Published in final edited form as:

J Technol Hum Serv. 2008 ; 26(1): 1–17. doi:10.1300/J017v26n01_01.

Psychiatric Information Systems: An Analysis of Inpatient and Outpatient Unit Capabilities

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Abstract

This paper describes how a sample of inpatient and out-patient psychiatric treatment units use technology to aid in patient care through scheduling, tracking, billing, and documenting clinical services. We conducted semi-structured interviews ($n = 68$) at four inpatient and four outpatient psychiatric facilities in Oregon. Results indicate psychiatric facilities are assembling systems for managing information that include a combination of electronic linked clinical records, paper records, and unit-specific, unlinked databases. Barriers remain in (1) improving the sophistication of psychiatric information systems, (2) improving linkages of behavioral health with other medical information systems, and (3) increasing information technology support.

Keywords

Behavioral health; informatics; psychiatric treatment; mental health; information systems

Addressing the quality of health care requires standardized, relatively complete, and valid data on services and outcomes (Drake, Teague, & Gersing, 2005). Medical facilities have struggled for more than 30 years to improve patient services with electronic medical records and health information systems that track clinical services, scheduling, and medication administration (Hersh, 2004). In addition, research indicates organizational effectiveness and patient safety can be improved by computerized practice management systems that integrate these clinical aspects of patient care with billing and performance management (Bates et al., 2001; Hersh, 2004). Although the proliferation of practice management and electronic medical record systems has reduced challenges in choosing software appropriate to clinical needs and integrating software into existing systems, challenges in the adoption of medical care tracking still include training staff in new procedures, and managing emotion and resistance regarding software implementation and use (Major & Turner, 2003; Sittig, Krall, Kaalaas-Sittig, & Ash, 2005). These efforts, however, have typically focused on primary care and hospital-based services only and have mostly excluded behavioral health, including psychiatric and drug treatment services.

The purpose of this qualitative research investigation is to provide an overview of the medical informatics capabilities and needs of a sample of inpatient and outpatient psychiatric treatment units. We describe (1) the types of electronic data systems that mental health treatment units use in their daily operations; (2) how these systems were used to inform patient care in case notes, insurance/billing, medication administration, and communication; (3) administrative, information technology, and health care staff perceptions of the usability of these systems; and (4) areas for improvement regarding information management and patient care.

Three frequently used terms identifying electronic data management systems in the health care field are “practice management system,” “electronic medical record,” and “health information system.” Generally, a practice management system is used for “front office” (scheduling) and “back office” (billing) functions. An electronic medical record maintains an electronic version of that which would be found in the jacket of a medical chart. A health information system is a combination of functions including patient tracking; billing; ordering; the management of lab, pharmacy, radiology and other clinical functions; and complete financial reporting. A health information system can, but does not always, include the electronic medical record function.

BACKGROUND

Behavioral health conditions (including psychiatric and substance use conditions) are common; they are complicated; and they frequently involve medical care services. More than 33 million adults are treated annually for behavioral health conditions, which includes about 20% of all working-age adults (18–54) and 20% of adolescents (Institute of Medicine, 2006). Further, there is an undeniable link between behavioral health conditions and physical health problems; behavioral health conditions often accompany chronic diseases such as diabetes, heart disease, and cancer, and they are associated with the leading causes of outpatient visits (e.g., headache, fatigue, pain). Treatment for behavioral health conditions also frequently involves multiple interventions (e.g., medication, case management, counseling) by multiple providers (e.g., psychiatrist, psychologist, social worker) in multiple settings, such as inpatient hospital units and outpatient treatment centers. Tracking and linking patient information during multiple episodes of service is a challenge.

Factors generally cited as barriers to integrating mental and physical health care may also affect the integration of information systems used in these settings. Historically, mental health has functioned as a separate entity, which results in mental health systems that tend to be underfunded and not connected to the mainstream systems of the organization. Other barriers include physical separation of medical and mental health provider practices, limited communication between medical and mental health professionals, differences in agency culture between medical and mental health settings, and territorialism (Hogg, n.d.). Further, mental health records are treated somewhat differently from other medical records. Psychotherapy records are often specifically granted a different status with stricter requirements than other medical records, including requiring a client’s written consent to disclose their records (Bazelon, 2002).

