adoption of HIT by creating an infrastructure for the development, approval and implementation of HIT standards, a new process for certifying HIT as meeting those standards, as well as amendments to the Social Security Act to influence the Inpatient Prospective Payment

System (IPPS) to award healthcare organizations and individual providers for adopting and demonstrating 'meaningful use' of certified HIT. In addition, by eventually penalizing those organizations and providers who do not demonstrate meaningful use of certified HIT, the HITECH act has essentially mandated such adoption.

On July 28, 2010 the Centers for Medicare and Medicaid Services published a final rule for the implementation of the incentive payments to providers and physicians established in the HITECH act. This rule, called the 'Medicare and Medicaid Programs; Electronic Health Record Incentive Program' [**2**] established the regulations under which both incentives and penalties would be imposed for the adoption and meaningful use of certified HIT; or the failure thereof. This final rule is commonly called the 'Stage 1 Meaningful Use' rule, due to the fact that in this rule the certification and 'meaningful use' definitions were discussed as being implemented in at least three stages over time, where this rule clearly defined the requirements, incentives and timeline for meeting Stage 1.

In this same edition of the Federal Register, the initial standards, specifications and certification criteria for HIT were defined in the final rule entitled 'Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology'. [**3**]

On September 4, 2012 the final rules for Stage 2 of the Electronic Health Record Incentive Program were published in the Federal Register, entitled 'Medicare and Medicaid Programs; Electronic Health Record Incentive Program – Stage 2' [**4**] and 'Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the

Permanent Certification Program for Health Information Technology; Final Rules'. [**5**] In addition to defining the objectives and measures for Stage 2 of meaningful use, these rules also amended the timeline for implementation of Stage 2 of the incentive program extending the adoption requirement for Stage 2 to federal fiscal year (FY) 2014 for hospitals that originally attested to Stage 1 meaningful use in FY2011 or FY2012, and also made amendments to some of the measures and definitions for meeting the Stage 1 meaningful use objectives.

2.3 Timeline for meaningful use attestation

The Electronic Health Record Incentive Program specifically addresses 'Eligible Hospitals' (EHs), Critical Access Hospitals (CAHs) and 'Eligible Providers' (EPs). The current definitions for these terms can be found in the Code of Federal Regulations (CFR), and are briefly summarized below:

> **Qualifying Eligible Hospital:** 42 CFR 495.100 "a hospital subject to the prospective payment system specified in § 412.1(a)(1) of this chapter, excluding those hospitals specified in § 412.23 of this chapter, and excluding those hospital units specified in § 412.25 of this chapter." [**6**] and "that is a meaningful EHR user for the EHR reporting period for a payment year."
>
> **Qualifying Critical Access Hospital:** 42 CFR 495.4 "a facility that has been certified as a critical access hospital under section 1820(e) of the Act and for which Medicare payment is made under section 1814(l) of the Act for inpatient services and under section 1834(g) of the Act for outpatient services." [**7**] and 42 CFR

495.100 "that is a meaningful EHR user for the EHR reporting period for a cost reporting period beginning during a payment year."

Qualifying Eligible Providers: 42CFR 495.100 "a physician as defined in section 1861(r) of the *[Social Security]* Act, which includes, with certain limitations, all of the following types of professionals: (1) A doctor of medicine or osteopathy, (2) A doctor of dental surgery or medicine, (3) A doctor of podiatric medicine, (4) A doctor of optometry, (5) A chiropractor." and "who is a meaningful EHR user for the EHR reporting period for a payment year and who is not a hospital-based EP, as determined for that payment year."

These definitions will slightly change November 5, 2012 due to amendments to CFR 495.100, however the text of these changes is not significant. [**8**]

This project focuses on the requirements for meeting meaningful use for EHs and CAHs. The objectives, measures and timelines for EHs and CAHs are the same for Stage 1 and Stage 2 of meaningful use. The objectives, measures, requirements and timelines for EPs are different for each of these stages, and will not be addressed here.

The current timelines and requirements for EHs and CAHs for meaningful use stages are demonstrated in the figure 1 below, based upon the first payment year for federal incentives. The earliest an EH or CAH could attest to meaningful use of certified EHR technology was for FY2011, thus the earliest any EH or CAH may attest to Stage 2 of meaningful use will be FY2014.

TABLE 3—STAGE OF MEANINGFUL USE CRITERIA BY FIRST PAYMENT YEAR

First payment year	Stage of meaningful use										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
2011	1	1	1	*2	2	3	3	TBD	TBD	TBD	TBD
2012		1	1	*2	2	3	3	TBD	TBD	TBD	TBD
2013			1	*1	2	2	3	3	TBD	TBD	TBD
2014				*1	1	2	2	3	3	TBD	TBD
2015					1	1	2	2	3	3	TBD
2016						1	1	2	2	3	3
2017							1	1	2	2	3

*3-month quarter EHR reporting period for Medicare and continuous 90-day EHR reporting period (or 3 months at state option) for Medicaid EPs. All providers in their first year in 2014 use any continuous 90-day EHR reporting period.

Figure 1: Excerpt from 77 FR 53917, Table 3 [**9**]

2.4 Financial implications for hospitals

The adoption of certified EHR technology (CEHRT) by hospitals is an extremely expensive proposition. The Electronic Health Record Incentive program is designed to provide an incentive for organizations to rapidly adopt and demonstrate meaningful use of CEHRT. In addition, this incentive is quickly phased out, and ultimately penalties are emplaced for organizations that fail to demonstrate meaningful use of CEHRT.

In the Electronic Health Record Incentive Program organizations are eligible for both Medicare and Medicaid incentives. The incentive formulas for EHs are explicitly described in the Stage 1 final rule, and are briefly summarized below. [**10**] CAHs have a different reimbursement formula, which is available for review in the final rule.

> **Medicare:** The Medicare incentive for an EH is calculated based upon the number of total discharges ($2,000,00 plus $200 for every discharge between the 1,150th and 23,000th), the fraction of their inpatient bed days that are attributable to Medicare and Medicare managed care beneficiaries, and the fraction of the overall hospital charges that are attributed to charity care. These are placed in a formula and a

transition factor is then applied, depending upon the year for which the incentive is received (1 for year one, ¾ for year 2, ½ for year three, and ¼ for year 4). The last year a hospital may receive an incentive payment is for FY2016, and the last year they may initially attest to meeting meaningful use for an incentive is FY2015. Thus, any hospital that attests to meaningful use for the first time after 2013 will use transition factors as if they had first attested for FY2013.

TABLE 14: Transition Factor for Medicare FFS Eligible Hospitals

Fiscal Year	Fiscal Year that Eligible Hospital First Receives the Incentive Payment				
	2011	2012	2013	2014	2015
2011	1.00	------	------	------	------
2012	0.75	1.00	------	------	------
2013	0.50	0.75	1.00	------	------
2014	0.25	0.50	0.75	0.75	------
2015	------	0.25	0.50	0.50	0.50
2016	------	------	0.25	0.25	0.25

Figure 2: Excerpt from 75 FR 44460, Table 14 [**11**]

Based upon the formula, the maximum year one incentive payment (for a hospital that sees 100% Medicare patients and 23,000 inpatient discharges per year) is $6,370,000; with an aggregate maximum of $15,925,000 from the Medicare incentive program for four incentive years, if first attesting in FY2011, FY2012 or FY2013.

Medicaid: For an EH to qualify for the Medicaid incentive they must have at least 10% of their inpatient volume attributable to Medicaid patients. The formula to calculate Medicaid incentives is essentially identical to that of the Medicare incentive program, simply substituting Medicaid and Medicaid managed care

inpatient days for those of Medicare. [**12**] Hospitals may qualify for both the Medicare and Medicaid incentive programs.

In FY2015 and onwards, EHs will be susceptible to a penalty for failing to demonstrate meaningful use of CEHRT. This penalty will be implemented as a reduction in EHs Medicare market basket updates of ¼, ½ and ¾ in FY2015, FY2016 and FY2017 and onwards respectively. The market basket update for FY2013 is 2.8%, so as an example if this were 2017 and a hospital failed to meet meaningful use, that hospital would have a ¾ reduction in their market basket update of 2.8%. In that case, the hospital would only receive a 0.7% increase as opposed to a 2.8% increase in payment for that fiscal year. A fact sheet describing the market basket update, and specifically the effects of the August 1, 2012 final rule regarding the Inpatient Prospective Payment System for FY213, is available on the Centers for Medicare and Medicaid Services (CMS) website. [**13**]

2.5 Kadlec Regional Medical Center

Kadlec Regional Medical Center is a 270 licensed inpatient bed acute care hospital in southeastern Washington State. As part of the Kadlec Health System, the hospital is a regional referral center for northeastern Oregon and southeastern Washington. Kadlec Health System is comprised of both a Medical Center, as well as a large ambulatory care clinic system, a neuroscience center, and other associated entities.

In 2010 Kadlec Health System decided to make the transition from it's then state of disparate EHRs to a single enterprise system, and chose to use Epic as it's new enterprise EHR. At that time the health system was using the GE Centricity EHR in its ambulatory

clinics, and the McKesson Horizon products for inpatient nursing care, as well as for financial and operational processes. The inpatient providers were documenting on paper, and order entry was on paper. The Emergency Department was using T-System EV for nursing and provider documentation, as well as for CPOE.

The transition to Epic started in November, 2010 with validation and build processes, and culminated in an ambulatory clinic 'go live' in August 2011, and an Inpatient 'go live' in November 2011.

Kadlec Health System went live with the Epic 2010 version, and is currently still on that version. The Epic 2012 version has just recently been released for general use, but has not yet been adopted by the medical center.

2.6 Methods

This project was undertaken with the approval of the Chief Information Officer for Kadlec Regional Medical Center, as well as with approval of the Epic Corporation. [**14**] It involved an evaluation of the current build and implementation of Epic version 2010 at Kadlec Regional Medical Center including: (a) personal experience during the year long validation and build of the EHR as part of Kadlec's implementation team, (b) discussions and interviews with Kadlec system analysts, (c) review of documentation from Epic in regard to both the system functionality, meaningful use report design, meaningful use report configuration, and system updates, (d) review of current and prior legislative and regulatory materials regarding meaningful use, and (e) evaluations of current clinical workflows where appropriate.

Initial assessments of the performance and workflows for Kadlec Regional Medical Center for each of the EH core and menu set objectives for Stage 1 meaningful use was performed, followed by a subsequent analysis of the Notice of Proposed Rulemaking for Stage 2 of the Electronic Health Record Incentive Program [**15**] and how those proposed rules would introduce new requirements for the organization. Subsequent to that proposed rulemaking, the final rules were published on September 4, 2012 in the Federal Register. A final analysis was performed, taking into account these final rules; and the resultant analysis is the body of this document.

This project was drafted with the intent to develop an understanding of the complexity and work effort this single organization will be facing in order to meet Stage 2 of meaningful use, as well as to assist in providing a roadmap or guide to the initial commitment of the limited organizational resources in the pursuit of this goal.

