Creating Quality

In This Issue….

WELCOME

Creating Quality is your resource for gaining insights from our deep-dives into public use information, direct work with our client hospitals, and relationships with other organizations. *Creating Quality* will provide the in-depth analysis and review needed in order to turn research into action.

Our clients provide insightful questions that prompt many of our research studies and create collaborative projects with them. Future issues of the journal will invite our clients to share their quality improvement stories. We recognize that turning your quality improvement stories into publications is not a trivial matter, so I offer my staff to assist in this labor. Your colleagues want to hear how you have accomplished so much and we want to serve you both.

Creating Quality provides a variety of articles and editorials, from "telling the story" to aggregate analysis of the system of inpatient psychiatric care. Content will be relevant to the needs of clinical staff, quality managers, and administrators.

We welcome feedback from all our clients so that we can make *Creating Quality* the go-to journal for inpatient psychiatric care.

Best Regards,
Lucille Schacht, PhD, CPHQ, Director and Editor for this issue

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Torre Boyd, MS, NCC, Project Manager

Glorimar Ortiz, MS, PhDc, Principal Biostatistician

Missy Rand, LPC, CSAC, Clinical Quality Educator

Robert Shaw, MA, Senior Research Analyst

Alexis Tyson, Quality Improvement Specialist

Kamal Kohli, .Net Developer

Editorial: Current and Future State of EHRs in psychiatric hospitals

By Lucille Schacht, PhD, CPHQ

The Electronic Health Record (EHR) continues to be a driver for operational changes and touts to be a more reliable source for performance measures. Why is inpatient psychiatric practice behind on adoption? Let's address operational change first. There is a certain comfort in the old paper medical record. We recognize that it has its shortcomings, notably a lack of standardization across providers, and the ever-present issue of unreadable handwriting. However, it can be easily copied and given to the consumer for reference; it can be copied and given to another provider for the continuation of care; it is not susceptible to power or internet failures. A paper medical record requires no special skills for documentation and the entire record is available to all the clinicians involved with the consumer.

An electronic medical record, on the other hand, requires some computer skills, navigating multiple screens for direct entry as well as reviewing other clinical data contributed by other staff. The options for free-text may be limited or may be combined with required check boxes. Workflows are often different from the old paper record. An extensive computer system is needed as a backbone that requires specialized skills for maintenance as well as development. Having all consumers' data in a centralized (or decentralized) data store enables quick analytics, given the correct permissions and tools.

Now to my second point – is an EHR a more reliable source for performance measures? What makes data reliable? Storage is not the answer. Defined and validated processes for entering data, clear and well understood definitions of data fields, identified (and accepted) source of "truth" for information; these are the factors that make data reliable. These factors cannot be assumed to be true unless they are tested much like the

required testing of the reliability of a paper record. The technology may be the easy part; writing code is easy, ensuring that everyone is using the same rules when they enter the data is not.

> **Electronic Health Record**
>
> An electronic health record, or electronic medical record, is the systematized collection of patient and population electronically-stored health information in a digital format. These records can be shared across different health care settings. Records are shared through network-connected, enterprise-wide information systems or other information networks and exchanges. EHRs may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images, vital signs, personal statistics like age and weight, and billing information.
>
> Wikipedia

Electronic storage makes the calculation of performance measures more reliable. A defined algorithm that applies rules in a specific order can ensure that the output is reliable. But the algorithm relies on how data are stored, the code sets that are used, and standardization of those code sets. The validity of the calculation depends on how the original data are gathered and entered into the electronic system.

Electronic health records are necessary. The technology exists, although it needs some guidance for its utility to be optimized for inpatient psychiatric care. Consumers, and their caregivers, want an easily transportable record to help them navigate care. Clinicians may find that standardizing the collection of information enables key psychiatric and medical concerns to be the focus of attention and ultimately improve

patient safety. In order for the EHR to meet the various needs of stakeholders, from clinicians to consumers to administrators and beyond, leadership will need to find and then dedicate resources to maintain an electronic system. There are benefits to electronic health records that cannot be found in continuing to use paper records. Unified record-keeping means more staff time can be spent on direct care. Electronic storage promotes advanced analytics using common and consistent assessment of the quality of care.

The first issue of *Creating Quality* focuses on Electronic Health Records (EHR).

What is the status of using EHRs for transitions of care and where does interoperability fit in this picture? These are the two attributes of greatest interest to CMS (Center for Medicare & Medicaid Service), as demonstrated by mandated reporting and financial incentives. While CMS played a significant role in enabling the uptake of EHR technology among physician offices and acute inpatient medical care, there have been no incentive funds available to inpatient psychiatric providers. Ms. Ortiz's study shows that a greater proportion of acute (medical) inpatient hospitals use EHRs during transitions of care, and there is a considerable gap for free-standing specialty psychiatric hospitals. Can specialty providers catch-up to meet the future requirements from CMS?

