Advancing the adoption, integration and testing of technological advancements within existing care systems

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ABSTRACT

Objective: This manuscript reviews the work on uptake and dissemination of health information technologies in mental health populations and settings, with the goal of informing the future research agenda.
Methods: We reviewed both the formal and "grey" literature describing the rates and correlates of uptake for electronic health records (EHRs) and personal health records (PHRs) for general and specialty mental health settings.
Results: Rates of uptake and use of EHRs and PHRs are low in general medical settings, and the limited evidence suggests even lower rates for specialty mental health settings. Many of the patient, provider and system-level characteristics associated with lower rates of use in general populations would be expected to be exacerbated in mental health settings.
Conclusions: The findings suggest a need to better understand both the causes and strategies for overcoming barriers to uptake of health information technology (HIT) in mental health settings. Observational studies could help to better elucidate the barriers to adoption of HIT that are unique or disproportionate in mental health populations. Implementation science studies are needed to better identify strategies for addressing these barriers and optimizing uptake of mental health HIT interventions.

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1. Introduction

Health information technology (IT) and interoperable health information exchange (HIE) are central to efforts to improve healthcare quality and control the cost of health care in the United States [1–3]. Health IT is critical for engaging consumers in illness self-management, supporting providers in the delivery of evidence-based clinical care coordinating care across settings and over time and facilitating performance and outcome measurement [4,5]. The mental health system faces disproportionate challenges in each of these domains and, thus, could derive particular benefit from expanded use of Health IT [6]. Furthermore, because persons with mental illnesses, particularly those with comorbid medical conditions, are typically treated across multiple systems of care [7], research is needed about the best approaches for exchanging information between the mental health and medical systems as a tool for improving quality and outcomes of care.

A number of promising health IT interventions already exist that could be used to enhance care for persons with mental illnesses, most notably electronic health records (EHRs) and personal health records (PHRs). However, uptake of these interventions has been slower within the mental health system than for general healthcare. A research agenda in this area will need to systematically identify and develop strategies to overcome the barriers to adoption and use of these new health IT technologies for mental health consumers, providers and systems of care.

2. Methods

An a priori search strategy was developed to identify all studies examining uptake and use of technologies in mental health populations or settings. A comprehensive search without language restriction from inception through August 2011 was conducted within MEDLINE, EMBASE, CINAHL, PsycINFO, Social Sciences Abstracts and the Cochrane Library.

The search followed Cochrane guidelines from the Cochrane Effective Practice and Organization of Care Group [8]. Searches included the following terms: *mental*; *psychiatric*; *behavioral*; *health information technology*; *HIT*; *electronic health record*; *EHR*; *personal health record*; *PHR*.

The authors screened all citations, index terms, abstracts if available and the full text for all articles considered potentially relevant. Bibliographies were scanned for other potentially relevant studies.

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To identify gray literature on the topic, including conference proceedings, reports and white papers, the authors conducted Web searches and contacted informants with expertise in the field.

3. Results

3.1. EHRs in general health settings

A large body of work has demonstrated problematically low rates of use of health ITs in general health settings. The uptake of EHRs in ambulatory practices in the United States was initially low; a 2008 national survey of physicians found that only 13% of physicians had adopted EHRs [9]. However, rates have been rapidly rising; in 2011, 57% of office-based physicians used electronic medical record (EMR)/EHR systems, with about one third of physicians (34%) reporting having a "basic" system including patient demographic information, patient problem lists, clinical notes, orders for prescriptions and applications for viewing laboratory and imaging results [10]. A number of policy initiatives, including the Health Information Technology for Economic and Clinical Health (HITECH) initiative [11] and health reform legislation, have contributed to this rapid increase [12].

Studies have found that lack of capital resources, concern about physicians' ability to input into the EHR [13,14], complexity in choosing and maintaining electronic record systems [15] and uncertainty about future policy mandates [16] may all be factors contributing to low rates of uptake of EHRs by physicians. A recent national survey of family practitioners found continuing concerns among clinicians about lack of practical utility of EHRs [17]. Smaller and solo practices have consistently been found to be less likely to adopt EHRs [18,19], due to the required up-front investment and need for administrative and technical support [13].