The Institute of Medicine (IOM) (2006) specifically identified the effective use of information technology as a pathway to improving the quality of care for psychiatric and substance use conditions. The IOM report identified a weak measurement and improvement infrastructure that could not meet the needs for data tracking and quality improvements. The IOM also indicated that the absence of a culture of measurement will continue to impede the delivery of quality behavioral health care, and will impact its parity with other health services. Further, the growing emphasis on the use of evidence-based practices has also resulted in an increased need for tracking and reporting among psychiatric and substance use treatment providers (Torrey, Finnerty, Evans, & Wyzik, 2003). Little is known, however, about agency information technology characteristics and needs of those individuals who provide these services. A report submitted to Oregon’s governor recommended the creation of a common health care information system in order to improve performance measurement, decrease medical errors, and increase efficiency in mental health services (Governor’s Mental Health Task Force, 2004).

The available evidence indicates that behavioral health providers in the United States track data primarily for regulatory requirements, and that their use of data to make decisions has been limited (McLellan, Carise, & Kleber, 2003; Wisdom et al., 2006). Descriptions of behavioral health data systems are also limited. The few reports available indicate that, like the fragmented behavioral health treatment system itself, behavioral health agencies typically combine commercial software with unlinked manual systems and paper records to create a nonintegrated and less than ideal “system” of information technology (Wisdom et al., 2006). A review of nine New York State mental health agencies by Major and Turner (2003) found that although most agencies (77%) had automated financial services (e.g., billing and accounts receivable), fewer (37.5%) had automated administrative functions (e.g., scheduling and census management). Less than 20% had automated clinical information capabilities, such as case management and treatment planning.

Increased emphasis on the implementation of behavioral health evidence-based practices highlights the need to implement new metrics and improve monitoring (Torrey, Finnerty, Evans, & Wyzik, 2003). In addition, increasing focus on the quality of care of medical services including behavioral health treatment indicates the need for improved performance monitoring.

This report describes the electronic data systems used by psychiatric treatment agencies in clinical services (e.g., case notes and medication administration), financial services (e.g., insurance and billing), and communication (e.g., electronic mail). Further, it describes agency staff perspectives regarding (1) the use of information to make decisions, (2) integration of behavioral health and information technology services, and (3) agency-identified areas for improvement.

METHODS

This report contains data that were collected as part of a larger study addressing behavioral health treatment units’ infrastructure and ability to implement and track evidence-based practices. Community partnerships of inpatient and outpatient facilities were identified in four Oregon cities: Portland, Salem, Corvallis, and Eugene. Rather than defining “community partnerships” as exclusive care providers to specific patients with mental illness, the units chosen tended to share many patients who transferred between inpatient and outpatient mental health care within the same geographic areas. We chose four of the most populous communities in Oregon and chose providers in those communities that served the highest number of Oregonians.

In collaboration with the unit directors, we identified individuals in each of the eight units via a method of purposive sampling (Blankertz, 1998). Purposive sampling involves deliberately selecting participants who are heterogeneous on factors designated as important to the concepts being studied (e.g., job duties). Interviewees in this study were: (1) medication prescribers (e.g., medical doctors or psychiatric nurse practitioners), (2) other clinical staff (e.g., nurses, mental health therapists), (3) administrative staff, (4) agency directors and clinical supervisors, or (5) information technology specialists. Most staff were employed exclusively within the mental health treatment unit. The most common exception to this was information technology staff; these staff often worked with the mental health units as part of a wider scope of duties. Identified individuals were invited to participate in interviews that addressed evidence-based practices. Roughly equal numbers of interviewees per unit were interviewed, and no scheduled interviewees refused participation. Interviewees received a \$5 gift card.

Experienced research staff asked study participants about methods used to track information by using the prompt, “Tell me about any electronic data management systems you have and their capabilities.” We asked for clarification on systems mentioned. We also asked respondents about how the systems are used in day-to-day activities, benefits of and challenges in using the systems, and their reflection on current unit-wide information technology capabilities. Research staff transcribed interview responses from participant answers.

