Published in final edited form as:

AIDS Care. 2011 March ; 23(3): 357–365. doi:10.1080/09540121.2010.507745.

Perceptions of Factors Influencing Use of an Electronic Record for Case Management of Persons Living with HIV

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Abstract

Case managers (CMs) facilitate continuity of care for persons living with HIV (PLWH) by coordination of resources and referrals to social services and medical care. The complexity of the management of HIV drives the need for more coordination, which can be achieved through the use of health information technology (HIT). However, HIT has not been well studied in the context of HIV services. The primary aim of this qualitative study was to assess CMs' perceptions regarding factors that influence acceptance and use of an electronic continuity of care record (CCR) for PLWH. Focus group methodology was used to gather perceptions from 37 CMs. Major themes related to factors for CCR adoption and use included: predisposing (system functionality and confidentiality), enabling (user training and computer access), reinforcing (work efficiency, continuity of care, information quality, and communication). Electronic CCRs have the potential to improve coordination of services and information sharing for PLWH. Careful attention must be paid to factors that predispose, enable, and reinforce use of HIT such as CCRs so that potential benefits in terms of quality and efficiency can be realized.

Keywords

HIV/AIDS; medical record, electronic; program evaluations; technology

Case management has been a frequently used strategy for coordinating care. For the past 30 years, case management has been used to meet the needs of client populations with long-term vulnerabilities and illnesses and has more recently been adopted for caring for persons living with HIV (PLWH) (Chernesky & Grube, 2000; Wright, Henry, Holzemer, & Falknor, 1993). As more services are needed for PLWH, centralized resource coordination and referral to services are increasingly important (Merithew & Davis-Satterla, 2000; Ungvarski, 1996). Case management programs are designed to provide PLWH continuity of care by coordination of resources and referrals to community based social services and medical care (Merrill, 1996; Shelton, Golin, Smith, Eng, & Kaplan, 2006). Several studies have shown that having a case manager (CM) increases a PLWH's utilization of support services and promotes client adherence to highly active antiretroviral therapy (HAART) (Shelton et al., 2006).

The complexity of the management of HIV drives the need for improved care coordination, which can be potentially achieved through the use of health information technology (HIT). Numerous studies have illustrated the many benefits of HIT on the overall care of patients (Balas, 2001), by increasing efficiency (Bjorvell, Wredling, & Thorell-Ekstrand, 2002; Moody, Slocumb, Berg, & Jackson, 2004), care coordination (Marchibroda, 2008) and improving patient safety and quality of care (Cooper, 2004; Institute of Medicine, 2001; Moody et al., 2004). HIT tools such as electronic continuity of care records (CCRs) have the potential to provide CMs with information regarding their clients' health information and to improve overall care (Jerant & Hill, 2000).

The purpose of this study was to assess CMs' perceptions regarding factors that influence acceptance and use of the SelectHealth Continuity of Care Document (SH-CCD) prior to its deployment. SelectHealth is a Medicaid managed care plan for PLWH and their dependents, which provides comprehensive health services to its members through a contracted network of providers. The SH-CCD aggregates pertinent critical patient data and makes it available via a secure Internet connection to SelectHealth members, CMs, and clinicians. The SH-CCD includes a subset of data elements delineated in the American Society for Testing and Materials (ASTM) CCR (ASTM E31.28, 2005) Standard and adheres to the CCD Standard (ASTM WK4363, 2004) in terms of technical specifications.

The SH-CCD is primarily created from claims data and includes: primary care provider contact information; documentation of HIV/AIDS status and TB status; laboratory results; pharmacy records of medication refills; procedures that generate a claim; referral visits; and within network emergency room. The SH-CCD does not include information such as family history, social history, immunizations, and vital signs, all of which are included in the ASTM CCR standard. In contrast to an electronic health record (EHR), which offers clinician information viewing, data entry (e.g., orders, notes), and decision support capability, the SH-CCD is designed for information viewing by clinicians, CMs, and patients. As such, it addresses some of the critical needs (e.g., care transitions, team care) related to the patient-centered medical home model (Bates & Bitton, 2010).

Methods

Study Design and Approach

The observational design incorporated focus groups for the gathering of a large amount of information in a relatively short amount of time and permitted participants to use their own words to answer open-ended questions and to freely react to each other's responses (Kitzinger, 1995). Data analysis was conducted from a qualitative, interpretative perspective.

Participants

Columbia University Institutional Review Board approval was obtained before recruiting CMs for focus group sessions. Inclusion criteria were English speaking and a provider of HIV/AIDS case management services to SelectHealth members. A detailed description of the demographics of the focus group participants from each site is listed in Table 1.