What is the status of general uptake of EHR technology in state psychiatric hospitals? NRI conducted a recent study with the NAMSHPD Medical Directors to learn about the implementation of EHRs, the pros and cons of different system, the barriers to implementation and the reasons for changing/upgrading systems. Mr. Shaw's study explores the barriers to implementation and the high rate of upgrading of EHRs.

As more hospitals begin using EHRs for more complex information, data in electronic format can be easily extracted and is less prone to human error. In the final article, I discuss the fundamental differences between abstraction and extraction of medical records. I propose that inpatient psychiatric care has entered a grey area with the breadth of information that is electronic but the lack of consistent and uniformly applied code sets.

The journey is still unfolding; the networking among providers will build better systems. We will continue to release targeted papers on EHR adoption and guidance on how to help your system meet your needs. Technology may be the easy part, but it is not totally in your control. The importance of clinicians' involvement in building and refining systems that are the evidence of their work cannot be understated. But you are not alone, and we are on this journey with you.

Trends in the Use of the Electronic Health Records During Transitions in Care at Inpatient Psychiatric Facilities

By: Glorimar Ortiz, M.S., Ph.D.c

Introduction

An electronic health record (EHR) is the digital form of a client's medical paper chart (Rathert, Porter, Mittler, & Fleig-Palemer, 2019). The evolution of a paper-based client chart into an EHR is based on the notion of the timely generation of data that may be used to improve the coordination and integration of care (O'Malley et al., 2009). EHRs may transfer information more efficiently across various settings, may increase the quality and accuracy of data, and may support the decision-making process (Bemat, 2013).

The proportion of hospitals adopting EHRs is growing (Boonstra, Versluis & Vos, 2014) but the implementation in the mental health field has been slow. A study showed that the uptake of the EHR is significantly slower in psychiatry settings (Kokkonen et al., 2013). A systematic review of 21 articles showed that implementing an EHR could be a complex undertaking, but applying a framework that includes the context, content, and the process may help overcome typical problems (Boonstra et al., 2014).

In 2012, the Centers for Medicare & Medicaid Services (CMS) implemented the Inpatient Psychiatric Facility Quality Reporting (IPFQR) program as mandated by section 1886(s)(4) of the Social Security Act, and amended by Sections 340(f) and 10322(a) of the Affordable Care Act (Pub.L.111148) (Centers for Medicare & Medicaid Services [CMS], 2017). The program strives to provide consumers with quality of care information that could be used for decision-making about their healthcare services. It also promotes the adoption of best practices of care among participating facilities. Since its implementation, the program has continued to evolve, approving new measures and retiring others when appropriate.

In 2014, CMS began requiring facilities participating in the IPFQR to provide an attestation about their use of an EHR (CMS, 2018). Failure to report required information may result in a two percentage point reduction in the daily reimbursement rate. Reporting facilities for the IPFQR include free-standing psychiatric facilities and psychiatric units in general hospitals.

The main purpose of this study was to identify through CMS public use files trends in using EHRs during transitions of care for facilities participating in the IPFQR program. The study also explored the proportion of facilities that exchange health information with a health information services provider.

Method

The study involved quantitative analyses of data from Hospital Compare, a public use database provided by CMS that provides the performance measure rates for facilities in selected CMS quality programs. It is the goal of CMS to promote the use of Hospital Compare by consumers for decision-making about health care (Medicare.gov, n.d.a.).

The data for the IPFQR program and analyzed for this study were downloaded from the CMS website "data.medicare.gov", which includes quality of care measures for psychiatric facilities (Medicare.gov, n.d.b.). Along with the measure rates, the database contains demographic

information for the facility (facility's name, address, city, state, zip code & county) and a unique provider number that was used to categorize participating facilities as free-standing psychiatric facilities and other facilities with psychiatric units. Free-standing psychiatric facilities are facilities that have a license or registration to focus their scope of services on inpatient psychiatric care and to maintain their license, the facility must demonstrate that it continually assesses and improves the quality of its care, treatment, and/or services (The Joint Commission, 2018). Free-standing facilities in this study included public and private psychiatric hospitals. Other facilities included general acute care hospitals with designated psychiatric units.

There were two questions posed by CMS as part of the IPFQR program that relate to the use of EHR technology.

1. Which of the following statements best describes your facility's highest level of typical use of an EHR system (excluding the billing system) during the reporting period at times of transitions in care?
    a. The facility most commonly used paper documents or other forms of information exchange (for example, email) not including the transfer of health information using EHR technology at times of transitions in care.
    b. The facility most commonly exchanged health information using non-certified EHR technology (that is not certified under the ONC HIT Certification Program) at times of transitions in care.
    c. The facility most commonly exchanged health information using a certified EHR technology (certified under the ONC HIT Certification Program) at times of transitions in care.
2. Did the transfer of health information at times of transitions in care include the exchange of

interoperable health information with a health information services provider (HISP)?
    a.   Yes
    b.   No

Data were available for three years of the IPFQR program, representing the end of calendar years 2015, 2016, and 2017. Frequency and chi-square analyses were performed to compare free-standing facilities and other facilities in their implementation of EHRs during transitions in care. Analyses were conducted using SPSS version 22.