3 Meaningful Use for Eligible Hospitals

3.1 Certified EHR Technology

3.1.1 Definition

In order to meet the meaningful use requirements, an EH must be using CEHRT. The technical specifications for Stage 1 meaningful use for CEHRT are published in the final rule entitled 'Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology'. [3] The Stage 2 meaningful use requirements for CEHRT are published in the September 4, 2012 final rule entitled 'Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the Permanent Certification Program for Health Information Technology; Final Rules'. [5]

The ARRA of 2009, HITECH act, and their resulting regulations created the current infrastructure for testing and certification of HIT. The program was previously called the Permanent Certification Program, and has recently changed its name to the ONC HIT Certification Program. An overview of that process is available on the HealthIT.gov website [**16**], and is summarized here:

> Standards for CEHRT are defined and created by the Secretary of Health and Human Services, and published in the federal rulemaking process. The National Institute of Standards and Technology (NIST) developed the 2011 (Stage 1) testing requirements, tools and use cases for the HIT certification program in collaboration with the ONC. NIST has also developed the initial drafts of testing requirements and

use cases for the 2014 (Stage 2) certification program in collaboration with ONC. [**17**,**18**]

The National Voluntary Laboratory Accreditation Program (NVLAP) is the Accreditation Body for Test Labs for the Permanent Certification Program. It accredits test laboratories to test EHR technology under the program, against the approved testing requirements and use cases, and using the approved tools. Currently certified Accredited Testing Laboratories (ACLs) are [**19**]

InfoGard Laboratories, Inc

SLI Global Solutions, Inc

Certification Commission for Health Information Technology (CCHIT)

ICSA Labs

Drummond Group EHR Test Lab

Currently the American National Standards Institute (ANSI) is the ONC – Approved Accreditor for certification bodies. ANSI accredits certification bodies, which may then apply to the ONC to become an ONC – Authorized Certification Body (ONC-ACB). Once approved, ONC-ACBs have authorization to certify successfully tested EHR technology under the ONC HIT Certification Program. Currently certified ONC-ACBs are [**20**]

ICSA Labs

InfoGard Laboratories, Inc

Certification Commission for Health Information Technology (CCHIT)

Drummond Group

Orion Register, Inc

A diagram of the current testing and certification structure is presented in figure 3 below:

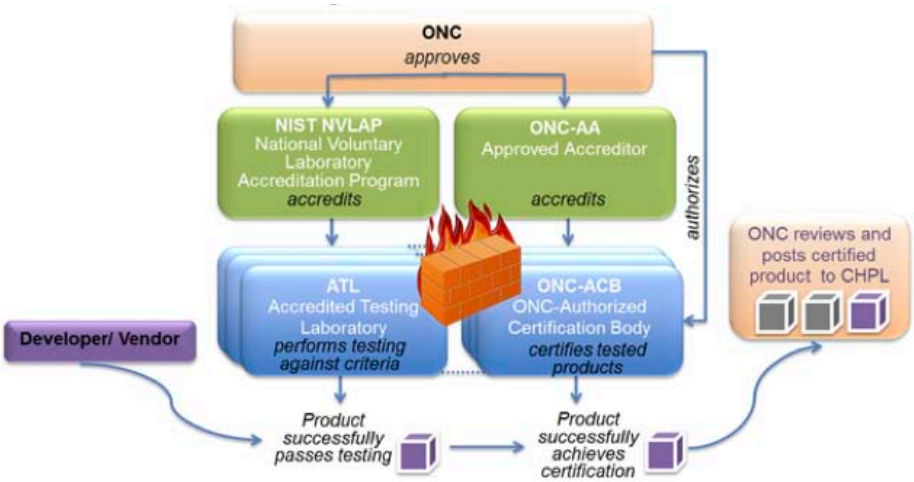


Figure 3, Excerpt from [**21**]

3.1.2 Epic and certification

Kadlec Health System implemented Epic (Version 2010) in November of 2011 for hospital use. The Epic 2010 version has been certified as a Complete EHR by CCHIT, their chosen ONC-ACB, for both Inpatient [**22**] and Ambulatory [**23**] settings, thus the health system met the first mandatory step in being able to attest for the Electronic Health Record Incentive Program, which is the use of CEHRT.

The next mandatory step, in order to attest and be able to qualify for incentives, is to become a 'Meaningful User' of the CEHRT. Kadlec attested for Meaningful Use for FY2012, based upon both the use of CEHRT, as well as being a 'meaningful user' of that technology.

3.2 Meaningful Use

3.2.1 Stage 1 Core and Menu Objectives for Eligible Hospitals

In order to be a 'Meaningful User' of CEHRT, and be able to attest to meeting Stage I of meaningful use, EHs and CAHs have to satisfy a core set of objectives and measures, as well as selected 'menu set' objectives and measures. The Stage 1 core objectives for EHs and CAHs are listed below. Every core objective must be satisfied by the hospital, and each objective has one or more measures that must be accomplished in order to satisfy the objective.

Core Stage 1 EH and CAH Objectives: [**24**]

1. Use CPOE for medication orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines
2. Implement drug-drug and drug-allergy interaction check
3. Record demographics

    - preferred language
    - gender

- race
- ethnicity
- date of birth
- date and preliminary cause of death in the event of mortality in the eligible hospital or CAH

4. Maintain an up-to-date problem list of current and active diagnoses
5. Maintain an active medication list
6. Maintain an active medication allergy list
7. Record and chart changes in vital signs

    - Height
    - Weight
    - Blood pressure
    - Calculate and display BMI
    - Plot and display growth charts for children 2-20 years, including BMI

8. Record smoking status for patients 13 years old or older
9. Implement one clinical decision support rule related to a high priority hospital condition along with the ability to track compliance with that rule
10. Report hospital clinical quality measures to CMS or the States
11. Provide patients with an electronic copy of their health information (including diagnostic test results, problem list, medication lists, medication allergies, discharge summary, procedures), upon request

12. Provide patients with an electronic copy of their discharge instructions at time of discharge, upon request
13. Capability to exchange key clinical information (for example, discharge summary, procedures, problem list, medication list, medication allergies, diagnostic test results), among providers of care and patient authorized entities electronically
14. Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities.

EHs and CAHs also have to meet five of the 10 menu set objectives, each of which as one or more measures that must be accomplished in order to satisfy the objective. The menu set objectives are listed here: [**25**]

1. Implement drug-formulary checks
2. Record advance directives for patients 65 years old or older
3. Incorporate clinical lab-test results into certified EHR technology as structured data
4. Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research or outreach
5. Use certified EHR technology to identify patient-specific education resources and provide those resources to the patient if appropriate
6. The EP, eligible hospital or CAH who receives a patient from another setting of care or provider of care or believes an encounter is relevant should perform medication reconciliation

7. Each EP, eligible hospital or CAH who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide a summary of care record for each transition of care or referral
8. Capability to submit electronic data to immunization registries or Immunization Information Systems and actual submission in accordance with applicable law and practice
9. Capability to submit electronic data on reportable (as required by state or local law) lab results to public health agencies and actual submission in accordance with applicable law and practice
10. Capability to submit electronic syndromic surveillance data to public health agencies and actual submission in accordance with applicable law and practice.

3.2.2 Stage 2 Core and Menu Objectives for Eligible Hospitals

On September 4, 2012 the requirements to meet Stage 2 of meaningful use were published. These included the core and menu set objectives for hospitals to achieve, the technology and functional requirements for EHRs to become 2014 CEHRT, as well as updates to the definition of being a 'meaningful user' of CEHRT.

Below is a list of the 16 core and six menu set objectives for Stage 2 meaningful use for EHs. Each objective has one or more measures that must be satisfied in order to accomplish the objective.

Core Stage 2 EH and CAH Objectives: [4]

1. Use CPOE for medication, laboratory and radiology orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines
2. Record the following demographics

    - preferred language
    - sex
    - race
    - ethnicity
    - date of birth
    - date and preliminary cause of death in the event of mortality in the eligible hospital or CAH

3. Record and chart changes in vital signs

    - Height
    - Weight
    - Blood pressure (age 3 and over)
    - Calculate and display BMI
    - Plot and display growth charts for children 2-20 years, including BMI

4. Record smoking status for patients 13 years old or older
5. Use clinical decision support to improve performance on high-priority health conditions

6. Incorporate clinical lab-test results into Certified EHR Technology as structured data
7. Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, or outreach.
8. Automatically track medications from order to administration using assistive technologies in conjunction with an electronic medication administration record (eMAR).
9. Provide patients the ability to view online, download, and transmit information about a hospital admission.
10. Use Certified EHR Technology to identify patient-specific education resources and provide those resources to the patient.
11. The eligible hospital or CAH who receives a patient from another setting of care or provider of care or believes an encounter is relevant should perform medication reconciliation
12. The eligible hospital or CAH who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide a summary of care record for each transition of care or referral
13. Capability to submit electronic data to immunization registries or Immunization Information Systems and actual submission in accordance with applicable law and practice
14. Capability to submit electronic reportable laboratory results to public health agencies, except where prohibited, and in accordance with applicable law and practice

15. Capability to submit electronic syndromic surveillance data to public health agencies, except where prohibited, and in accordance with applicable law and practice
16. Protect electronic health information created or maintained by the certified EHR technology through the implementation of appropriate technical capabilities.

Menu Set Stage 2 EH and CAH Objectives: [26]

1. Record whether a patient 65 years old or older has an advance directive
2. Imaging results consisting of the image itself and any explanation or other accompanying information are accessible through Certified EHR Technology
3. Record patient family health history as structured data
4. Generate and transmit permissible discharge prescriptions electronically (eRx)
5. Record electronic notes in patient records
6. Provide structured electronic lab results to ambulatory providers

4 Kadlec Regional Medical Center and the Transition to Stage 2 Meaningful Use

This project examines Kadlec Regional Medical Center's current Epic 2010 build, implementation and workflows with respect to meeting the Stage 2 meaningful use requirements of the Electronic Health Record Incentive Program.

Each objective and measure for Stage 2 meaningful use is evaluated, and changes of those measures and objectives with regard to Stage 1 meaningful use requirements are addressed. The current software implementation and the organizational performance against the EH Stage 1 meaningful use requirements is assessed, and where possible an assessment of

workflow changes or decisions necessary to meet the Stage 2 meaningful use requirements is delineated.

4.1 Denominators for Measures

Stage 2 meaningful use regulations continue the practice of the Stage 1 rules, allowing hospitals to select one of two methods of counting patients in the denominator for most measures. [**27**] These methods are commonly called the 'observation services' method and the 'all emergency department' method.

> Observation services method: "… includes all patients admitted to the inpatient department (POS 21) either directly or through the emergency department and patients who initially present to the emergency department (POS 23) and receive observation services." **[27**] Observation services are defined in the Medicare Benefit Policy Manual.
>
> All Emergency Department method: "…includes all patients admitted to the inpatient department (POS 21) either directly or through the emergency department and all patients receiving services in the emergency department (POS 23)." **[27]**

The Stage 1 meaningful use rules provided two methods for EHs and CAHs to calculate the denominator for patients because they recognized that some of the objectives and measures may not be relevant to all emergency department encounters; and thus provided a way for individual hospitals to make their own decision.

On initial evaluation with Kadlec Regional Medical Center it appeared to be in a hospital's interest to pursue using the 'All Emergency Department' method for Stage 1 Meaningful User reporting. This was based upon the following observations:

- The Emergency Department was felt to be the department that would have the least transitional issues when moving to Epic. The emergency department was the only department of the hospital, prior to the implementation of Epic, which was performing electronic physician documentation, electronic nursing documentation, and CPOE. The remainder of the hospital was using paper and dictation for physician notes, and handwritten orders.
- The emergency department had an annual volume of approximately 60,000 patients per year, with an overall admission rate (inpatient and observation patient) of 16%. Admissions from the emergency department then accounted for approximately 50% of all hospital admissions.
    - Using the 'observation services method' the emergency department would influence approximately 50% of the denominator for most EH measures
    - Using the 'all emergency department method' the emergency department would influence 93.5% of the denominator for most EH measures
- By focusing on the processes and methodologies for patients within the emergency department, and aggressively managing workflows and optimizing user interfaces and clinical decision support, the hospital would much more likely achieve success

- The hospital would be able to work within one department, and only need to influence the behavior of a small percentage of the active medical staff (~8%)
- The hospital would only have to critically evaluate and adjust the behavior of a small percentage of its nursing staff

Kadlec Regional Medical Center went forward with its initial intent to use the 'all emergency department' method for attestation for meaningful use, however discovered late into the process that this was not going to be possible without significant customization and maintenance of reports within Epic.

The current Epic 2010 reporting methods for meaningful use do not support EHs using the 'all emergency department' denominator, and instead require hospitals to use the 'observation services' denominator. [**28**] As hospitals are going to use these reports to prove to justify their attestations to CMS, should they be audited, it is absolutely incumbent upon them to be able to rely on these reports. The requirement to internally build, maintain and validate reports by using the 'all emergency department' method for calculating the patient denominator for measures was essentially too risky for the organization to adopt. In that same communication Kadlec was informed that "There is currently no plan to develop that option because of the hours involved and that it would most likely cause the MU reports to take about twice as long to run."

Kadlec Regional Medical Center is currently using the 'observation services' method to calculate patient denominators for Stage 1 meaningful use; and it is anticipated that this will continue for Stage 2 meaningful use unless Epic changes it's reports and provides native support for use of the 'all emergency department' method. In the following section during the discussion of Kadlec Regional Medical Center's performance against Stage 1 meaningful use requirements, all measures of current performance are using the 'observation services' method.