We used qualitative data analysis software (Atlas.ti 5.0, Scientific Software) to help identify and organize patterns and themes; this method of analysis has been used in previous studies of information technology capability (e.g., Wisdom et al., 2006, 2007). Material reported from interviews as field notes or as directly quoted material in this article is italicized. Themes of participant’s responses are reported as sub-categories in the results section. We refer to electronic medical records generally, acknowledging various means of electronically tracking patient information.

We took several steps to increase methodological rigor of qualitative analyses: (1) multiple researchers participated in data collection and analysis to ensure multiple viewpoints and discussion of perceptions of data, (2) we sought consensus on coder agreement to ensure more accurate coding by conducting blind check-coding, and (3) we brought researcher findings back to knowledgeable staff members to verify our findings were accurate representations (Boyatzis, 1998).

The Oregon Health & Science University Institutional Review Board for the Protection of Human Subjects approved this study and provided oversight. Respondents were informed that their comments may be published and promised anonymity in published reports.

RESULTS

Overview of Units’ Data Systems

Table 1 provides an overview of agency data systems, including the type of software used, and how the agencies manage case notes, insurance and billing, medication, and electronic communication. Details of each agency’s data management are given in the following sections.

Unit A is a 32-bed, hospital-based inpatient psychiatric unit in a three-county, five-hospital system. The hospital uses an integrated health information system that integrates administrative, financial, and clinical applications. The health information system has a mental health module, but since the unlinked internal database existed prior to the conversion to the health information system, psychiatric unit staff were reluctant to investigate its capabilities. This has now changed and the module is being investigated by psychiatric unit staff. Currently, the inpatient psychiatric unit staff write case notes on paper, and the unit administrator keeps an unlinked, internal database to track client’s length of stay and census information because it is easier to manage than the health information system.

Unit B is a 24-bed inpatient psychiatric unit in an independent regional hospital system that covers a six-county region and offers services to the entire state. They use a customized practice management and limited electronic medical record system as a central resource directory that manages demographic information, medication administration, and laboratory reports, but notably is lacking an integrated case note system. Case notes are currently dictated to paper copies. The unit and hospital are moving to a health information system by 2008, which will provide a higher level of integration of clinical documentation, laboratory

findings, bar-coded medication administration, imaging, and e-mail. The unit and hospital also use a separate financial management system.

Unit C is a 36-bed inpatient psychiatric unit in a three-state, six-hospital system that has had an electronic medical record system for more than 15 years. The hospital has combined two primary information systems: (1) an electronic medical record maintains demographic and clinical information, and (2) a separate financial and administrative health information system manages clinical documentation (including pharmacy and radiology services), billing, and insurance. Patient case notes are dictated and printed on paper, then scanned into a single electronic medical record upon patient's discharge.

Unit D is a 54-bed inpatient psychiatric unit that is part of a four-state hospital system. At time of interview (September 2006), psychiatric staff wrote medication orders and progress notes on paper, and dictation notes were entered into an electronic medical record, although clinical notes were entered electronically in other hospital departments. Billing was conducted separately using a financial management system. The entire hospital system has been in the process of transitioning to a health information system that includes the capability for clinical documentation, medication tracking, pharmacy, and radiology, as well as other features that will be integrated in the future, including automated chart auditing and biotelemetry.

Unit E is a county mental health provider that manages behavioral health services for about 7,000 clients. The mental health department participates in the health department's customized practice management system and electronic medical record that had been in place for approximately two months at time of interviews. The practice management system manages scheduling, clinical documentation, forms and reports (including monitoring staff caseloads and documenting timeliness), as well as all billing functions. The county mental health system also uses a county-wide financial management system. The practice management system, electronic medical record, and financial system have sufficient linkage to eliminate double-entry of data.

Unit F is a county mental health provider serving more than 1,100 adults annually. Currently, they use a database that provides tracking for demographic information, and limited billing capabilities. Staff track scheduling and clinical case notes on paper. Staff report the county is currently (August 2006) beginning a systems review for updated health information management software that would integrate mental health, public health, corrections, and developmental disabilities services. The anticipated implementation of this might be in 2008.