Findings

Facility sample

Table 1 presents the number of psychiatric facilities that submitted data to CMS for the IPFQR program by study year. There has been a conservative but steady increase in the number of free-standing facilities participating in and reporting data to the IPFQR program. However, free-standing facilities represent on average only 33% of all participating facilities.

Table 1. Number of facilities submitting data to CMS

|	2015	2016	2017
Free-standing facility	533	544	554
Other facilities	1,101	1,100	1,099
All facilities	1,634	1,644	1,653

Note. Other facilities include general acute care hospitals with designated psychiatric units.

Highest level typical use of an EHR system during transitions in care

Figures 1-3 describe the highest-level typical use of an EHR system during transitions in care reported by psychiatric facilities.

The figures display the EHR use rate by the level of the EHR (certified, non-certified & no EHR) by type of facilities. An increasing trend in the use of certified EHRs during transitions of care was observed for both free-standing facilities and other facilities (Figure 1). However, other facilities (general hospitals with psychiatric units) were significantly more likely to use certified EHRs than free-standing facilities.

Figure 1. Trend of certified EHR use during transitions in care
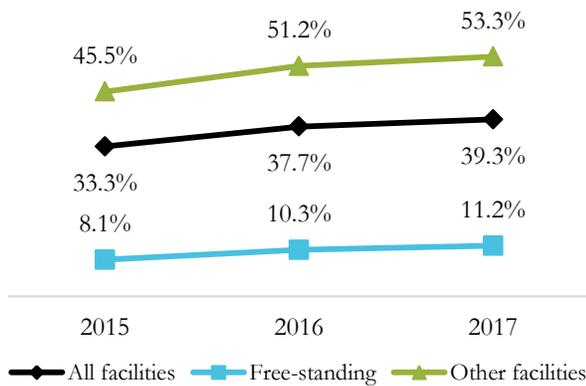
The magnitude of change in EHR use reported from 2015 to 2017 was also larger for other facilities than for free-standing facilities. At the end of 2017, only 39% of all facilities used certified EHR technology during transitions in care. Facilities have increased the use rate of certified EHRs across years.

Figure 2 shows that very few facilities use non-certified EHR technology during transitions in care. A slightly larger proportion of free-standing facilities used non-certified EHRs than other facilities during 2016 and 2017. In 2016, there was

a higher peak of non-certified EHR use for free-standing facilities than for other facilities. This gap was smaller by 2017. Overall, use of non-certified EHR technology was reported by about 3% of facilities.

Figure 2. Trend of non-certified EHR use during transitions of care
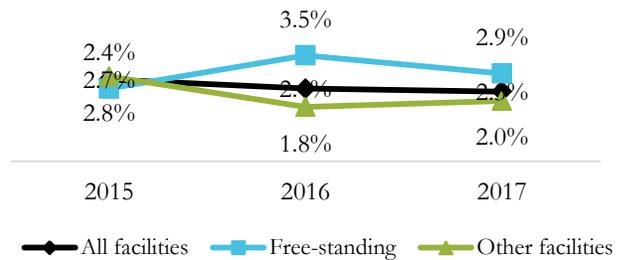
Figure 3 demonstrates that, across years, a significantly larger proportion of free-standing facilities did not use EHR technology during transition in care compared with other facilities. These rates represent that 6 out of 7 of free-standing facilities compared to less than 1 out of 2 of other facilities use a paper-based system during transitions in care. Facilities have been decreasing the use of paper-based documents during transitions in care across years; however, this

Figure 3. Trend of no EHR use during transitions in care
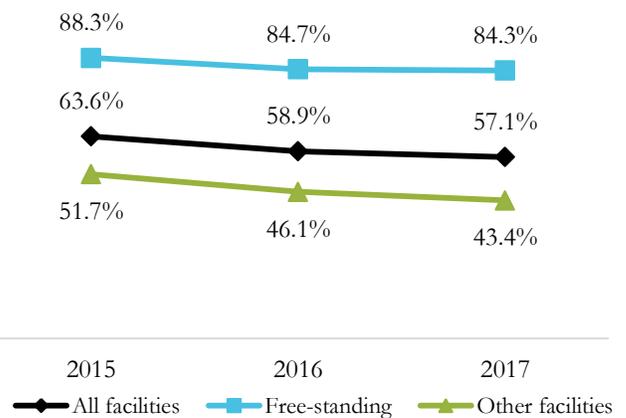
decrease has been slow.

Exchange of interoperable health information with a health information services provider

The transfer of health information during transition in care is further explored using two additional criteria: interoperable data and use of a health information services provider (HISP). Figure 4 demonstrates that a significantly lower proportion of free-standing facilities use interoperable data exchange functionality in their EHR systems compared with other facilities. Other facilities showed an increasing trend of exchanging interoperable data with a health information services provider, although by 2017 only 50% of facilities had such capability.