4.2 Stage 2 Definition of a Meaningful User

In Stage 2 of the Electronic Health Record Incentive Program the definition of a 'Meaningful User' was modified to include the requirement successfully report clinical quality measures selected by CMS in a format and manner selected by CMS. [**29**] Due to this, the prior objectives and measures related to reporting of quality measures have been removed. The requirement to submit clinical quality measures (CQMs) for FY2014, however, has expanded with a total of 29 electronic CQMs for EHs, with 17 of these measures being new. [**30**]

This ongoing CQM requirement is a simple 'Yes' or 'No' attestation, related to the configuration of reports provided by Epic against a body of clinical quality measures. Hospitals are not currently ranked, graded or incentivized by the results of these reports; nor is that proposed for FY2014. Hospitals do have a number of CQMs publically reported through CMS, however those metrics are currently manually abstracted from hospital charts and not based upon automated reporting.

In order to be certified to 2014 standards, the 2010 version of Epic will be required to report against the mandatory CQM measures. Kadlec's work effort regarding this process will be the configuration of selected new CQM reports.

The attestation of success for meaningful use is related to the reports running and being able to report these measures. Meaningful use does not require a comparison of the electronically derived data to that of manually abstracted charts, nor the alteration of workflows or EHR implementation to intentionally improve automatic capture of data. Due to these facts, the CQM requirement to meet the minimum for meaningful use attestation simply requires the time of report writers.

4.3 Stage 2 Core Objectives and Measures

The stage 2 final rule lists a set of 16 core objectives, all of which must be satisfied by EHs, in order to be 'meaningful users' of CEHRT. Those 16 objectives and their related measures are listed and discussed in this section, along with the current performance of Kadlec Regional Medical Center where known.

4.3.1 CPOE

Objective: Use CPOE for medication, laboratory and radiology orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines: [**31**]

Measure 1: More than 60 percent of medication orders by authorized providers of the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period are recorded using computerized provider order entry

Measure 2: More than 30 percent of laboratory orders created by authorized providers of the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period are recorded using computerized provider order entry

Measure 3: More than 30 percent of radiology orders created by authorized providers of the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period are recorded using computerized provider order entry.

Discussion: The numerator and denominator for this objective are changing in Stage 2. In Stage 1 there was a single measure for the CPOE objective, and this objective was specific to medication orders only. In Stage 1 the requirement is "…more than 30 percent of all unique patients with at least one medication in their medication list admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) have at least one medication order entered using CPOE." [**32**] The numerator and denominator have now changed, with the denominator now being all orders of a given class (medication, laboratory and radiology), and the numerator being all orders of that class being recorded using CPOE. The requirements have become more stringent in Stage 2, as previously a single medication order entered via CPOE would place a patient in the numerator for an admission, with the

denominator being unique patient admissions. In Stage 2 the specific proportion of all orders in a given class (medication, laboratory, and radiology) will be calculated.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 100% for the Stage 1 meaningful use CPOE measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 4, from [**33**]

It is assumed that the performance for this measure will decrease using the new definitions for the measures. The current Epic 2010 meaningful use reports do not reflect what that performance will look like, however a rough assessment may be obtained by using the Epic go-live utility built for the Epic technical support personnel. [i] This report was run for a seven day time window and demonstrated the following:

- Inpatient medication orders were written by providers using CPOE 80.26% of the time, while 12.76% of the time the orders were entered by nursing staff as verbal orders. It is important to note that verbal orders, and 'protocol orders' entered by nursing staff are considered CPOE orders for the purposes of meaningful use. [**34**] Per this utility only ~5% of medication orders would not have counted as CPOE orders for meaningful use (the remainder 2%

[i] This report may be run from Epic's 'text' environment via the following path: Clin Admin > Management > Utilities > EC Inpatient TS Order Utilities > Inpatient Go-Live Utilities. This can only be run for a short timespan, roughly 7-10 days at most.

falling into other categories which should also count towards the meaningful use measure), thus the organization is anticipated to easily meet the 60% threshold for measure 1 of this objective using current workflows and ordering methods.

- The Epic utility does not provide a method to break apart laboratory from radiology orders, and groups all of these as 'procedure' orders. Looking at that aggregate, however, performance again appears to easily exceed the threshold levels for measures 2 and 3 for this objective, with an aggregate of 80.26% CPOE entered by primary providers, 18.06% being entered by verbal orders and 'protocol orders', and only ~2% not being counted as CPOE orders for meaningful use.

Workflow Evaluation: Non-provider access to order entry capabilities was intentionally outside the scope and design of Kadlec's Epic implementation, in order to prevent medical staff from circumventing the requirement for CPOE with initial implementation. This was quickly reversed for certain geographic areas of the hospital (ICU, surgical floors, cath lab and interventional radiology) due to the fact that the standard order sets for those areas were not built, tested and deployed on time; and the need to be able to allow unit clerks to transcribe written orders into the system.

While there does not appear to be a significant practice of providing written orders to clerks within the hospital, current automated reports don't likely capture all of these entries. It is recommended that now that order sets have been built, tested and

deployed for all inpatient services, the hospital re-visit this issue and remove clerk entered order access capabilities. This will assist in enforcing only nurse/protocol and provider entered orders into the system.

Summary: The organization should be able to meet the Stage 2 meaningful use for all three measures for the CPOE objective without significant changes to current workflow or processes, however this should be promptly validated once Epic 2010 stage 2 meaningful use reports are available for use.

4.3.2 Demographics

Objective: Record all of the following demographics: (A) Preferred language, (B) Sex, (C) Race, (D) Ethnicity, (E) Date of birth, and (F) Date and preliminary cause of death in the event of mortality in the eligible hospital or CAH. [**35**]

Measure 1: More than 80 percent of all unique patients admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period have demographics recorded as structured data.

Discussion: The calculation of this measure has essentially not changed between Stage 1 and Stage 2 of meaningful use, with only an increase in the threshold requirement from 50% to 80%. The verbiage has changed from previously recording 'gender', which is an attribute that an individual assigns to themselves, to recording 'sex' which is defined as 'the physiologic characteristics at time of birth'. [**36**] Current Epic meaningful use reports should accurately reflect how the medical center is performing against this measure.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 99% for the Stage 1 meaningful use demographic measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 5, from [33]

Workflow evaluation: Kadlec has done an excellent job of obtaining the core demographic requirements for all patients admitted to the hospital. One very small subset of patients, those who expire during the admission, currently fails to make the numerator for this measure. This is due to the current workflows, and failure to record the preliminary cause of death in a discrete location within the patient's medical record for reporting purposes. Epic has released service updates to allow for the recording of this information by providers, including in a specific order [**37**], using a specific Preliminary Cause of Death Navigator section [**38**], or through a coding abstraction method associated with Charting Deficiency Reminders [**39**]. None of these workflows have been currently implemented at Kadlec.

Summary: The organization should be able to meet the Stage 2 meaningful use the Demographics objective without changes to current workflow or processes. If the desire is to improve capture of the preliminary cause of death demographic information, than changes in provider workflows will need to occur. It is recommended that such changes only occur with the involvement of the medical staff, and include workflow validation sessions and the development of clinical decision support to prompt adoption.

4.3.3 Vital Signs

Objective: Record and chart changes in the following vital signs: (A) Height/Length, (B) Weight, (C) Blood pressure (ages 3 and over), (D) Calculate and display body mass index (BMI), (E) Plot and display growth charts for patients 0-20 years, including body mass index. [**40**]

> **Measure 1:** More than 80 percent of all unique patients admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period have blood pressure (for patients age 3 and over only) and height/length and weight (for all ages) recorded as structured data.

Discussion: The calculation of this measure has slightly changed from the 2012 Stage 1 requirements to new 2013 Stage 1 and Stage 2 requirements for meaningful use. Specifically, the age threshold for recording of height and weight has changed to all ages (from 2 years of age), and the threshold for recording blood pressure has changed to 3 years of age (from 2 years of age).[**41**] Other that that requirement, there has only been an increase in the threshold requirement from 50% to 80%. Current Epic meaningful use reports should be roughly accurate and reflect how the medical center is performing against this measure. The current population of patients admitted to Kadlec Regional Medical Center is preponderantly greater than two years of age, and thus should be counted in current report. In addition, newborn nursery patients are specifically excluded from the meaningful use measures.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 99% for the Stage 1 meaningful use demographic measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 6, from [33]

The Neonatal Intensive Care Unit (NICU) currently is not measured for vital sign performance for Stage 1 although that will start this fiscal year (FY2013). As recording height and weight of newborns is part of standard practice within the NICU, this is not anticipated to become an issue.

Summary: Kadlec has done an excellent job of obtaining the necessary vital sign elements for all patients admitted to the hospital. Kadlec should be able to easily meet the Stage 2 80% threshold. It is not recommended that processes change for the recording to core vital sign data. It is recommended that as soon as report updates are available for Epic 2010 to report against the FY2013 updated vital sign requirements (notably recording height and weight for patients of all ages), the performance of the medical center with specific attention to the NICU and pediatrics floors be assessed.

4.3.4 Smoking Status

Objective: Record smoking status for patients 13 years old or older. [**42**]

Measure 1: More than 80 percent of all unique patients 13 years old or older admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period have smoking status recorded as structured data.

Discussion: The calculation of this measure is unchanged from the Stage 1 requirements, other than a change in the threshold level from 50% to 80%. Current Epic meaningful use reports should be accurate and reflect how the medical center is performing against this measure.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 99% for the Stage 1 meaningful use smoking measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 7, from [33]

Workflow Evaluation: In order to achieve success in this measure, when it was anticipated that the hospital was going to use the 'all emergency department' method for calculating the measure denominator, the emergency department implemented clinical decision support within the system to assist in performance. Per the Epic reporting methodology, a patient's smoking history is considered 'Never Assessed' until an alternate value is documented:

Figure 8, Epic Smoking History user interface from [**43**]

The emergency department developed and deployed a form of active clinical decision support, called a 'Best Practice Advisory' (BPA) which presents to both nurses and clinicians within the Emergency Department when the patient is 13 years old or older, their smoking status is 'Never Assessed', and the provider or nurse is on a disposition navigator (i.e. ready to discharge or admit the patient).

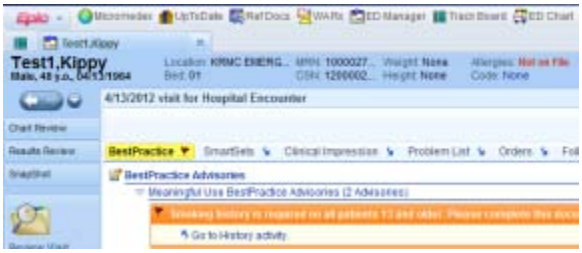


Figure 9, Epic Smoking History BPA user interface from [**43**]

This workflow provides a hyperlink, which allows the nurse or provider to click directly to the 'Social History' section and document the smoking history for these patients. At which time the BPA is cancelled, and the patient is placed into the numerator for this meaningful use measure.

This BPA has been kept in production, even when the organization changed its plan to use the 'observation services' denominator, due to the fact that 50% of all admissions to the hospital come from the emergency department. It is not an onerous workflow for providers or nurses within the emergency department, and has helped the organization obtain this information successfully and reliably. This is an example of a method which has been successful in helping the organization to meet Stage 1 meaningful use requirements.

Summary: Kadlec has done an excellent job of obtaining the necessary smoking information for all patients admitted to the hospital. Kadlec should be able to easily meet the Stage 2 80% threshold.

4.3.5 Clinical Decision Support

Objective: Use clinical decision support to improve performance on high priority health conditions. [**44**]

Measure 1: Implement five clinical decision support interventions related to four or more clinical quality measures at a relevant point in patient care for the entire EHR reporting period. Absent four clinical quality measures related to an eligible hospital or CAH's patient population, the clinical decision support interventions must be related to high-priority health conditions

Measure 2: The eligible hospital or CAH has enabled and implemented the functionality for drug-drug and drug-allergy interaction checks for the entire EHR reporting period.

Discussion: This measure is essentially the combination of two Stage 1 core objectives. Measure 1 is an adjustment of the 'Implement one clinical decision support rule related to a high priority hospital condition along with the ability to track compliance with that rule' objective, while Measure 2 is essentially the same as the Stage 1 'Implement drug-drug and drug-allergy interaction check' requirements.

Current performance of Kadlec Regional Medical Center: Kadlec was able to successfully attest to Stage 1 meaningful use for FY2012, which included attesting 'Yes' to having implemented a clinical decision support rule.