Unit G is a county mental health provider that serves 3,400 people a year. The county mental health provider has used a practice management and electronic medical record system for the past year to track clinical documentation, scheduling, and billing. The health information system has a medication log that provides easy access to a client's medication history and current orders. Staff reported some limitations in the system as configured, including lack of ability to track documents from outside the agency, such as laboratory findings. The system can track the status of releases of information; the system does not support document scanning, so original paper copies of releases are maintained in client files. The county provider uses a separate database to conduct some data analysis via downloads from the health information system.

Unit H is a private nonprofit agency that provides mental health and addictions services in four metro area counties. The agency is currently using printable templates for documenting clinical information on paper and a financial management system, which manages client billing. Unit staff report plans for implementing an integrated health information system for

clinical records, combined with a subsystem for routing forms. Staff report the health information system will allow clinical documentation across multiple sites.

Across all units, there are a variety of methods to manage data needs. Hospital-based units tended to have more sophisticated systems, and county-based units tended to have less sophisticated systems. Many units used multiple systems to manage billing, medication, and case notes, with most units still having at least some paper-based recordkeeping.

Staff Perceptions of Data Management

Qualitative interviews assessed agency staff perspectives regarding (1) the adequacy of current systems, (2) use of information to make decisions, and (3) integration of behavioral health and information technology services.

Adequacy of Current Systems—Most interviewed staff reported that their information systems were adequate for the record-keeping required to do their jobs. Some acknowledged, however, that their systems, while adequate, were far from ideal. Interviewees cited challenges with current data systems such as an inability to easily track patients over time and the complexity of managing patient's data across multiple data systems. An interviewee said that the *lack of a universal data management system causes client information to get lost between agencies*.

A staff person at another unit was very positive about their comprehensive system, which he reported contained *just about everything connected to patient care*. He or she reported valuing the software's analysis functions to review where the agency is headed and analyze trends.

One inpatient unit was not able to retrieve demographic and census information easily from the hospital's electronic medical record system, and consequently created an adjunct, unlinked Access database to track admissions, discharges, county of residence, etc. Staff said the Access database *gave more accurate data than we could get out of [the current system]*. The unit is now working to integrate the two data systems or add additional fields to the hospital electronic medical record system for unit use.

Use of Information to Make Decisions—Units tended to use their medical record systems for record-keeping and billing, with little emphasis on tracking trends over time, at least at the unit level. One unit discussed challenges of moving case notes to an electronic format, but emphasized the importance of their current systems to maintaining regulatory reporting procedures: *It's hard to keep up with regulatory stuff if we don't have those [IT] systems up*. Units were creative in modifying current systems or creating sometimes cumbersome add-on systems to obtain the information they needed. These modifications were either created with consultation from the IT services, or were the work of an enterprising administrator.

Units were asked about the flexibility of their current medical record systems to adapt to new requirements or data collection procedures. Staff uniformly indicated that flexibility was not a strength of their systems, especially for units that were a part of a larger hospital system. An information technology director at a hospital-based system indicated that any new clinical intervention that required standardized data collection would be a challenge to implement at his or her unit: *The electronic medical record system we use is standard across three states, six facilities, and hundreds of clinics. If we were required in Oregon to implement new standardized scales [for an intervention], it could impact other states we work with. If other states didn't think the forms were useful, they wouldn't go along with it.*

Few individuals reported using their records systems at the unit level for ongoing performance management. Some of the hospital-based units had centralized performance management that capitalized on more sophisticated data systems.

Integration of Behavioral Health and Information Technology Services—

Behavioral health respondents reported a variety of experiences with information technology staff. Generally, respondents with higher skills, and those in larger hospital systems, tended to have more positive experiences with information technology staff.

County and community mental health units reported IT staff were often busy making improvements to current systems and often did not have enough time to manage other basic, ongoing needs. In addition, the need to spread services across multiple county health departments, including developmental disabilities and maternal and child health, resulted in mental health units receiving less attention than they would like, and slowed the progress of system-wide information system improvements. An information technology specialist within a county mental health system reported a typical challenge within county systems of balancing daily tasks that leave little time to develop innovations: *The health department is extremely volatile. They are moving staff every day, redeploying staff, moving staff from one location to three locations. There is high, rapid turnover among part-time and temporary staff. [Each] new staff needs a new computer and training for logging on. Further, a lot of facilities are leased or rented. Dynamic changes result and we scramble to equip new buildings on a moment's notice. Telephones are IT's responsibility too. IT staff needs to handle everything from a lost password to adding 70 new users.* One county behavioral health provider reported that all health services in the county share 2 full-time and 2 part-time/programming IT staff, which he indicated was insufficient for their many needs.