Figure 4. Proportion of facilities that exchange interoperable information

(Legend: ■ All facilities ■ Free-standing ■ Other facilities)
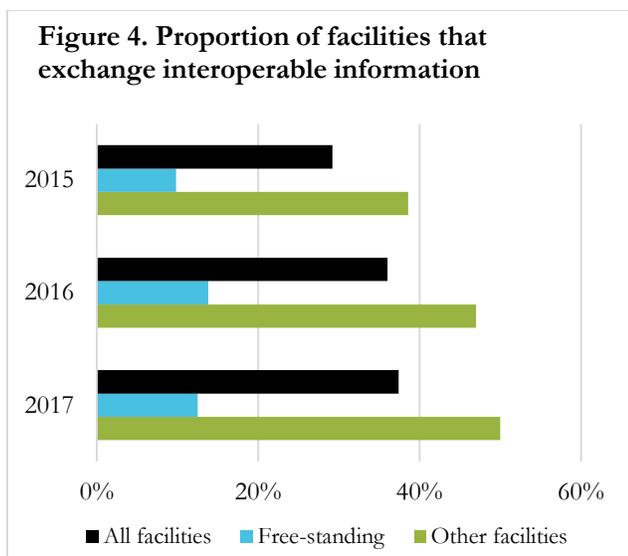
Insights

The focus of the CMS attestations was the use of an EHR system during transitions in care. The attestations do not assess general implementation of EHR technology. For the IPFQR program, 67% of the psychiatric facilities are general acute care hospitals with designated psychiatric units, and 33% are free-standing psychiatric hospitals. Therefore, the national aggregate from CMS will

be more reflective of general acute care hospitals than specialty psychiatric hospitals.

There has been an increase in the proportion of psychiatric facilities using certified EHR technology during transitions in care (33% to 39% over 3 years). General acute care hospitals are 5 times more likely to use certified EHR technology during transitions in care than specialty (free-standing) psychiatric hospitals (53% compared to 11%).

The proportion of facilities using non-certified EHR technology during transitions in care has remained constant and low (under 3%).

The proportion of facilities using paper records during transitions in care has decreased (64% to 57% over 3 years). General acute care hospitals are half as likely to use paper records during transitions in care as specialty (free-standing) psychiatric hospitals (43% compared to 84%).

At the end of 2017, 41% of all psychiatric facilities used certified or non-certified technology during transitions in care and 37% of all psychiatric facilities transferred information during transitions in care by exchanging interoperable data with a HISP. This high concordance suggests that most EHR technology has the capability to exchange interoperable data with a HISP. The high concordance rate applies to general acute care hospitals and specialty (free-standing) psychiatric hospitals.

Implications for Quality Improvement

CMS likely makes program decisions based on overall rates and those rates are heavily influenced by the performance of general acute care hospitals. Free-standing psychiatric hospitals are markedly behind in using EHR technology during transitions in care. Most EHR technology appears to have the capability for interoperable health data (common data elements, common code sets) and

exchanging that data with HISP. Future trends in CMS quality programs rely heavily on effective EHRs for both tracking patient data and providing a seamless record for the continuity of care. EHRs can have significant benefits for patient care, can be used to address complex needs of psychiatric patients, and can promote service coordination and integration.

Move the needle. Uptake of EHR technology during transitions in care needs to be a focus of free-standing psychiatric hospitals, which lags significantly behind general acute care hospitals.

Work flow. Current work practices and work flows will need to be evaluated and potentially modified to optimize the use of EHR technology.

Leadership. Organizations need to ensure a balance of clinical staff and information technology personnel to ensure clinical utility of the technology.

Caution: garbage in, garbage out. A hospital cannot have confidence in the data extracted from the EHR if the clinical staff does not feel their data entry into the system serves them in their interactions with patients.

Feedback loop. Organizations need to use the data in its detail and in aggregate summaries with the clinical staff to test reliability and validity of the data.

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CMS Public Use Data Files

CMS Public Use Data files are available on-line. There is no fee and no registration required. The IPFQR program data is available from the Hospital Compare website (https://www.medicare.gov/hospitalcompare/) as downloadable files but it is not included in the Compare Reports where you can choose to compare up to three providers/hospitals on performance measures. The download retrieves the data from the Data.Medicare.gov site (https://data.medicare.gov/data/hospital-compare). We recommend going directly to Data.Medicare.gov for ease of download.

Choose Hospital Compare data sets. This page will tell you when the data was last refreshed or updated.

In the search box, type IPFQR. Three results should be returned. Selecting the name of the file will take you to a page to "export" (download) the data file. The description does not indicate what period is covered by the file. You can view a segment of the data file to determine the time period covered by the file. Three files shown represent Facilities, States, and National. The 2019 Payment Determination data was posted February 25, 2019. Facilities include all 1600+ facilities that reported any data to CMS for the IPFQR program. States is an aggregation of all facilities located within the state into a "state" rate. National is an aggregation of all data.