Procedure

Data were gathered from March to December 2008 through focus groups at two COBRA case management agencies and two Designated AIDS Centers (DACs). Each focus group session was moderated by a member of the research team; a second member recorded field notes. Participants were provided with information sheets that described the study purpose, process, benefits, and possible risks. Following the informed consent process, ground rules

were introduced to ensure understanding of the purpose of the focus groups and the flow of the session. Audio-tape recordings and field notes were used for data collection. The six-question focus group guide included sections covering the opening, introductory, and transition periods (Krueger & Casey, 2000), and was informed by the Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989) and the predisposing, reinforcing, and Enabling Constructs in Evaluation (PRECEDE) portion of the PRECEDE-PROCEED Model of health program planning and evaluation (Green, Kreuter, Deeds, & Partridge, 1980). The integration of these frameworks for application in HIT implementation evaluation has been proposed by a number of authors as a strategy for assessing predisposing, enabling, and reinforcing factors for use and acceptance of HIT (Bakken & Ruland, 2009; Kukafka, Johnson, Linfante, & Allegrante, 2003). The behavioral aspect of the frameworks was central to our approach because use of the SH-CCD is voluntary in the CM organizations. As part of the focus group session, the general concept of an electronic CCR was described without specifying SH-CCD features and functions in detail because the data provided input into the final design and implementation strategies.

Each focus group session lasted approximately one hour. The moderator summarized the keypoints at the end of each question. In order to maintain the trustworthiness of this study, the investigators attended to established criteria for credibility, transferability, dependability, and confirmability. Strategies included: substantial engagement in the field with participants from diverse backgrounds; peer debriefing among research team members; member checks with focus group participants; and audit trails.

Data analysis

The audio tapes were transcribed verbatim. Coding began after reading each transcript at least twice; codes were created based on a line-by-line analysis. Data were summarized thematically through an iterative process by the authors (RS, SB) and organized according to the PRECEDE factors (Kegler & Miner, 2004). Predisposing factors occur prior to behavior change and address motives for behavioral change and can include beliefs (e.g., perceived ease of use of CCR), attitudes, knowledge, behavioral intentions, and existing skills (Predisposing Factors, 2002). Enabling factors facilitate behavior change, and include resources (e.g., training), conditions of living, societal supports, and skills that facilitate a behavior's occurrence (Enabling Factors, 2002). Reinforcing factors include the incentives and rewards for a behavior (e.g., improved efficiency) (Jandorf et al., 2006) and increase the probability that the behavior will recur at the next opportunity (Green, 1999). The investigators also identified categories within themes as the data were iteratively coded and summarized.

Findings

The summary of the themes and categories related to the PRECEDE constructs (Green et al., 1980) is listed in Table 2, and presented in the following paragraphs.

Predisposing factors

Two major themes related to predisposing factors emerged from the data: system functionality and potential breach of confidentiality (Table 3).

Theme 1: system functionality—Participants expressed concerns over the system's functionality, specifically the efficiency in updating the system's data and the reliability of the data. For instance, a participant voiced concerns over the data being obsolete because "if providers aren't always entering stuff it won't be up-to-date." The reliability of the data is particularly important because CD4 counts are largely affected by HAART adherence and

thus medication refill and laboratory data are essential for management of the disease. As one participant said “A person not taking medication for a month is a serious issue.” Additionally, CMs felt that the data contained within the system must be reliable; one CM explained that “I have a concern if everybody is doing the input into the computer what if somebody makes a mistake ...”

Concerns about the stability of the system, such as the system “going down” were articulated. In addition, CMs explained the importance of a user-friendly system. One focus group participant stated his concern over “how friendly is the system.” CMs said to “keep it simple,” and “to make sure that it is user-friendly.” To illustrate, one CM asked, “and will there be security codes which you have to enter every four or five minutes?” Overall, participants felt very strongly that the system needed to be friendly and simple.

Theme 2: potential breach of confidentiality—One participant highlighted concerns about confidentiality breaches, “I mean there is the whole of course confidentiality stigma around HIV.” There were two main categories, which surrounded the theme of confidentiality: trust and losing one’s access code. One CM explained that patients have different levels of trust for different care providers, and so “they would feel intimidated by having that information out there ...” For instance one participant stated: “I know there are certain things our clients will tell the providers that they wouldn’t want CMs to know.”

CMs also expressed concerns over confidentiality being jeopardized if patients lose their password to the system. Participants were worried about “what if they lose their SelectHealth card or password?” The CMs explained that there are “confidentiality issues just with the client leaving the password around,” and as a result a concern over who might gain access to confidential health information. Focus group participants discussed their concerns over the wrong person picking up someone’s SelectHealth access card and publicizing someone’s personal health information.