Measure 1: Kadlec has successfully implemented a large number of clinical decision support rules, and is currently in the process of implementing a number of additional clinical decision support rules specifically related to 'core measures' and the CQMs. All of these current[ii] and new clinical decision support measures will allow Kadlec Regional Medical Center to continue to attest that it has successfully met measure 1 of the Stage 2 meaningful use rules for this objective, and the current focus on CQMs specifically addresses the expressed need to address four of the

[ii] Kadlec currently has specific order sets related to stroke, congestive heart failure and pneumonia. In addition, referential clinical decision support has been built into a number of medication orders, and documentation template specific clinical decision support has been built for many presenting complaints including chest pain (for pulmonary embolus evaluations) and head injury (for adult and pediatric imaging).

CQMs. It is important to note that the clinical decision support is not required to be 'alerts', and includes the breadth of decision support to include documentation templates, order sets, dosing guidelines, and referential decision support. [**45**] Kadlec currently has specific order sets related to stroke, congestive heart failure and pneumonia. In addition, referential clinical decision support has been built into a number of medications, and documentation template specific clinical decision support has been built for many presenting complaints, including chest pain (for pulmonary embolus) and head injury (for adult and pediatric imaging).

Measure 2: Kadlec was able to attest for FY2012 to having successfully implemented drug-drug and drug-allergy interaction checks. Kadlec continues to have this functionality enabled in its current version of Epic, and will once again be able to attest 'Yes' to this measure.

Summary: Kadlec is currently developing and implementing a number of clinical decision support methods to improve CQM performance, documentation and reporting. All of these new clinical decision support elements, in addition to currently implemented clinical decision support, will allow the hospital to attest 'Yes' to measure 1 of this objective. Kadlec currently is able to attest 'Yes' to drug-drug and drug-allergy testing based upon current capabilities and functionality enabled in the EHR.

4.3.6 Clinical Lab Test Results as Structured Data

Objective: Incorporate clinical lab test results into Certified EHR Technology as structured data.[**46**]

Measure 1: More than 55 percent of all clinical lab tests results ordered by authorized providers of the eligible hospital or CAH for patients admitted to its inpatient or emergency department (POS 21 or 23) during the EHR reporting period whose results are either in a positive/negative affirmation or numerical format are incorporated in Certified EHR Technology as structured data.

Discussion: The calculation of this measure is unchanged from the Stage 1 requirements, other than a change in the threshold level from 40% to 55%. Current Epic meaningful use reports should be accurate and reflect how the medical center is performing against this measure.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 100% for the Stage 1 meaningful use discrete lab test measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 10, from [**33**]

Summary: Kadlec is performing well above the current Stage 1 40% threshold, and should be able to easily meet the Stage 2 55% threshold without any change in current workflows or implementation. Kadlec is using Sunquest version 6.4.2 as its laboratory information

system. This system returns structured laboratory values across the hospital's interface engine, and they are propagated into the EHR as structured data.

4.3.7 Generate Lists of Patients

Objective: Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research or outreach. [**47**]

> **Measure 1:** Generate at least one report, listing patients of the eligible hospital or CAH with a specific condition.

Discussion: The measure is unchanged from the Stage 1 requirements. Kadlec was able to attest 'Yes' to this measure in FY2012 due to the use of reports and worklists used in day-to-day patient care with Epic.

Summary: Kadlec is currently able to attest 'Yes' to this objective, based upon current functionality and implementation of its EHR. Kadlec creates lists of patients routinely from its EHR in order to track patients on specific services, as well as with specific diagnoses (such as congestive heart failure).

4.3.8 Provide Patients the Ability to View Online, Download and Transmit Information

Objective: Provide patients the ability to view online, download, and transmit information about a hospital admission. [**48**]

Measure 1: More than 50 percent of all patients who are discharged from the inpatient or emergency department (POS 21 or 23) of an eligible hospital or CAH have their information available online within 36 hours of discharge

Measure 2: More than 5 percent of all patients who are discharged from the inpatient or emergency department (POS 21 or 23) of an eligible hospital or CAH (or their authorized representative) view, download or transmit to a third party their information during the EHR reporting period.

Discussion: This is a new objective for meaningful use, and each measure will require detailed understanding and workflow changes by the organization to successfully implement. This objective is replacing two prior meaningful use objectives; 'Provide patients with an electronic copy of their health information' and 'Provide patients with an electronic copy of their discharge instructions'.

Measure 1: In this measure all patients discharged (or their guardians) must have online access to their information within 36 hours of discharge. The information that is required to be provided is delineated in 77 FR 54040, [**49**] 'Health Information Technology: Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology, 2014 Edition; Revisions to the Permanent Certification Program for Health Information Technology; Final Rules'[5] and specifically 45 CFR 170.102[**50**] as the 'Common MU Data Set' with respect to the Summary of Care record. In summary, the elements required include:

- Patient name
- Admission and discharge date and location
- Reason for hospitalization
- Care team members including attending of record as well as other providers of care
- Procedures performed during the admission
    - IHTSDO SNOMED CT, or
    - Health care Financing Administration Common Procedure Coding System and Current Procedural Terminology, Fourth Edition (CPT-4)[**51**]
- Current and past problem list
- Current medication list and medication history
- Current medication allergy list and medication allergy history
- Vital signs at discharge
- Summary of care record for transitions of care or referrals to another provider
- Laboratory test results available at discharge
- Care plan fields, including goals and instructions
- Discharge instructions for patient
- Demographics maintained by the hospital (sex, race, ethnicity, date of birth, preferred language
- Smoking status

Currently Kadlec Health System does have a patient portal system implemented through Epic, and branded as 'My Chart'. The functionality of that system to date has focused on ambulatory patients, with extremely limited access to information from inpatient and emergency department stays. This will require significant changes in policy and implementation prior to attesting for Stage 2 meaningful use by the hospital in FY2014.

Implementation considerations must extend beyond the basic Information Technology (IT) issues related to providing information electronically to patients; which are relatively easy to accomplish by providing accounts and access codes to 'My Chart' at the time of discharge (which is current practice at the organization, and meets the requirement for the patient to be in the numerator for this measure)[**52**] and ensuring the necessary data elements (see above) are available. Much harder process and human interaction issues dominate, however, and will need to be considered and addressed prior to the IT implementation. These include:

- Enabling and vetting proxy access to patient portal accounts. The Stage 2 meaningful use guidelines state that the provision of account access to guardians will meet the requirements for this measure for patients under the age of 18 years, and that restriction of information due to state and local laws is acceptable and the patients may still be counted in the numerator for the measure.[**53**]
- Addressing requests for clarification or modification of online material. Online material will become a collated repository of information from both

ambulatory and inpatient visits by patients. Patients will have previously unprecedented access to information within their medical record, which is accepted as likely to improve overall patient care. Kadlec Health System must, however, have the ability to address patients' questions related to pieces of information within their health record, as well as a process to address patients' concerns related to the information within the health record including a process to validate, modify, and expunge information when appropriate. Such a process, from a shared 'database' of patient information, does not currently exist at the medical center.

Kadlec's current policies and procedures regarding patient requests to amend records revolve around the historic concept of isolated notes. Those notes can be easily attributed to single individuals, and requests for changes may be directly addressed to those individuals. Any changes in those stand-alone documents are subsequently isolated to those documents, and are static.

When data from multiple notes, encounters and interactions with a multitude of nurses and providers propagate a large database, and the personal health record of a patient is a 'view' of a portion of that database, significant complexities then result. Identifying the attribution of specific data

elements, and developing a process to validate, and if necessary amend data within the database will become a much more significant issue.[iii]

Measure 2: In this measure, the patients not only need to have access to their accounts (as in Measure 1), but must actually log into their accounts and access their information.[**54**] This is a measure that may be particularly challenging for the health system. It is currently thought that less than 3% of ambulatory patients (who have more functionality and access to health information than inpatients) have established and used their 'My Chart' accounts within Kadlec Health System despite a marketing campaign.[**55**]

While the assumption that increased access to information, and improved functionality of the patient portal, will increase adoption by customers, there is currently no reliable information or program to ensure that the medical center will successfully meet this measure.

It is recommended that the medical center address this measure though a modification of the discharge process for all inpatients and observation patients, incorporating the use of wireless laptops in the discharge process with case management or nursing staff. This new discharge process would encompass the following:

[iii] Of note, this has already occurred with at least one patient since the health system implemented this EHR. A patient identified that their medical record from a prior visit incorrectly listed that they were taking a specific medication. The patient requested that this information be changed within the medical record. Organization Health Information Management (HIM) and IT procedures had 'locked' nurses out of that chart by that time, preventing anyone from being able to access and update this information. At that time there was no process in place to create an 'administrative encounter' to allow for the correction of this patient's data. A one time decision was made to create a 'telephone encounter' and correct the information after escalating this issue to both the department chairman and nurse manager for the unit. There was no HIM policy addressing how this should be accomplished.

- Review of the discharge instructions/after visit summary printed for the hospital stay, including the 'My Chart' account set-up information
- Having the patient log in to their 'My Chart' account at the point of discharge via the hospital wireless network
- Review the patient's problems, medications, allergies, laboratory tests and values and vital signs at the point of discharge[iv]

By implementing this discharge process the hospital will more closely approximate 100% performance on this measure as opposed to the currently anticipated low performance. The ability of this program to succeed will be predicated upon the following:

- Timely and accurate completion of the medication reconciliation as part of the discharge process
- Near real time updates to the 'My Chart' patient portal, as opposed to the allowed 36 hours prior to information being available for view and download.

Summary: It is anticipated that Kadlec will find this objective challenging to address, as it will require much more than an IT implementation; and will instead involve the establishment, modification and management of HIM policies regarding the communication, review and change of information in the patient's record. In addition, it will involve a decision making process regarding who may update pertinent patient information,

[iv] It is felt that this one on one review of medications, allergies, problems and vital signs at the point of discharge with the patient will likely improve communication, understanding, and can be an integral part of a readmission reduction program for the hospital as well.

how that will be accomplished, and under who's auspices this will be performed. Current historical processes are related to individual notes by providers, however patients will now be seeing discrete data within a database which may be attributable to any number of providers.

In addition, Kadlec will now be measured by the performance of its individual patients, and whether they chose to log into their 'My Chart' accounts and access their information. Fortunately for Kadlec, the geographic catchment area for its patient population has excellent broadband penetration, as well as a technologically savvy patient population. Continued marketing of the 'My Chart' patient portal, as well as smartphone and tablet applications for the patient portal, will likely not be sufficient to meet this objective's measure regarding patient views; and the development of a proactive and aggressive discharge process that sets up and introduces patients to their 'My Chart' account is strongly recommended.

Lastly, this measure makes the adoption of the 'all emergency department' method for calculating denominators untenable. Attempting to orient and facilitate access for all emergency department patients to their 'My Chart' accounts prior to their discharge will significantly add to patients' length of stay and require enormous manpower. In addition, there will not be nearly as much relevant information to draw patient's interest, as compared to an inpatient stay. For the organization to become successful in assisting patients with setting up and using their 'My Chart' accounts, this manual process needs to focus on inpatients and observation patients only.

4.3.9 Education Resources

Objective: Use clinically relevant information from Certified EHR Technology to identify patient-specific education resources and provide those resources to the patient. [**56**]

> **Measure 1:** More than 10 percent of all unique patients admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) are provided patient-specific education resources identified by Certified EHR Technology.

Discussion: The calculation of this measure is unchanged from the Stage 1 requirements. Current Epic meaningful use reports should be accurate and reflect how the medical center is performing against this measure.

> **Current performance of Kadlec Regional Medical Center:** Kadlec is currently performing at 91% for the Stage 1 meaningful use patient-specific education resources measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 11, from [**33**]

> **Workflow Evaluation:** Epic designed its meaningful use reports to place patients in the numerator by one of two methods [**57**]:
>
> > **Nursing documentation:** Any teaching points documented by nurses in the 'Patient Education Activity' as part of nursing workflow will place a patient

in the numerator for this activity. This is not part of emergency department nursing workflow.

Inclusion of Selected References: The inclusion of references selected by providers or nurses from suggestions made to them by the EHR. Selected references are provided to clinicians via two methods, only one of which currently place the patient into the meaningful use numerator:

- Suggested SmartTexts are presented to providers based upon discharge diagnoses. These show up as hyperlinks, and if they are selected they are added to a patient's discharge instructions. This does not place a patient in the denominator.