3.2. EHRs in mental health settings

Fewer data are available about barriers to adoption of health IT in mental health settings, but the available literature suggests that the barriers are even more formidable than those seen in the general health system settings. A 2009 survey of 440 behavioral health organizations nationwide found that they only spent about half as much of their total operating budget on IT as general medical counterparts (1.8% vs. 3.5%). Fewer than half of the sites had implemented EMRs. Level of interoperability with general medical records was limited, and there was minimal knowledge or interest in participating in Regional Health Information Organizations or HIEs [20].

Other data suggest that psychiatrists are disproportionately less likely to use technology in general, and EHRs in particular, than other physicians. One study found that psychiatrists show a propensity for using less technological applications than other physicians [21]. Psychiatrists are significantly less likely to use IT to exchange data and images with hospitals and laboratories; obtain treatment alternative information; access patient notes, medical or problem lists and exchange data and images with other physicians [21]. Using data from the 2001–3 National Ambulatory Medical Care Survey, psychiatrists were the least likely of 14 specialties to use EHRs [18]. Those in smaller practices may be less likely than those in larger practices to use EHRs.

3.3. PHRs and patient portals

PHRs may improve patients' health by providing them with timely access to their health information and, when coupled with patient portals, may also provide a context to help patients to understand and make use of the information. While a growing number of studies have examined the effectiveness of PHRs on health outcomes [22–25], less

research is available on rates or predictors of uptake for PHRs. Studies have indicated that barriers to PHR use include both patient health literacy and activation and providers' skepticism towards reliability of data contained in them [26]. Populations including the poor, disabled and elderly may face particular challenges in using PHRs [27–30]. PHRs that have been developed as extensions of EHRs within particular health systems [31] have had higher rates of uptake than freestanding PHRs that do not automatically provide consumers access to health data [32]. Similarly, patient portals that are extensions of EHRs have been shown to increase patient and provider interaction leading to better management of chronic illness including chronic depression [33,34].

Few rigorous studies have examined the use of PHRs among persons with mental illness outside of primary care [35]. In a UK randomized trial of a paper PHR for persons with serious mental illness, 56% of the participants randomized to PHR did not use it, leading to a lack of significant improvement in study outcomes [36]. A study of patients attending a safety net clinic found that mental health and substance use conditions were not barriers to PHR use or access to Web-based health information but that low levels of computer literacy created a more significant hurdle [37]. In the US, California recently developed a personal mental health record that was made available, free of charge, to mental health consumers across the state. Of more than 11,000 PHRs made available to consumers, only 448 consumers, or less than 4%, logged in one or more time during the first 12 months after the record was established [38].

4. Discussion: directions for future research

The results of this review suggest that uptake of EHRs and PHRs are low in general health settings. The limited data on use in mental health settings suggest even lower rates of uptake.

These findings suggest two complementary areas of research addressing the issue of barriers to adoption of health IT PHRs among mental health patients and EHRs among mental health providers. First, descriptive research is needed to identify barriers that may uniquely or disproportionately affect EHR adoption in mental health settings or PHR uptake among mental health patients. Second, dissemination and implementation research is needed to understand how best to encourage adoption of IT and to optimize its use. Each of these can be organized across three categories of barriers that might be expected to disproportionately affect mental health providers and persons with mental illness − patient, provider and system-level factors.

4.1. Identify barriers and facilitators to uptake of IT across mental health patients, providers and systems

Persons with chronic and severe mental illnesses may have limitations in cognition [39] and health literacy [40,41] that could reduce their ability to engage with PHRs and other patient-centered forms of technology. These patients are typically poor, which may limit their access to computers [42]. Social disadvantage and chaotic lives may make engaging in health technologies a relatively low priority amidst the demands of day-to-day living.

Qualitative approaches could be particularly useful in identifying these symptom-based and socioeconomic factors and how they interact in influencing patients' abilities to access health ITs.

Mental health providers are highly heterogeneous, with a much lower proportion of physicians than are seen in the general medical sector [43]. There are inconsistencies in levels of education and experience for mental health care workers and a wide range of licensing and credentials [44]. The graying of the mental health workforce may also pose challenges in adoption of IT [45], given that EHR use has been found to decline with age and the average age of psychiatrists in the United States has been increasing over time; it is