Enabling factors

The investigators identified two themes related to enabling factors: user training and computer access (Table 4).

Theme 1: user training—Multiple participants made recommendations for training sessions to learn how to use the electronic CCR. After implementation of the system, participants also thought that it would be important to receive update trainings so “whenever there are changes, you need to give us an in service.”

Theme 2: computer access—An enabling factor for system use is access to a computer with Internet capability. At three of the four focus group sites, CMs had their own computers with Internet access at their desk. The CMs at one site represented a multi-site organization and the participants stated that “there are not computers at every site,” which would make it almost impossible for these CMs to use the system while caring for their clients.

Reinforcing factors

Major themes related to reinforcing factors were: work efficiency; continuity of care; information quality; and communication (Table 5).

Theme 1: work efficiency—Focus group participants felt that one reward for using an electronic CCR would be improved work efficiency by saving time and resources. Multiple CMs explained that they thought an electronic CCR would be a time-saving tool because this system would “eliminate the process of having to do a face to- face conference with the

physicians and the primary care providers.” Moreover, participants thought that an electronic CCR would save resources. A few CMs mentioned that repetitive diagnostic tests are ordered because providers can’t find documentation and one CM said that an electronic CCR would be “cost-effective” due to prevention of redundant testing. Another CM described a client who “had their whole Hep (Hepatitis) vaccination but the doctor can’t find their paperwork so they have to get it again.”

Theme 2: continuity of care—Focus group participants elucidated many reinforcing factors related to improvement of their clients’ continuity of care. CMs described how services are not initiated, such as “lab work is not ordered,” because there is no documentation of patients’ medical history or services. In other instances, PLWH are “denied entitlements because they don’t have information, not knowing their CD4 counts and viral loads.”

Many participants explained that it is very important to be able to track their clients’ attendance at appointments and know when they switch providers. Another participant said that the system would be very useful in achieving service continuation because “I think this will help us because a lot of times they don’t know the doctors name or where they go.” Finally, a CM explained the challenge of “they get lost to follow up and that kind of stuff.”

Finally, focus group participants thought that an electronic CCR could be a useful tool in helping PLWH achieve adherence to their HAART regimens. For instance, one CM said that, “I think it will prepare us for educating the client as to how to keep themselves up to par with their treatment and medication adherence ...” Another CM noted that a CCR would be useful so that, “We can access the record to find out what happened at the last appointment like their CD4 count and viral load.”

Theme 3: information quality—CMs explained that they thought that the quality of the information, which they would have from an electronic CCR, would be of greater quality than their currently accessible information because it would be more organized and accurate. CMs described the importance of updated information stating that “It would be helpful if someone comes in comatose.” CMs described that “people just drop off the face of the earth and show up next year and don’t have anything,” and an electronic CCR would provide access to information about the client’s health status, which users of the system would not otherwise be able to access.

In addition, focus group participants perceived that their client’s health information would be more organized if they had an electronic CCR. Many of the clients have complicated health histories. One CM described, “I also have at least two clients that actually walk around with all of their information on them ... you say where is this, this and this and they reach into their bag and there is like a file system they walk around with.” However, most of the clients “can’t carry the information everywhere” because there are too many papers. Likewise, the CM can be looking for “a piece of paper among thousands of pieces of paper in a book in a drawer, here you have a screen before you and the information is readily available and it is visual.” The participant felt that the use of an electronic CCR would make the information more organized and easier to access and understand. Another CM commented, “I think the system would help generally it would help the client in terms of their organization skills. I mean they come in sometimes with papers everywhere and it is so hard for them to stay organized.” Many CMs commented that there would be an improved quality of information obtained through an electronic CCR because it would be more “timely.” CMs also explained that “clients don’t always know about their medical information,” and so a CCR would enable CMs to access information that is “more clear and more precise.”

Theme 4: communication—Focus group participants explained that the system would provide the opportunity for improved communication. More specifically, one CM stated, “I think it would improve communication between providers and CMs.” Using the system would “open up the dialogue” between CMs and providers “because they (providers) know you at least understand where the client is medically.” Ultimately, this may improve the overall relationship between providers and CMs since as one participant explained, “not all providers are the easiest people to get along with or the easiest people to get information from.”

Moreover, focus group participants explained that they thought that an electronic CCR may facilitate better communication between CMs and clients. To illustrate, one CM stated that the system “will allow us to have a better dialogue with the patient.” Another CM expressed that an electronic CCR may improve communication because it would eliminate “the confusion between the client and what they have. . diagnosis wise or medical wise.”