Figure 12, Discharge SmartText user interface from [**43**]

- Go to References/Attachments activity. If this activity is entered, and a provider selects and adds discharge instructions to the patient's discharge material from this activity, then the patient is included in the denominator.

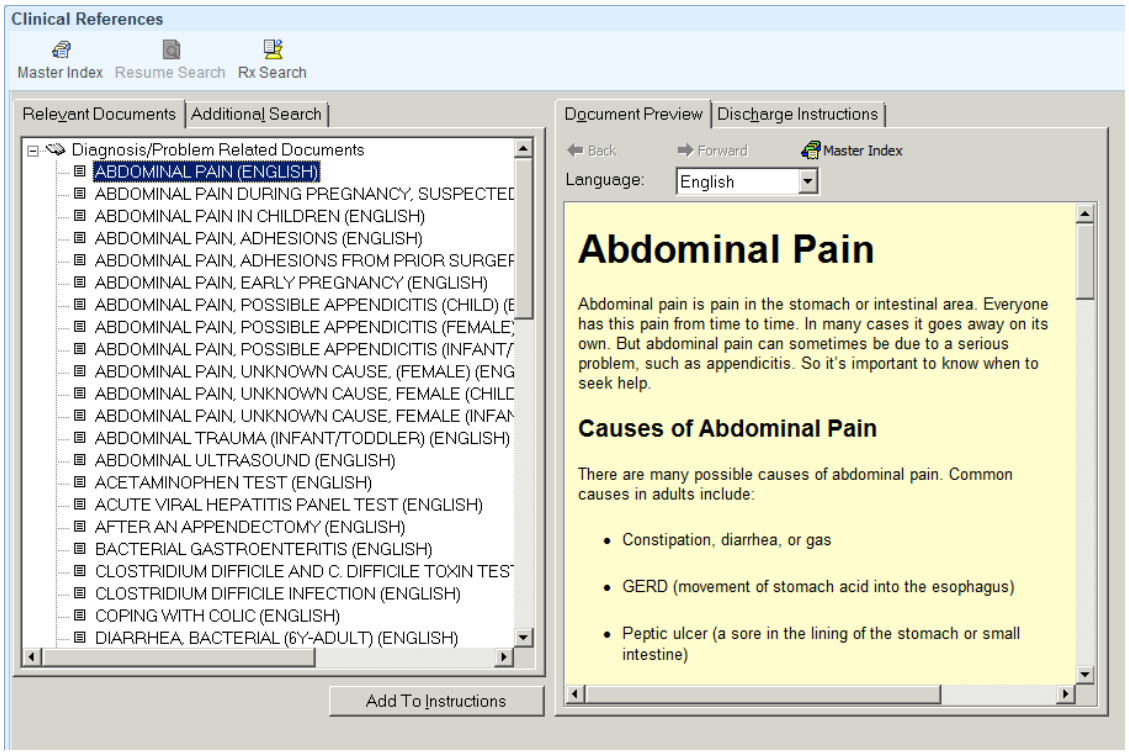


Figure 13, Go to References user interface from [**43**]

Summary: Kadlec is performing well above the current Stage 1 threshold, and should be able to easily meet this objective measure with current workflows. It is interesting to question, however, why this measure isn't higher at the medical center. Exploration of the data demonstrates that the general inpatient floors at Kadlec perform extremely well on this measure, but the Birth Center (which cared for 20.5% of the patients in the denominator during this 90 day period) only performed at 78%, the Cath Lab (which cared for 1.3% of the patients in the denominator) only performed at 47%, the Intensive Care Unit (which cared for 3.1% of the patients in the denominator) only performed at 64%, and the NICU (which cared for 1.8% of the patients in the denominator) only performed at 49%. On assessment,

each of these areas can be considered ‘high risk’ areas that should warrant complete and detailed discharge instructions being provided to either the patients or their caregivers.

It is strongly recommended that the organization evaluate the discharge workflow for each of these supposedly underperforming areas, and establish the reasons for why they are not performing well against this measure. This can be due to a number of reasons, including the following:

- Providers may have established their own discharge instructions using ‘Smart Phrases’ , ‘SmartText’ or ‘dot phrases’ within Epic. In addition, they may be using the standard functionality of the system that suggests third party discharge content as Smart Text, but doesn’t include the patient in the denominator. The use of these methods, as opposed to going to the ‘Resources’ activity and choosing ExitWriter or Krames discharge instructions from the presented list does not add a patient to the numerator for this measure
    - If providers are using the third party discharge content as Smart Texts, it may be necessary to remove this functionality, and have them access the same content through the ‘Go to References’ activity within their discharge navigator.
    - If providers are using their own ‘dot phrases’ or ‘Smart Phrases’, it may be due to the fact that they are not satisfied with the content of the third party discharge instructions. The discharge content that Kadlec is using may be modified to meet the requirements of the end-users, to improve the consistency of use as well as decreased variability in discharge instructions

within specific services. Kadlec has not stood up a process to edit, manage or maintain discharge content on behalf of the medical staff, and this is something that should be developed to assist in the use of standard discharge instructions and material.

- Nurses are not documenting educational activities within the expected areas of the chart.
    - This may be due to failure to provide education, or may be due to the fact that education is provided but not documented. Either may be reported/tracked and education can be provided to the nursing staff regarding the need to document education and the provision of educational materials to patients and their caregivers.

4.3.10 Medication Reconciliation

Objective: The eligible hospital or CAH that receives a patient from another setting of care or provider of care or believes an encounter is relevant should perform medication reconciliation. [**58**]

Measure 1: The eligible hospital or CAH performs medication reconciliation for more than 50 percent of transitions of care in which the patient is admitted to the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23).

Discussion: The calculation of this measure is unchanged from the Stage 1 requirements. Current Epic meaningful use reports should be accurate and reflect how the medical center is performing against this measure.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 75% for the Stage 1 meaningful use medication reconciliation measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 14, from [**33**]

Summary: Kadlec Regional Medical Center is currently performing this process at a rate that will allow them to attest for Stage 2 of meaningful use. The current low success rate for this measure, however, is concerning from a patient care standpoint, and will likely be reflected in significant patient dissatisfaction and frustration when this is coupled with the new 'view, download and transmit' objective, as lack of adequate medication reconciliation will only become more clear to patients.

The Epic reports place a patient in the numerator for the medication reconciliation measure when the 'Mark as Reviewed' button is checked for a patient's medications. Failure to check this 'reviewed' button keeps a patient out of the numerator, even if the patient's medication list has been updated.

Geographic discharge areas of the hospital which are performing significantly lower than the rest of the organization are listed here:

- Birth Center (64%)

- Cath Lab (47%)
- Clinical Decision Unit (62%)
- Intensive Care Unit (47%)
- NICU (7%)
- Surgical Floor (55%)

Methods to address performance on this measure are two-fold. One is to change the way the reports are currently calculating the numerator. The Epic reports allow configuration to either count the 'Marked as Reviewed' button click, or access to the Medication Reconciliation navigator. Changing to the Medication Reconciliation navigator may arguably increase the numerator simply by accounting for the average clinician workflow on the inpatient floors. The medication reconciliation navigators are not in the emergency physician workflow, however, and the Emergency Department currently performs at 85% on this measure (greatly assisting the hospital in performance). Thus, the hospital should continue to report medication reconciliation against the 'Marked as Reviewed' functionality of the EHR.

The second method is to address nursing and provider, as well as general patient care workflows. Reports may be created and run to assess individual provider performance, which will allow for a better understanding of how individual clinicians are using the system. By assessing and tracking individual performance over time, and providing individual provider feedback, it is anticipated that provider performance would likely

improve – and the medication reconciliation performance would trend upwards. In fact, this is the process adopted by the emergency department, with quite good success.

It is important to note, however, that the medication reconciliation process for meaningful use does not require a physician or non-physician practitioner to perform the process; and nursing or other staff may also perform medication reconciliation, and enter information into the patients' medical records in order to meet meaningful use measures. Thus, a thoughtful evaluation of nursing workflows is important for this objective, as they are frequently the individuals who are gathering and updating the patients' home medications including dose, route and frequency.

Lastly, if the organization starts to have performance issues regarding medication reconciliation it is possible to provide both 'charting deficiencies' as well as clinical decision support around the medication reconciliation process. The provision of alerts may improve performance and patient safety if thoughtfully placed into the clinicians' or nurses workflow to prompt the performance of medication reconciliation during the normal admission and discharge process. Creating 'charting deficiencies', however, runs the risk of provider dissatisfaction (if made a physician charting reminder), as well as improving reporting performance without necessarily improving patient safety (whether a physician or nursing charting reminder). This would be the concern for charting deficiencies, as they are usually addressed after a patient's visit, when the performance of medication reconciliation is no longer of clinical benefit.

4.3.11 Summary Care Record for Transitions of Care

Objective: The eligible hospital or CAH that transitions their patient to another setting of care or provider of care or refers their patient to another provider of care provides a summary care record for each transition of care or referral. [**59**]

> **Measure 1:** the eligible hospital or CAH that transitions or refers their patient to another setting of care or provider of care provides a summary of care record for more than 50 percent of transitions of care and referrals
>
> **Measure 2:** the eligible hospital or CAH that transitions their patient to another setting of care or provider of care provides a summary of care record for more than 10 percent of such transitions and referrals either—(1) Electronically transmitted using Certified EHR Technology to a recipient; or (2) Where the recipient receives the summary of care record via exchange facilitated by an organization that is a NwHIN Exchange participant or in a manner that is consistent with the governance mechanism ONC establishes for the nationwide health information network
>
> **Measure 3:** an eligible hospital or CAH must satisfy one of the following: (1) Conducts one or more successful electronic exchanges of a summary of care record meeting the measure specified in paragraph (l)(11)(ii)(B) of this section with a recipient using technology to receive the summary of care record that was designed by a different EHR developer than the sender's EHR technology certified at 45 CFR 107.314(b)(2); or (2) Conducts one or more successful tests with the CMS designated test EHR during the EHR reporting period.

Discussion: Measure 1 consolidates the prior objectives of maintaining an 'up-to-date problem list', 'active medication list' and 'active medication allergy list' with the necessity of providing a summary of care record for each transition of care (measure 1 of this objective).[**36**] The summary of care document for EHs must contain the following information:

- Patient name
- Procedures
- Encounter diagnosis
- Immunizations
- Laboratory test results
- Vital signs (height, weight, blood pressure, BMI)
- Smoking status
- Functional status, including activities of daily living, cognitive and disability status
- Demographic information (preferred language, sex, race, ethnicity, date of birth)
- Care plan field, including goals and instructions
- Care team including the primary care provider of record and any additional known care team members beyond the referring or transitioning provider and the receiving provider
- Discharge instructions
- Current problem list (may not be blank)
- Current medication list (may not be blank)
- Current medication allergy list (may not be blank)

Measure 1 does require the electronic creation of a summary of care record for 50% of patients, however it does not require electronic transmission of this document. Much like Stage 1 of meaningful use, the document may be printed in the patients' after visit summary where they can then take this to the subsequent provider. Given the required extensive content of this summary of care document, however, alternative methods are suggested for its production.

Kadlec Regional Medical Center participates in Washington State's Health Information Exchange (HIE). It is recommended that the summary of care document be produced automatically at the time of discharge for all emergency department, inpatient and observation patients, and be submitted electronically to the HIE. This will exceed the threshold requirements for this measure, and provide a framework to assist in meeting the second measure of this objective. In addition, it will greatly decrease the printing and paper management requirements that this measure would otherwise impose upon the organization, which is both costly as well as increases the risk of accidental breaches of the HIPAA privacy rules with regard to Protected Health Information.

Measure 2 places a significant burden upon the medical center, as it requires external organizations and providers to either electronically receive or 'pull' summary of care records. Ten percent of all transition of care, including patients discharged from the emergency department, must include direct transmission of the summary of care record to the recipient (a 'push' methodology, such as with Direct Connection), or the recipient must receive the document from an HIE (a 'pull' methodology). The regulations specifically

state that "The act of uploading a summary of care record to a repository that can be queried by the recipient – without validation that this query in fact occurred will not be sufficient to count towards the numerator."[**60**]

Organizational performance with regard to this measure will require an understanding of how Epic plans to address not only the 2014 CEHRT requirements for electronic exchange of summary of care records, but also the workflows that are both available and enabled.