Barriers to Implementing an EHR and Reasons for Upgrading an Existing EHR

By: Robert Shaw, MA

Introduction

Implementing an Electronic Health Record (EHR) is an expensive (Ross, 2011) and difficult undertaking (Ajami & Bagheri-Tadi, 2013; Boonstra, Versluis & Vos, 2014). However, it is a growing expectation that psychiatric hospitals have an EHR that can provide functionality for direct clinical care and for reporting on performance measures mandated by Centers for Medicaid & Medicare Services (CMS) (Centers for Medicare & Medicaid Services, 2019). With the technology in existence for many years now and the mandate ever-present, what continues to be barriers for adoption and are there any specific drivers for changing systems? This paper addresses those questions for state operated psychiatric facilities.

Method

A survey of state mental health authorities regarding the implementation of EHRs in their state psychiatric hospitals was conducted in the summer of 2018 in collaboration with the NASMHPD Medical Directors Council. Two sections of that survey are the focus of this paper. States were asked to describe their greatest barriers to the adoption and implementation of an EHR in their state psychiatric hospitals. States that had an existing EHR were asked whether or not they were planning to upgrade or change it and, if so, to describe their reasons. The answers to these open-ended questions were read and categorized to find common themes when possible.

States were grouped by whether their EHR was Netsmart, Homegrown, or an Other commercially available system. Twenty states used Netsmart, nine states used Homegrown systems (including Vista), and 12 states used other systems (including Cerner, Meditech, Harris, FEi, Meta, Reliable, Thrive, and TIER).

Findings

Barriers to Adopting and Implementing an EHR

Nine of the ten states without an EHR identified the specific barriers. Most states provided at least two barriers. Inadequate funding and the difficulty of finding an appropriate EHR were the most mentioned barriers to adopting and implementing an EHR.

Funding

Funding was the most common reason, with seven of the nine states reporting this barrier. One state expanded the description to indicate that funding for projects of this size was scrutinized by their legislature and by control agencies and thus difficult to secure.

Finding an Appropriate System

Finding a system appropriate to their needs was a reason given by four states. Three states expanded their description. One state reported that the difficulty finding an appropriate system lay with their hospital(s) serving medical and psychiatric patients. One state reported that there didn't seem to be a system that addressed the needs of a system focused on forensic patients and so were considering building a system themselves. Another state noted the difficulty of finding a system that

protects PHI but can also integrate with the various EHRs of external hospital systems.

Other barriers that were cited by only one or two states included:

- Aging physical infrastructure;
- Variation across hospitals; and
- IT issues.

Upgrading or Changing EHRs

Forty-one states reported a current EHR is use at their state psychiatric hospitals. More than half of these states (59%) reported planning to either upgrade or change their EHR system (see table 1). It appears that the adoption and implementation of an EHR is a process involving changes, as technology evolves and as requirements change.

Table 1. Is there a plan to upgrade or change EHRs?		
	Count	Percent
No	17	41%
Yes	24	59%

In most states that were planning to upgrade or change, the problem identified was that the current system was inadequate in some manner. The question about reasons to upgrade or change an EHR was open-ended; therefore, the counts in table 2 represent the multiple responses provided.
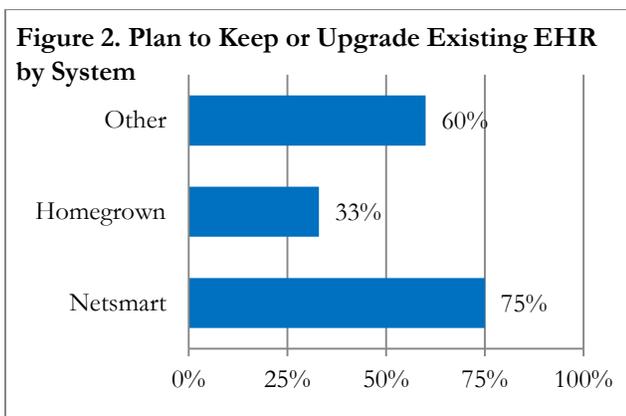
Table 2. If planning to upgrade or change EHRs, what reasons* were given?		
	Count	Percent
Current EHR is inadequate	21	88%
Upgrade same EHR to add functionality	8	33%
Current System outdated	4	17%
* States provided more than one reason		

As shown in figure 1, states with Homegrown and Other systems were more likely than states with Netsmart to plan on upgrading or changing their EHR.