In contrast, staff at hospital systems tended to report that they had the IT resources they needed: *A lot of technology training is available on operating systems, databases, programming languages, and lots of application training.... The IT department has the largest per capita training budget in the organization and they spend it.* A common concern among hospital behavioral health staff was that behavioral health appeared to be a lower priority, particularly within larger hospital systems. Behavioral health staff not only reported that they understand prioritization, but noted it also causes concern: *IT looks at the whole hospital system and mental health gets tacked on at the end. It doesn't always fit us and someone from IT has to come in and help us. Mental health isn't always the priority. I'm concerned about our IT capability. I don't have a good feeling about that in the future.* A voice for psychiatric units appears adequate for this participant, who said, *Behavioral health does seem to be last to get IT help, but they're good about working with us and what our needs are. We may not be consulted as much as we'd like to be, but we do have a voice.*

Respondents reported varying degrees of collaboration with IT staff and consistently reported that behavioral health tends to have a lower priority for IT services than other units. The sophistication of IT services and the ability of behavioral health providers to work with IT staff to maintain and improve services remain a concern for many respondents.

Identified Areas for Improvement

Staff identified several areas for improvement regarding mental health information systems, including more sophisticated information systems, increased linkage of services within and across systems, and increased information technology support services by staff who understand mental health care.

More sophisticated information systems—Both hospital and county staff reported that although more sophisticated information systems would be ideal, lack of resources and

system complexity limits the ability to make progress. This county system struggled with identifying and finding funding for an electronic records system: *[Agency leaders] have been wanting to get treatment records online. They have been talking about it for years, but it would require a huge financial outlay, and it is hard to find software to meet all their needs.* Some of the units indicated they had identified electronic patient record systems that were meeting their needs, but counties that must integrate across multiple types of health care services may face greater challenges in identifying appropriate systems. In addition, county systems may be subject to more public oversight than a private hospital system, making the process for making system improvements a more politically charged situation.

Linkages within and across systems—Several units reported creating additional unlinked data systems to be able to track the information they need. Most units report using at least some paper records, which posed difficulties in quickly transmitting information. Staff reported that information gets “lost” because of gaps in the informatics infrastructure. The organization of a fragmented community mental health “system” poses challenges in creating these linkages while maintaining appropriate patient privacy.

Information technology technical support—Challenges exist for behavioral health care in that IT services are often organized within larger systems that may not prioritize behavioral health or understand its unique information technology needs. County information technology staff often must manage many types of health care provision, whereas hospital-based services have more specialized components (e.g., radiology software) to maintain. Staff indicated that advancement in information system quality would require significant information technology assistance by specialists who understand mental health.

DISCUSSION

This research analyzed (1) the types of electronic patient records used for information management; (2) how these systems were used to inform patient care in case notes, insurance/billing, medication administration, and communication; (3) health care staff perceptions of the usability of these systems; and (4) areas for improvement regarding information management and patient care. Findings indicate that mental health units tend to combine commercial software with in-house, unlinked datasets or paper records to create an information technology structure. Mental health treatment staff acknowledged limitations of their informatics system, and suggested that improvements can be made by implementing more sophisticated information systems, increasing linkages of services within and across systems, and increasing information technology support services by staff who understand mental health care.

Substantial differences were identified between county mental health systems and hospital-based inpatient units. County mental health systems typically reported less information technology support and a more cumbersome process for making system improvements. Hospital-based systems reported more information technology support, and typically had more specialized software (e.g., for radiology). Two units of the eight interviewed reported plans for making significant improvements to their information technology infrastructure in the near future.