- The regulation specifically excludes providers who access a patient's medical record from the same instance of the CEHRT, thus the medical center should only count patients in the denominator who are referred to a provider which is not currently using Kadlec's EHR in their office or clinic setting.[**61**]
- A large (though shrinking) portion of primary care (follow up) physicians and referral physicians for Kadlec's emergency department, as well as inpatient and observation patients who are subsequently discharged, are not currently using Kadlec's Epic ambulatory product. It will be incumbent upon the organization to determine the most prominent providers to whom patients are referred for follow-up from the medical center, and establish and validate electronic data exchange methods with those providers using the approved transport standards in 45 CFR 170.202[**62**] and 45 CFR 170.299. [**63**] This will be a significant task that will require both a large amount of time and coordination with non-affiliated providers.
- Kadlec Regional Medical Center does not transfer many patients to outside hospitals, however identifying the most prominent referral centers by patient volume and subsequently automating and validating electronic summary of care

document generation and transmittal as part of the transfer process will assist the medical center in achieving the threshold for this measure.

Measure 3 is predicated upon the 2014 CEHRT technology of the EHR, and it's ability to interoperate. The medical center will have the option to perform this function with a number of non-Epic EHRs in order to establish mechanisms to meet measure 2 of this objective. If the medical center should wish, it may also use the 'test EHR' being established by NIST for this purpose.

4.3.12 Submit Electronic Data to Immunization Registries

Objective: Capability to submit electronic data to immunization registries or immunization information systems except where prohibited, and in accordance with applicable law and practice. [**64**]

> **Measure 1:** Successful ongoing submission of electronic immunization data from Certified EHR Technology to an immunization registry or immunization information system for the entire EHR reporting period.

Discussion: This measure is an extension of the Stage 1 menu set measure to have the 'capability' to submit immunization data, and now requires 'ongoing submission' of such data. Kadlec Regional Medical Center currently has ongoing exchange of immunization data with the Washington State Immunization Registry [**65**], and thus Kadlec Regional Medical Center will be able to attest 'Yes' to this Stage 2 meaningful use requirement.

4.3.13 Submit Electronic Reportable Laboratory Results

Objective: Capability to submit electronic reportable laboratory results to public health agencies, except where prohibited, and in accordance with applicable law and practice. [**66**]

> **Measure 1:** Successful ongoing submission of electronic reportable laboratory results from Certified EHR Technology to a public health agency for the entire EHR reporting period.

Discussion: This measure is an extension of the Stage 1 menu set measure to have the 'capability' to submit reportable laboratory data, and now requires 'ongoing submission' of such data. Kadlec Regional Medical Center did not attest to this menu set objective in FY2012.

Kadlec Regional Medical Center currently uses the Sunquest laboratory information system (LIS) in conjunction with its partnership with Tri-Cities Laboratory (TCL), as opposed to Epic's LIS (Beaker). The Sunquest laboratory system is a 2011 certified EHR module, which includes the requirements of reportable laboratory results.[**67**] It is anticipated that Sunquest will achieve 2014 certification as well, and be a CEHRT module.

Kadlec Regional Medical Center may meet this objective measure by either (a) ensuring that TCL has established the necessary interfaces between the Sunquest system and the Washington State Department of Health to provide automated reporting of reportable laboratory results from Kadlec Regional Medical Center (including identifying and maintaining the list of reportable results), or (b) ensuring that TCL is identifying all reportable results in the Sunquest system and is flagging those results as reportable when

sending them to Epic. At that point, Kadlec can use its interface engine to send those results via to the Washington State Department of Health.

4.3.14 Submit Electronic Syndromic Surveillance Data

Objective: Capability to submit electronic syndromic surveillance data to public health agencies, except where prohibited, and in accordance with applicable law and practice. [**68**]

> **Measure 1:** Successful ongoing submission of electronic syndromic surveillance data from Certified EHR Technology to a public health agency for the entire EHR reporting period.

Discussion: This measure is an extension of the Stage 1 menu set measure to have the 'capability' to submit syndromic surveillance data, and now requires 'ongoing submission' of such data. Kadlec Regional Medical Center did not attest to this menu set objective in FY2012, and is not currently submitting syndromic surveillance data to the state.[**69**]

The 2014 CEHRT requirements[**70**] mandate the use of HL7 v2.5.1 as the messaging standard[**71**] for syndromic surveillance. It does not, however, specify the specific data elements that are required to be transmitted. Those are left up to the public health agency. Kadlec will need to build, test and maintain a syndromic surveillance interface with a public health agency in accordance with 45 CFR 170.314(f)(3). Of particular note, the 42 CFR 495.6(l)(14)(iii)[**72**] provides some assistance in addressing this measure, with a few exclusions including:

(B) Operates in a jurisdiction for which no public health agency is capable of receiving electronic syndromic surveillance data in the specific standards required for Certified EHR Technology at the start of their EHR reporting period or can enroll additional eligible hospitals or CAHs.

(C) Operates in a jurisdiction for which no public health agency provides information timely on capability to receive syndromic surveillance data.

(D) Operates in a jurisdiction for which no public health agency that is capable of accepting the specific standards required by Certified EHR Technology at the start of their EHR reporting period can enroll additional eligible hospitals or CAHs.

In discussions, working with the Washington State Department of Health has been particularly challenging with regard to standing up and maintaining immunization registry interfaces.[**73**] The ability to exclude this measure if the state registry is not ready, available, or capable of accepting information provides some relief from this measure.

4.3.15 Protect Electronic Health Information

Objective: Protect electronic health information created or maintained by the Certified EHR Technology through the implementation of appropriate technical capabilities.[**74**]

Measure 1: Conduct or review a security risk analysis in accordance with the requirements under 45 CFR 164.308(a)(1), including addressing the encryption/security of data stored in Certified EHR Technology in accordance with requirements under 45 CFR 164.312(a)(2)(iv) and 45 CFR 164.306(d)(3), and

implement security updates as necessary and correct identified security deficiencies as part of the eligible hospital's or CAH's risk management process.

Discussion: This objective and measure are essentially the same as those present in Stage 1 of meaningful use. There is, however, an emphasis on the risk assessment that the EHs must perform, specifically related to addressing data encryption and security. This objective and measure cite the current HIPAA privacy and security rules in the CFR, however the 'Medicare and Medicaid Programs; Electronic Health Record Incentive Program – Stage 2, Final Rule' also states that EHs "must use the capabilities and standards of CEHRT at 45 CFR 170.314(d)(1) through 170.314(d)(8)"[**75**].

45 CFR 170.314(d)(i) requires that "EHR technology that is designed to locally store electronic health information on end-user devices must encrypt the electronic health information stored on such devices after use of EHR technology on those devices stops," [**76**] and that such technology must by default have encryption turned on.

The Epic 2010 implementation for Kadlec does currently allow the storage of electronic health information on local devices. Though Kadlec currently attempts to manage this via the use of Citrix sessions and security restrictions, electronic health information can be stored on network devices and flash drives.

It is anticipated that the 2014 CEHRT requirements will require modifications to the current implementation of Epic, as well as potentially require Kadlec to change hardware and network security settings.

4.3.16 Automatically Track Medications from Order to eMAR

Objective: Automatically track medications from order to administration using assistive technologies in conjunction with an electronic medication administration record (eMAR). [77]

> **Measure 1:** More than 10 percent of medication orders created by authorized providers of the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period for which all doses are tracked using eMAR.

Discussion: This is a new objective and measure. Kadlec medical center's version of Epic currently has an eMAR implemented, as well as bar code scanning of medications and patient identifiers to appropriately attribute medications to the correct patient and orders within the system.

> **Current performance of Kadlec Regional Medical Center:** There is currently no report available to reflect how well all doses of medications are tracked on a given patient's eMAR. By definition, within the patient's medical record, the denominator for any Epic reports would be the medications administered as recorded on the eMAR. The only disparities would be medications that are listed on the eMAR, for which there is not established order within the Epic system. The maximum for this value would be medications which are pulled from the medication dispensing system on an 'override' basis, which is known to be quite low and aggressively managed at Kadlec.

Summary: As soon as reports are available Kadlec Regional Medical Center should start tracking unit and nurse based performance on 'order' to 'delivery' for all medication doses with the eMAR. It is anticipated that Kadlec's performance will easily surpass the measure threshold.

4.4 Stage 2 Menu Set Objectives and Measures

The stage 2 final rule lists a set of six menu objectives. EHs must satisfy three of the six in order to be 'meaningful users' of CEHRT. Those six menu objectives and their related measures are listed and discussed in this section, along with the current performance of Kadlec Regional Medical Center where known.

4.4.1 Record Advance Directives

Objective: Record whether a patient 65 years old or older has an advance directive. [**78**]

> **Measure 1:** More than 50 percent of all unique patients 65 years old or older admitted to the eligible hospital's or CAH's inpatient department (POS 21) during the EHR reporting period have an indication of an advance directive status recorded as structured data.

Discussion: This menu set objective is unchanged from the Stage 1 meaningful use objective and measure.

Current performance of Kadlec Regional Medical Center: Kadlec is currently performing at 100% for the Stage 1 meaningful use medication reconciliation measure for the most recent 90 day reporting period (7.10.12 to 10.7.12).

Figure 15, from [**33**]

Summary: Kadlec is performing well above the Stage 2 50% threshold, and should be able to easily meet this threshold without any change in current workflows or implementation.

It is recommended that Kadlec use this objective as one of the three menu set objectives it will choose in order to attest for Stage 2 of meaningful use.

4.4.2 Imaging Results Accessible

Objective: Imaging results consisting of the image itself and any explanation or other accompanying information are accessible through Certified EHR Technology. [**79**]

Measure 1: more than 10 percent of all tests whose result is an image ordered by an authorized provider of the eligible hospital or CAH for patients admitted to its inpatient or emergency department (POS 21 or 23) during the EHR reporting period are accessible through Certified EHR Technology.

Discussion: This is a new menu set objective and measure. This measure clearly defines that the images and results are 'accessible' through the CEHRT, but do not need to be stored

or maintained within the CEHRT. Thus, links to the current Picture Archiving and Communication System (PACS) within the CEHRT are acceptable.[**80**]

Kadlec's current implementation of Epic 2010 provides URL links for all radiology studies, which take the provider directly to the image using WebPACS. In addition, both Epic and the WebPACS application provide access to the interpretation and supporting data for the studies.

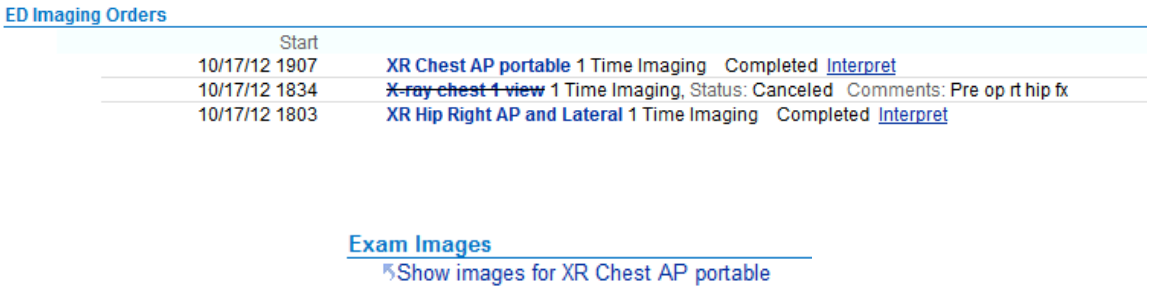


Figure 16, Imaging orders user interface from [**43**]

Summary: Kadlec is currently already meeting this objective and measure though its present Epic implementation.

It is recommended that Kadlec choose this objective as one of the three menu set objectives it will choose in order to attest for Stage 2 of meaningful use.

4.4.3 Patient Family History as Structured Data

Objective: Record patient family health history as structured data. [**81**]

Measure 1: More than 20 percent of all unique patients admitted to the eligible hospital or CAH's inpatient or emergency department (POS 21 or 23) during the EHR reporting period have a structured data entry for one or more first-degree relatives.

Discussion: Current functionality within this system allows providers to identify specific past medical history elements and attribute them to specific family members. It is unknown how Epic will chose to implement this functionality for 2014 CEHRT requirements, but it is reasonable to assume that they will use the same user interface. If that is the case, then attribution of structured past medical history data for first-degree relatives will not require re-education or training of providers.