Figure 1. Plan to Upgrade or Change EHR by System

Other 58%
Homegrown 78%
Netsmart 45%
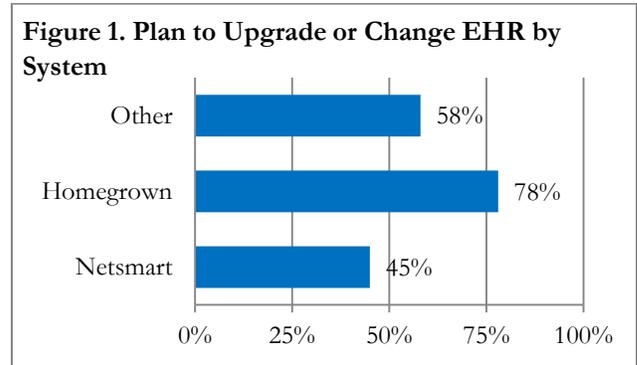
The perception that an EHR was inadequate did not necessarily mean than a state was looking to replace it. Among the 21 states who reported that their EHR was inadequate, eight states indicated that they were planning on upgrading their existing system rather than replacing it, four states indicated that they were planning to replace their vendor, and it was unclear what actions the remaining nine states were planning. Of the four states that reported that their system was outdated, two had Other systems and two had Homegrown systems. In addition, one state reported that they were required to re-procure their systems every six years even though they would recommend their EHR (Netsmart).

If the number of states that were planning on upgrading their existing EHR is added to the number of states that were not planning on either upgrading or replacing their EHR, then 61% of states were not considering replacing their current vendor. As shown in figure 2, states with either Netsmart or Other systems were far more likely than states with Homegrown systems to either keep or upgrade their existing system.

Figure 2. Plan to Keep or Upgrade Existing EHR by System

System	Percentage
Other	60%
Homegrown	33%
Netsmart	75%

(Bar chart with x-axis scale: 0%, 25%, 50%, 75%, 100%)

Reasons for Upgrading an EHR

States provided a variety of comments on the reasons they were considering upgrading or changing their EHR, including addressing areas of inadequacy in their current system. Most states provided a couple of discrete reasons. Below is a summary of this contextual data to identify the changes expected by an upgrade and highlighting the underlying inadequacies of current systems.

The system upgrades reported by states (with same or changed vendor) included the following:

- Improving functionality;
- Modernizing the interface or regular periodic upgrade; and
- Adding modules, such as ePrescribing, laboratory results, communication with outside entities/EHRs.

Implications for Quality Improvement

Most of the states that have not yet implemented an EHR reported inadequate funding as a leading reason. Among the states that have an EHR most were planning on either upgrading or replacing it. The most cited inadequacies of the systems were that it did not have all of the desired functionality, was not user friendly enough, and needed to be able to communicate with outside systems.

Although funding is an initial issue to adopt an EHR, it does not appear to be the driver for upgrading or changing EHR systems. Once a system has been put in place, functionality seems to become the driver of whether or not to upgrade or change EHRs.

States are looking to add components such as integrated medication management (ePrescribing for example) and communication with health information exchanges. States beginning the evaluation process may want to consider asking more specifically about the vendor's ability to meet these requirements.

States are also citing issues related to functionality and user-friendly interface. Here it is on the state and their team to clearly define what they expect in functionality (for example easy navigation, ability to create your own reports) and different user groups may define friendly in different ways. For example, the report writers may want a drag and drop option, whereas clinical staff may want just one screen for inputting their assessments.

Based on the experience of the states who reported that their EHR was inadequate, states considering changing or purchasing EHRs should consider whether an EHR or the vendor has the following attributes:

- The EHR connects to or integrates with other patient data platforms;
- The vendor has a positive reputation with other psychiatric hospitals;
- The EHR meets meaningful use requirements;
- The EHR system allows for health information exchanges;
- The EHR is user friendly;
- The EHR can integrate documents unique to psychiatric hospitals that are generated from other sources (referrals, consults, legal documents); and
- The EHR is not expensive to maintain.

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Resources

Office of the National Coordinator for Health Information Technology: https://www.healthit.gov/

HiMMS: https://www.himss.org/

HiMMS Insights: https://www.healthcareitnews.com/news/biggest-ehr-challenges-2018-security-interoperability-clinician-burnout

Association of EHRs https://www.ehra.org/

EHR vendors used by psychiatric hospitals:

Netsmart's Avatar family of systems, TIER (a substance use specific product from Netsmart), Cerner, Meditech, Harris, Fei-Web, Meta, Reliable Visual Suite, Thrive, Vista

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Data Abstraction: Getting the nuggets out of the medical record

By Lucille Schacht, PhD, CPHQ

Introduction

The patient's medical record is a resource of great value to the patient and his/her treatment team. It speaks to health status, the issues that have been identified, the options for treatment, and the choices that have been exercised. It is also the foundation for performance measures that attempt to assess quality of care by looking at processes, treatments, and outcomes (Centers for Medicare & Medicaid Services, n.d.; The Joint Commission, n.d.). Therefore, the patient medical record must be a source of "truth" if the data gleaned from it are to be used to evaluate the effectiveness, efficiency, and equity of the provider.