Clinical case notes appeared most likely to be paper-based; this is consistent with the findings of Major and Turner (2003), who found that less than 20% of surveyed agencies had automated clinical information capabilities. Special protections that make behavioral health records unique may present a challenge especially for organizations seeking to standardize the electronic medical record across both mental and physical health. The desire

to standardize electronic medical records may not be appropriate in the case of organizations managing both mental health and other components (Newman, 2005). Effective patient care in a mental health setting is dependent upon the patient's belief that information will be held in complete confidence (Newman, 2005).

An issue that is notable in its absence is that few staff specifically discussed goals of performance management or quality improvement when considering their information technology systems. Given the reported reluctance of health providers to be involved in these endeavors (Hogg, n.d.), and the tendency of mental health workers to resist the adoption of new practices (Drake, 2003) this is not a surprising finding, but it is indicative of an area for improvement. Federal agencies (e.g., the Substance Abuse and Mental Health Services Administration) have invested substantial effort in creating national outcome monitoring standards; this manuscript may be useful in the agency's effort to improve the informatics infrastructure that would make tracking these monitoring systems possible. In addition, agency staff who choose and purchase behavioral health software, and those who create the software can consider incorporating methods for staff to easily extract data for performance management purposes.

This study is necessarily limited by its small sample and limited geographic area. It provides the groundwork, however, for a larger-scale assessment of informatics capabilities of behavioral health providers that should address a wider spectrum of providers, including independent community mental health centers and private practitioners.

The findings reported here suggest opportunities for improvement in behavioral health units' use of technology. Units would benefit from the identification of "best practices" related to information technology, particularly regarding integration of behavioral health units within larger systems, transfer of information across linked services, and training activities for staff regarding the use of data in making data-driven clinical and organizational decisions. A large-scale assessment of the information technology needs of behavioral health providers would be useful in this endeavor, particularly if it provides specific suggestions for the use of data in addition to administrative requirements. In addition, given that the health providers in this study all had at least some interaction with information technology, educational bodies that serve these professions (including degree-granting and continuing education programs) should provide training at a minimum to increase familiarity with these systems. Additional training for service providers that promotes a data-positive culture in behavioral health could expose trainees to specific data systems, describe typical administrative data requirements, and offer opportunities for the use of data to improve services. Similarly, there may be value in specialized behavioral health training for information technology specialists, so that they may also contribute to the effort to improve behavioral health informatics. An informed, data-positive culture in behavioral health could enable collaboration between service providers and information technology professionals to collectively increase the effective use of data to improve behavioral health services.

CONCLUSION

Behavioral health treatment units face unique challenges in integrating services for their clients. This analysis of inpatient and outpatient behavioral health treatment units indicates they may benefit from information systems more closely aligned with their needs, specialized information technology support, and training regarding the use of data in making data-driven decisions. The ability of the behavioral health care system to keep pace with the growing demand for accountability relies on its ability to harness the information systems to its advantage.

Acknowledgments

The authors appreciate the assistance of David A. Pollack, MD, Ann Hamer, PharmD, and Jon C. Collins, PhD. This work was funded by grant R24MH074912 from the National Institute of Mental Health, National Institutes of Health. Portions of this paper were presented at the American Psychiatric Association, San Diego, May 2007. This work was conducted while the first two authors were in the Center for Health and Disability Policy at the Oregon Health Policy Institute and the Department of Public Health and Preventive Medicine at the Oregon Health & Science University.

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TABLE 1

Agency Electronic Systems

	Unit A	Unit B	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Type of Agency	Hospital inpatient unit	Hospital inpatient unit	Hospital inpatient unit	Hospital inpatient unit	County outpatient MH	County outpatient MH	County outpatient MH	County affiliated outpatient MH
Insurance and Billing	HIS	PMS	PMS	Financial system	PMS	Database	PMS	Financial system
Case Notes	On paper	Dictated to paper	Dictated to paper scanned into EMR	On paper	EMR	On paper	EMR	On paper
Medication E-mail	HIS & EMR System- wide	EMR System- wide	EMR System- wide (secure)	EMR System- wide	EMR System- wide	On paper System- wide	EMR Used by some staff	On paper System- wide (secure)

Note: HIS = Health Information System; PMS = Practice Management System; EMR = Electronic Medical Record.