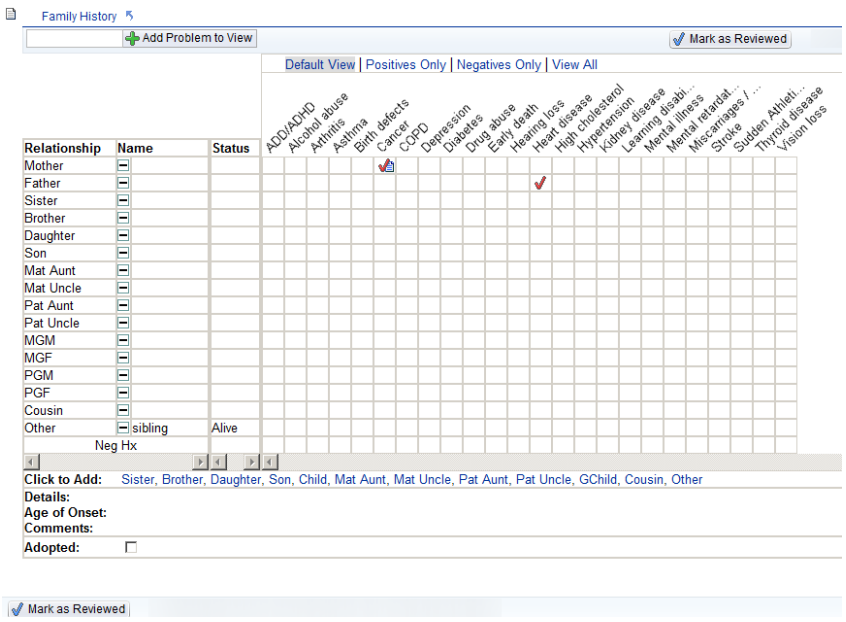
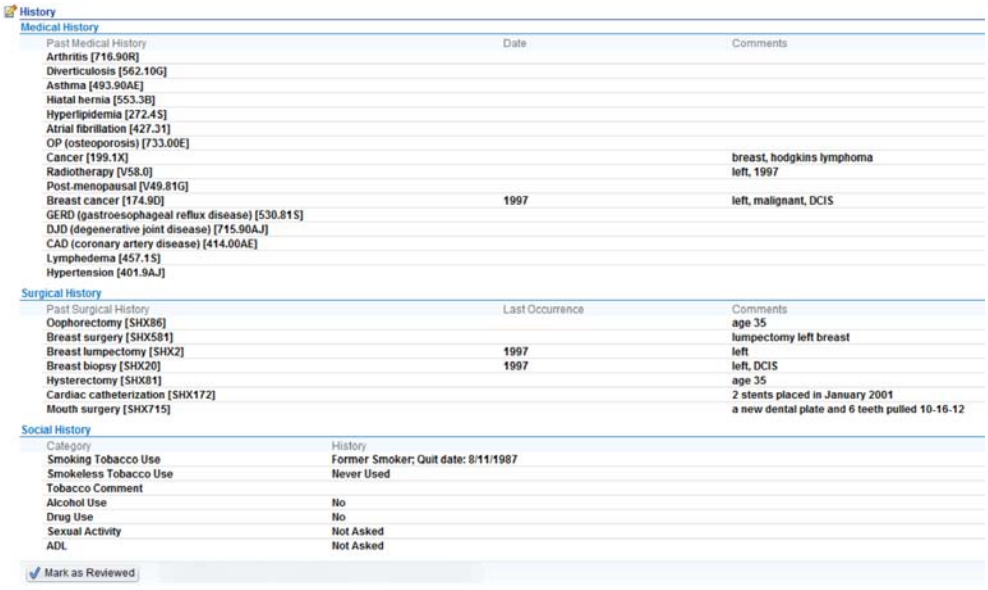


Figure 17, Family history user interface from [**43**]

This measure requires the information to be (a) structured, and (b) related to a first-degree relative. This will require the list of disease items in the family history activity to be mapped to structured data elements, and it will require Kadlec to prioritize these items based upon both the most commonly present medical conditions (so they are easily accessible and most likely to be selected), as well as the most relevant items for the ongoing care of patients as a whole (as items which are not on this list are less likely to be selected and/or added).

The current user interface already prioritizes (from the top down) first-degree relatives, so there is no requirement to re-sort those rows of information.

Of note, the Family Medical History activity in the Emergency Department navigators for providers is not actually visible in their standard workflow, and is not routinely validated by providers or nursing staff in the Emergency Department.



History

Medical History

Past Medical History	Date	Comments
Arthritis [716.90R]		
Diverticulosis [562.10G]		
Asthma [493.90AE]		
Hiatal hernia [553.3B]		
Hyperlipidemia [272.4S]		
Atrial fibrillation [427.31]		
OP (osteoporosis) [733.00E]		
Cancer [199.1X]		breast, hodgkins lymphoma
Radiotherapy [V58.0]		left, 1997
Post-menopausal [V49.81G]		
Breast cancer [174.9D]	1997	left, malignant, DCIS
GERD (gastroesophageal reflux disease) [530.81S]		
DJD (degenerative joint disease) [715.90AJ]		
CAD (coronary artery disease) [414.00AE]		
Lymphedema [457.1S]		
Hypertension [401.9AJ]		

Surgical History

Past Surgical History	Last Occurrence	Comments
Oophorectomy [SHX86]		age 35
Breast surgery [SHX581]		lumpectomy left breast
Breast lumpectomy [SHX2]	1997	left
Breast biopsy [SHX20]	1997	left, DCIS
Hysterectomy [SHX81]		age 35
Cardiac catheterization [SHX172]		2 stents placed in January 2001
Mouth surgery [SHX715]		a new dental plate and 6 teeth pulled 10-16-12

Social History

Category	History
Smoking Tobacco Use	Former Smoker; Quit date: 8/11/1987
Smokeless Tobacco Use	Never Used
Tobacco Comment	
Alcohol Use	No
Drug Use	No
Sexual Activity	Not Asked
ADL	Not Asked

Mark as Reviewed

Figure 18, History section user interface from [**43**]

It is unknown how many patients have this information recorded within the current Epic system. It is also unknown how Epic will develop it's report functionality, and whether they will place a patient within the numerator if a piece of information is present, or whether they will require either the active entry of a new piece of data or a 'Mark as Reviewed' button click.

Summary: It is recommended that if Kadlec choses to pursue this objective as one of it's menu set objectives for Stage 2 of meaningful use, that it does so in the following manner:

- Ensure that the family history is expanded within provider and nursing workflows for patients admitted as inpatients, and has relevant diagnoses which map to structured data fields
- Build active clinical decision support into the workflow of nursing and providers, much as has been done for the smoking objective, in order to ensure that this is addressed prior to the disposition of patients from the hospital.
- Carefully understand the data points that Epic's Stage 2 meaningful use reports will use to capture and report against patients in the numerator for this objective.

Due to the unknown current penetrance of first-degree relative information in the current EHR, and the method that Epic will use to place patients into the numerator for these reports, this is a measure that Kadlec will have to pay particular attention to as soon as Stage 2 Meaningful Use reports become available to the organization.

In order to be successful with this objective, the hospital will likely need to change navigators for nurses and clinicians, change workflow for nurses and clinicians, as well as

create, manage and report against clinical decision support and individual performance. This may be a measure that Kadlec chooses not to pursue for its Stage 2 attestation.

4.4.4 Electronic Prescriptions

Objective: Generate and transmit permissible discharge prescriptions electronically (eRx). [**82**]

> **Measure 1:** More than 10 percent of hospital discharge medication orders for permissible prescriptions (for new, changed and refilled prescriptions) are queried for a drug formulary and transmitted electronically using Certified EHR Technology.

Discussion: This is a new measure for EHs, and there are no current Epic Meaningful Use reports that report this information. Kadlec may create it's own report to identify the percentage of discharge medications that are currently electronically transmitted; however it is unlikely to meet the new 10% threshold.

This measure does not allow the hospital to choose to exclude Emergency Department patients, and thus the Emergency Department will account for approximately 84% of the patients with discharge prescriptions within the denominator. Currently the Emergency Department has elected to print discharge prescriptions as the default function for patients, as opposed to performing electronic prescriptions, due to current workflow issues related to (a) preferred pharmacies, and (b) narcotic prescriptions.

Preferred pharmacy issues: Patients who have prior records within the EHR frequently have a preferred pharmacy identified within the system. This is generally the pharmacy that they would like to use on a routine basis during regular hours. Many of these pharmacies within Kadlec's catchment area, however, are not 24 hour a day pharmacies.

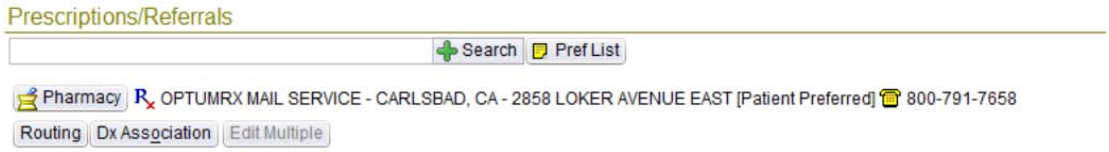


Figure 19, Discharge prescription user interface from [**43**]

The workflow for writing discharge prescriptions defaults the electronic prescriptions to go to the patient's previously selected pharmacy. This pharmacy information only presents to the provider at the time they are writing the prescription, which can be done anywhere from the middle to the end of the patient's Emergency Department stay. Having to verify and select the pharmacy for the patient is not something that is within the current provider workflow, and will require additional re-work and likely frequently a return to the patient's evaluation and treatment rooms to obtain.

The current implementation does provide a look up capability based upon pharmacy location, which does provide some assistance for providers when they have to select a new pharmacy.

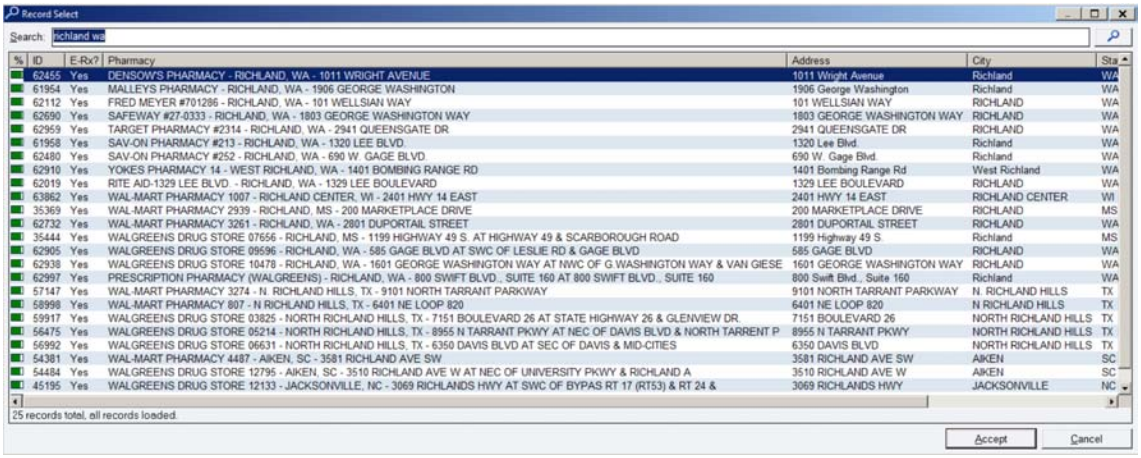


Figure 20, ePrescription user interface from [43]

It is anticipated that a number of prescriptions will be entered for the 'default' pharmacy for patients, and then need to be corrected. Unfortunately, the implementation of the electronic prescribing software within Epic 2010 allows for prescribing, but not cancelling of prescriptions. If prescriptions need to be cancelled, they require a phone call to the pharmacy itself, which often requires the use of a long phone tree and a fair amount of time for the provider. It is anticipated that erroneously routed prescriptions will not be predictably cancelled by providers, causing pharmacies to fill and then have to re-stock many medications.

Controlled Substances: Unfortunately Emergency Departments are frequent sites for patients to present with unverifiable pain syndromes, in an attempt to obtain narcotic pain medications. Historically is has been quite common at Kadlec Regional Medical Center for pharmacies to call after patients are discharged, informing the physicians that patients are trying to only fill the narcotic prescription when they had additional medications written on the same prescription.