Definitions

What is "truth?" Truth is a value statement that indicates the authority of the source as correct. If one were to ask about diagnosis, for instance, truth would point to the psychiatrist's notation of diagnosis, whether listed in the DSM-5 or ICD-10 nomenclature. A more complex example is in order. If one were to ask about treatment's received, truth might suggest the psychiatrist's notes, the nurse's notes, the psychologist's notes, or the treatment plan. Each facility must decide on the source of truth and must ensure that all their clinical and administrative staff recognize and accept the source of truth. Truth is a critical concept to abstraction.

> **Truth is a value statement that indicates the authority of the source as correct.**

What is "abstraction?" In the simplest terms, abstraction is the process of gleaning key pieces of information (or data) from a medical record. For chart-abstracted measures, it is assumed that the medical record is in paper format and that a person will review the medical record to glean the key attributes. (See also The Joint Commission, n.d.)

What is "extraction?" In simple terms, extraction is a well-defined computer algorithm that pulls data from specific code sets (tables in an EHR) into an output table or report. (See also The Joint Commission, n.d.)

> **Abstraction is human review of the source.**
>
> **Extraction is machine review of the source.**

Additional terms to define are "point of service" and "measures." Point of service refers to direct entry into a computer system (EHR) by the clinician when services are rendered to a patient. Measures are objectively defined metrics to indicate performance in relation to a standard, target, or other criterion. Measures currently are categorized as either chart-abstracted or eCQM (electronic clinical quality measures).

Getting Ready

Getting to truth is a prerequisite before doing abstraction. The hospital must first understand what "measures" are utilized (either required or self-selected), and then the specific elements that make up those measures. NRI's Implementation Guide provides this discrete information for each measure. Every vendor must do this if the

measures are to be implemented in a standardized way and provide valid and reliable comparisons (both internally and externally). When the vendor is not the author of the measure, as is the case with The Joint Commission and Centers for Medicare & Medicaid Services (CMS) measures, the vendor must also align the source of truth from their specifications to the official authority.

Armed with the data bytes that are needed for a measure, the hospital then has the task of assigning truth for each element. If there is more than one source of truth, the hospital must provide a hierarchy for decision-making. If the measure author has defined a hierarchy of authority, the hospital must adopt that hierarchy.

Critical questions to answer for each data element:

- Are the data electronic and administrative
- Are the data electronic at the point of service
- Are the data on paper forms only
- Are the data in specialized databases (incident tracking)
- How will the hospital combine information across these different formats

The following table provides a review of key differences between abstraction and extraction. In addition to determining truth, the attributes in the table delve into issues of training, complex contextual data, multiple sources, corrections to data, and reliability.

Table 1. Comparison of Abstraction to Extraction.

	Abstraction	Extraction
Training abstractors	You must ensure all abstractors are trained to truth (and tested). Be sure to train all abstractors to the "rules" and any code set translations.	The computer program is the application of the "rules" and any code set translations.
Special case of clinical text	What level of clinical knowledge is needed to derive that a practice occurred to the level required in the rules?	Rules can be applied to the presence of key words or phrases. Check-boxes can be added to improve the extraction process.
If there is only a paper source	Review the paper forms to get the nuggets.	NA
If there is a paper source as well as an electronic source	Re-read the paper record to determine the values for the data elements. (This is testing the electronic system versus the paper system but only if you actually evaluate differences).	Write a computer program to "pull" the data from the identified fields in the electronic record.

	Abstraction	Extraction
If there is only an electronic source (no paper source)	Re-read the medical record and re-record the nuggets in another field using the specified code set. (This would be testing a re-coding process if you develop a mechanism to also extract from the original source.)	Write a computer program to "pull" the data from the identified fields in the electronic record.
Where to put abstracted data	If you abstract the values onto a paper form, you will also need to create an electronic version. You could alternatively abstract to an electronic form. The electronic form might be entered into a stand-alone database or integrated with an existing system.	Store the information "pulled" from the chart in another table, a report or in another output format in the computer system.
Correcting "bad" data	The paper or electronic record must be altered and re-signed for authentication. If changes are tracked in another place, it may lead to a different abstraction result.	The electronic source must be altered and re-signed for authentication. A new "pull" should retrieve the corrected data.
Reliability of abstracted data	Need to test "inter-rater reliability" because each person is trained, and you need to ensure that they all apply the same rules the same way all the time.	Single algorithm ensures the same rules are applied to all cases.

Changing Format of the Inpatient Psychiatric Hospital's Medical Record

As we have seen over the past several years, inpatient psychiatric hospitals have continued to move to electronic storage of the medical record. Many psychiatric hospitals run hybrid systems that include many key aspects of the medical record in electronic format (as in an EHR or other computerized system) and other elements in paper form. The most common data stored electronically are the patient ID, admission date, patient demographics (date of birth, gender, religion, insurer), criterion for admission, discharge date, and discharge disposition. These data (in electronic format) have been referred to as administrative data and are assumed to be extractable from the electronic system without "abstraction" (human review of the chart).

In an EHR system, these administrative data are entered at the point of service (on intake or discharge). Extraction for these data occur through well-defined computer algorithms that define the rules and value sets for the data (i.e. extraction is performed not abstraction).

There are also "incidents" that are tracked more fully through incident tracking systems, although some key parts are included in the patient record. In essence, the patient record has already been abstracted as to the occurrence of an incident and

supplemental information about the incident has been added for the incident tracking system and all the data have been computerized. The incident tracking system may also link to the EHR.

As psychiatric hospitals continue to expand their EHR capabilities, more data are sitting inside computer systems at the point of service, making abstraction more like extraction. Do the rules change? How uniformly defined do the structured data need to be in order to qualify as extractable? eCQMs are based on applying an algorithm to administrative and point of service data that are entered as structured data (based on a defined code set and not text). Do the EHRs used by psychiatric hospitals meet these criteria or are there still data elements that need to be converted from text into code sets?

Implications for Quality Improvement

Every time the hospital has a change in clinical practice, paperwork, a change or upgrade in EHR, it should re-validate its source of truth. Then it needs to assess modifications to the defined rules for abstraction and extraction that take into account those changes. For example, a hospital may expand its list of options for legal status based on a change in state law. The new options need to be included in the abstraction and extraction rules.

The human activity known as abstraction requires regular training, retraining, and testing against a standard. Training is needed by all levels of staff, while the details of the training should be specific to the staff's role.

Educate the clinical staff on the quality metrics that are used to evaluate the hospital's performance. It is their direct point of service data that are compiled into most of the measures.

All extraction routines (algorithms) should be clearly documented as to the codes sets and rules.

These algorithms should be reviewed whenever there is a change in documentation or EHR. This documentation becomes even more critical when there are staffing changes: institutional knowledge is lost and starting from scratch is a tremendous burden.

> **Every time the hospital has a change in clinical practice, paperwork, EHR or upgrade in EHR, it should re-validate its source of truth.**

The process known as "re-abstraction" is the second abstraction of a medical record. The result of the second abstraction is considered the gold standard (correct answer) and is compared to the first abstraction for any differences. The key to quality is ensuring that all abstractors follow the same rules "to the letter." Differences that are found highlight areas for retraining staff or potentially re-defining the source of truth. NRI has developed a data integrity review process to assist you in conducting your own re-abstractions and evaluating differences. The Joint Commission recommends that hospitals conduct reviews regularly and that vendors provide tools to assist their hospitals.

To improve the quality of data from the start, NRI has developed a "forms review" process and "abstraction forms." The forms review process aims to assist hospitals with identifying "truth." NRI staff compares the hospital's collection forms (intake form, face sheets, demographic sheets, assessments, transition records, etc.) with the identified measure requirements (data elements and code sets). We couple the review with a discussion on the data flow process: how information becomes known, recorded, and pulled into measures.

The "abstraction forms" provide the data elements and code sets that are reported to NRI for all measures used by The Joint Commission, CMS, and NRI-defined measures. Abstraction forms include only the data necessary for compiling measures, they hold secondary data (primary data is the medical record). NRI trains all new participants in the "abstraction" process as part of the discussion on compiling the required data for measures and offers this training to any facility, particularly when there is a new primary contact.

Finally, let's consider data abstraction within a larger context of activity for a hospital (see figure below). First and foremost, the medical record is a reflection on the interactions with patients, from the clinical formulations to the treatment activities to the development of discharge plans. Within this rich context of clinical activity also lays administrative activity, such as processing intake and referral information and transmitting documents to other providers. Above the clinical activity is the policy environment that enables and may direct specific activities. Data abstraction is deriving data bytes representing key attributes of larger clinical activities (NRI, 2014). For example, there may be 15-20 screenings that occur but only 4-6 key attributes from each of six screenings that are needed for performance measures. It is re-connecting the data bytes to the context that is the vital step needed to inform the quality of care and engage the clinical staff in quality improvement.

References

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The Joint Commission. (n.d.). FAQ Page, *How do eCQMs differ from chart-abstracted measures?* Retrieved from https://www.jointcommission.org/about/jointcommissionfaqs.aspx?faq#2437

NRI. (2014). *Data Flow and Mapping Guide*. NRI, Falls Church, VA.

Policy Environment

regulatory requirement, accreditation requirements, insurer requirements, best-practice standards, vision/mission statement, stakeholder expectations

Clinical Practice ----------------------------- **Administrative Practice**

Clinical Practice	Administrative Practice
screening, assessment, treatment plan development, individualized care, patient/family-directed activity, discharge planning	Intake and referral data, assignment of unit, insurance/billing, transmitting to and coordinating with other providers, compliance and quality improvement

Data bytes in larger Data Systems (EHRs)

basic demographic data, crosswalks and primary source mapping, keys nuggets from screenings and assessments, every change in diagnosis, every unit movement, every incident, key nuggets from discharge plan