Shortly after Kadlec Regional Medical Center's Epic implementation the Emergency Department successfully lobbied to have multiple prescriptions print per page of prescription paper, as the default process was to print one piece of paper per prescription. When each prescription printed on it's own piece of paper, patients were then empowered to selectively present prescriptions to pharmacies.

Currently the electronic prescribing capabilities within Epic (and Superscripts) only allow for non-controlled prescriptions to be written electronically. Due to this, all controlled substance prescriptions have to be handled separately, and printed for patients. This process would defeat the processes put into place to enforce certain behaviors in patients.

Summary: Due to process issues, the need to create new workflows within the emergency department, the need to create individual provider reports and feedback for poor performers, the impact on inappropriate patient behavior with regard to narcotic prescriptions, and the likelihood that pharmacies will have a significant rise in re-stocking requirements for medications, it is not recommended that Kadlec Regional Medical Center select this 'menu set' objective.

4.4.5 Electronic Notes

Objective: Record electronic notes in patient records. [**83**]

Measure 1: Enter at least one electronic progress note created, edited and signed by an authorized provider of the eligible hospital's or CAH's inpatient or emergency department (POS 21 or 23) for more than 30 percent of unique patients admitted to

the eligible hospital or CAH's inpatient or emergency department during the EHR reporting period. The text of the electronic note must be text-searchable and may contain drawings and other content.

Discussion: It is standard practice at Kadlec Regional Medical Center for provider notes to be textual documents. These documents are generated via a variety of methods, including the entry of templated information from point and click user interfaces, the use of template text files with providers typing, as well as the use of natural language processing and dictation. Kadlec was aggressive with its implementation of its EHR in November of 2011, phasing out all written and scanned provider notes and histories and physicals within the first few months.

As an example, the emergency department only uses textual notes, with a list of complaint-based templates available to the physicians. Each physician also has the ability to create or modify his or her own version of these templates.

The CEHRT is not required to have a text-searching capability, only to create notes that are text searchable. The notes that are created by the 'Notewriter' activity are text files, which are searchable and exportable.

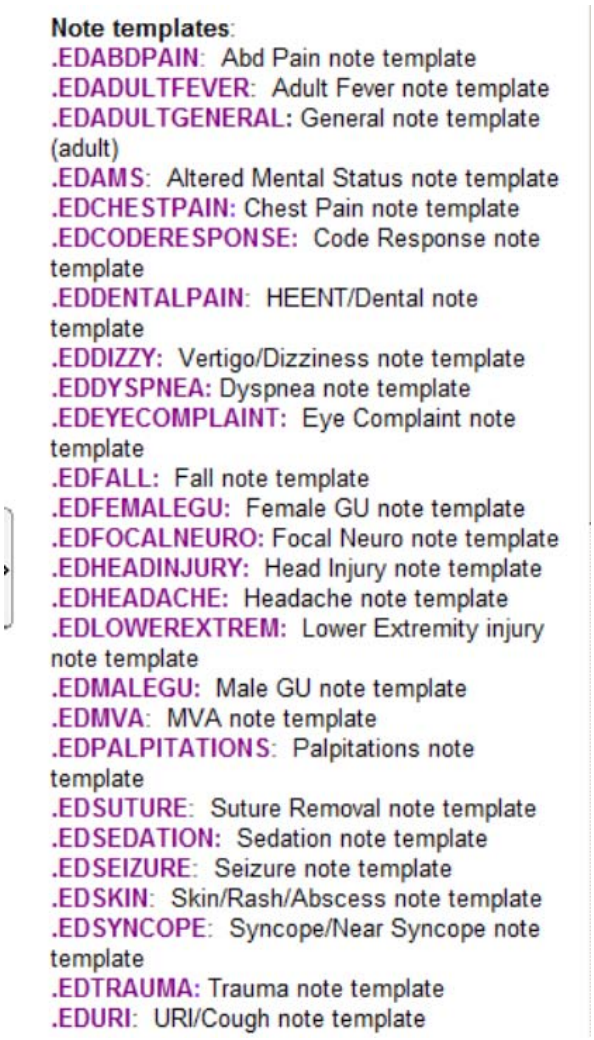


Figure 21, List of Emergency Department notes from [**43**]

Summary: Kadlec Regional Medical Center should already be meeting this Stage 2 'menu set' objective with its current implementation of the Notewriter activity, as well as the workflows of providers within the inpatient care areas. Kadlec should run Stage 2 meaningful use reports for this measure as soon as they are available, to validate this material.

It is recommended that Kadlec pursue this objective as one if its three 'menu set' objectives for attestation for Stage 2 of meaningful use.

4.4.6 Provide Structured Electronic Lab Results to Ambulatory Providers

Objective: Provide structured electronic lab results to ambulatory providers. [**84**]

> **Measure 1:** Hospital labs send structured electronic clinical lab results to the ordering provider for more than 20 percent of electronic lab orders received.

Discussion: As previously mentioned, Kadlec's LIS is currently Sunquest version 6.4.2, which is maintained by TCL. This version of the Sunquest software is currently a certified EHR module based upon the 2010/2011 specification. The new 2014 specification requires the LIS to have the capability to provide structured electronic clinical lab results to ordering ambulatory providers, and it is assumed that the current version of this LIS software will meet the 2014 certification requirements and that Sunquest will pursue this certification.

If Sunquest does obtain the 2014 certification for its LIS, then Kadlec will need to assess whether the LIS is providing structured laboratory results back to ambulatory providers for all electronically received orders which are processed by Kadlec Regional Medical Center.

- This assessment will require report development by TCL from the Sunquest system, specific for Kadlec Regional Medical Center
- These reports will need be created and validated, run and archived, in order to support attestation requirements for the medical center

Summary: It is felt to be very likely that the current version of Sunquest software will be updated to ensure that it is certified to meet the 2014 CEHRT requirements. If for some reason Sunquest decides to leave this version as legacy, then TCL will need to update their LIS software to a version which is certified to the 2014 standards; as TCL labs provides services by contract to all three of the local hospitals; all of whom need to meet the meaningful use requirements.

It is assumed that TCL will be able to meet these requirements to provide results as structured data back to ambulatory providers

In order for Kadlec to able able to attest to meeting this objective, TCL will need to create, validate and run reports specific to this measure; filtering on (a) ambulatory labs, (b) received electronically, (c) performed by the hospital, and (d) resulted electronically to the provider as structured data. This will likely require development time and resources outside of the hospital's control.

It is recommended that Kadlec Regional Medical Center pursue this objective for Stage 2 of meaningful use, and request TCL to create and run these reports on a frequent basis. This will initially establish how the medical center is performing, once developed; however in addition it will start a process that may have a significant lag time due to Kadlec not possessing the resources and being forced to rely on a contracted agency.

It is notable that the majority of Stage 1 'menu set' objectives became core set objectives in Stage 2, and it is expected that this will be replicated in Stage 3. Thus, it is anticipated that Kadlec Regional Medical Center will be required to meet this objective in FY2016 with

Stage 3 implementation, though the threshold for the measure may increase significantly from its current level of 20%. Pursuing this early is in the interest of the medical center.

Core Set Stage 2 EH Objectives:	Low Effort	High Effort	Recommended Selection
Use CPOE for medication, laboratory and radiology orders directly entered by any licensed healthcare professional who can enter orders into the medical record per state, local and professional guidelines	X		
Record demographics	X		
Record and chart changes in vital signs	X		
Record smoking status for patients 13 years old or older	X		
Use clinical decision support to improve performance on high-priority health conditions	X		
Incorporate clinical lab-test results into Certified EHR Technology as structured data	X		
Generate lists of patients by specific conditions to use for quality improvement, reduction of disparities, research, or outreach.	X		
Automatically track medications from order to administration using assistive technologies in conjunction with an electronic medication administration record (eMAR).	X		
Provide patients the ability to view online, download, and transmit information about a hospital admission.		X	
Identify patient-specific education resources and provide those resources to the patient.	X		
Perform medication reconciliation	X		
Provide a summary of care record for each transition of care or referral		X	
Submit electronic data to immunization registries	X		
Submit electronic reportable laboratory results to public health agencies		X	
Submit electronic syndromic surveillance data to public health agencies		X	
Protect electronic health information created or maintained by the certified EHR technology		X	
Menu Set Stage 2 EH Objectives:			
Record whether a patient 65 years old or older has an advance directive			X
Imaging results consisting of the image itself and any explanation or other accompanying information are accessible through Certified EHR Technology			X
Record patient family health history as structured data			
Generate and transmit permissible discharge prescriptions electronically (eRx)			
Record electronic notes in patient records			X

Provide structured electronic lab results to ambulatory providers			

Table 1, List of Stage 2 Meaningful Use objectives and implementation effort

Summary and Conclusions

The results of this evaluation of Kadlec Regional Medical Center, its current performance against unchanging Stage 1 meaningful use requirements, and an assessment of the likely performance against new Stage 2 meaningful use measures is actually quite reassuring.

It is important to note that it is as yet unclear how Epic will write many of it's future reports for Stage 2 meaningful use, much less what configuration options it will provide for these reports to its client hospitals. Kadlec Regional Medical Center was previously forced to abandon its plan of using the 'all emergency department' denominator, due to Epic's reports being unable to support this option; despite this being a specific option for EHs within the meaningful use regulations.

While recognizing this reporting uncertainty, and making basic assumptions such as the fact that Epic version 2010 will be certified to meet the 2014 CEHRT requirements, and the current Sunquest LIS will be certified to 2014 standards as well, Kadlec Regional Medical Center appears to be able to concentrate its time and resources on only a few 'difficult' objectives in the upcoming year.

It is recognized that the medical center should likely pursue all menu set objectives for Stage 2 meaningful use, as there is a high likelihood that they will be incorporated into Stage 3 as mandatory requirements. Due to the short period of from now until the hospital needs to attest for Stage 2 meaningful use, however, it makes most sense to concentrate attention and resources to the high effort core objectives, and resolve those issues as quickly as possible, planning to tackle residual menu set objectives after attestation.

Of the 'high effort' objectives, one was placed into this category due to the requirement to influence patient behavior and ensuring that 5% of the patients actually access their medical records online. This will require minimal IT implementation, other than ensuring that information is propagated to the patient portal; however it will likely require significant workflow and discharge process changes in order to be successful. In addition, this objective will provide patients with unprecedented access to their medical records in a manner with which the organization and its medical staff have not dealt with previously. It is anticipated that this is cause significant trepidation on behalf of the medical staff, and unforeseen management and policy issues for the medical center.

The remaining four objectives were placed into the 'high effort' category due to IT implementation issues. The summary of care objective is of concern, as the medical center needs to influence the behavior of non-affiliated referral physicians; either getting them to receive electronic summary of care records into their certified EHRs, or getting them to 'pull' electronic summary of care records from the state HIE. Obtaining the commitment of resources from these providers in order to ensure that summary of care documents can be successfully received by them will likely be a daunting task.

The reportable laboratory results objective is considered 'high effort', or more appropriately 'high risk', as it is reliant upon a third party to ensure that (a) their maintained version of the LIS becomes certified to 2014 standards, and (b) they develop, test, and maintain a functional reporting interface with the Washington State Department of Health. If they are unable to develop this interface, then Kadlec will need to stand up its own interface with the

Department of Health, however in doing so will still be reliant upon TCL to appropriately flag all abnormal results.

Lastly, the requirement to 'protect electronic health information' has been identified as a 'high effort' objective as well, due to the requirement to provide encryption on devices where the EHR is designed to store 'electronic health information' on the device. There is certainly no delineation of which EHRs do and do not have this functionality, however it is clear that the Epic EHR does currently allow for the storage of electronic health information on end user devices. If this objective requires the encryption of those devices, then Kadlec may have a significant logistic, financial, and temporal resource commitment in order to meet this objective.

Kadlec Regional Medical Center, like most hospitals within the United States, is facing the imposition of new regulatory and financial requirements related to the adoption of HIT. In addition, the adoption and implementation of new information technology and workflows into the clinical space is occurring faster than any time in history. This pace of adoption brings new challenges, as well as clinical, financial, efficiency, productivity and legal risks to the organization and medical staff. By thoughtful analysis, and purposeful focus of resources and time on high risk areas, Kadlec and other healthcare organizations are much more likely to achieve their goals while minimizing adverse outcomes. It is recommended that organizations going through similar changes adopt a focused analysis and prioritization method such as that performed in this project.

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