Discussion

Building upon Kukafka et al.’s (2003) model for integration of technology acceptance and PRECEDE constructs, our data revealed predisposing, enabling, and reinforcing factors related to the implementation of a CCR for PLWH. The themes identified indicate that HIV/AIDS CMs face similar issues with technology implementation as do professionals in other fields (Ventres et al., 2006; Wiljer et al., 2008; Yoon-Flannery et al., 2008). Similar to other research, data from this study suggest that end-user training may improve technology acceptance and use (Mazzoleni et al., 1996). Earlier studies have also demonstrated that system instability and poor information quality make users less willing to accept new technologies (Carroll, Saluja, & Tarczy-Hornoch, 2002; Delone & McLean, 2003). Similarly, in this study, focus group participants discussed what should be addressed to promote technology acceptance, including system stability and assurance of data integrity. CMs were hesitant to use a system, which they feared would crash on a regular basis or would provide them with data that is unreliable. These issues related to the system need to be managed from the technical end of the project before it is implemented. In earlier literature, workflow is a big concern among clinicians who are considering using a new technology (Poon et al., 2004; Saathoff, 2005). However, in our study, CMs did not seem to identify this as a barrier. This can likely be explained because many of the CMs in our study discussed the difficulty which they experience when trying to access information which is necessary for them to complete their job.

The SH-CCD will facilitate access to the required information (e.g., most recent CD4 count) without contacting clinicians or auditing charts. Earlier studies have specifically focused on clinician acceptance of a new system largely in acute care settings (Dillon, McDowell, Salimian, & Conklin, 1998; Mazzoleni et al., 1997; Palm, Colombet, Sicotte, & Degoulet, 2006). However, CMs usually do not have access to critical health information, such as laboratory data. As a result, despite the change in workflow which CMs may experience, they will likely be able to more easily access critical health information. Although the study was conducted in the context of development and implementation of SH-CCD, focus group questions were targeted toward an electronic CCR in general, thus these findings may be of relevance to others implementing an electronic CCR for case management of PLWH or other chronically ill individuals who need coordination of services and information sharing among their various providers.

Conclusion

HIT has the potential to transform health care. CCRs, in particular, maybe particularly useful in improving coordination of services and information sharing for those with HIV/

AIDS. Careful attention must be paid to factors that predispose, enable, and reinforce the use of HIT so that its potential benefits can be realized. Moreover, it is important that reports of HIT implementations include data on such factors because they are critical to assessing relevance and replicability of HIT implementation in other settings (Bakken & Ruland, 2009). Given both the complexity of HIV care, it is particularly vital that CMs who care for PLWH have access to the information required to provide quality case management services in an efficient manner.

Acknowledgments

The authors acknowledge Drs. David Kaufman, Susan Ledlie and Arlene Smaldone for their comments. We thank the SelectHealth SH-CCR Demonstration Project (H97HA08483, PI: Peter Gordon) and the Center for Evidence-based Practice in the Underserved (P30NR010677, PI: Suzanne Bakken) for funding this project.

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Table 1

Description of Focus Group Participants

Site	Agency Type	Date	N	Gender	Race/Ethnicity
1	COBRA case management	March 2008	11	0 Males 11 Females	5 Black 2 Latino/Hispanic 4 White
2	Designated AIDS Center (DAC)	July 2008	6	1 Males 5 Females	1 Black 3 Latino/Hispanic 2 White
3	Designated AIDS Center (DAC)	August 2008	9	1 Male 8 Females	2 Black 4 Latino/Hispanic 3 White
4	COBRA case management	December 2008	11	4 Males 7 Females	8 Black 3 Latino/Hispanic 0 White

Table 2

Summary of PRECEDE Constructs and Emerging Themes and Categories

Construct	Themes	Categories
Predisposing Factors	System Functionality	Data reliability
		Efficiency
		Stability
		User friendly
	Potential Breach of Confidentiality	Privacy
		Trust
		Lose password/ access code
Enabling Factors	User Training	Initial Training
		Update trainings
	Computer Access	Case managers
Reinforcing Factors	Work Efficiency	Saves time
		Saves resources
	Continuity of care	Service initiation
		Service continuation
		Adherence to medications
	Information Quality	Improved access
		Organized information
		Accurate information
	Communication	Provider – case manager
		Case manager – client

Table 3**Predisposing Factors to System Implementation and Adoption**

Utterances	Categories	Themes
– “I have a concern if everybody is doing the input into the computer what if somebody makes a mistake and how accurate would it be.” – “I am wondering if once you get into the system there’s going to be a way where you can only modify or change things that are specific to your job title or it’s going to be full access to everyone.”	Data reliability	System functionality
– “How long will it take to put that information in the system so you can access” – “Every time they go to the provider something has to be entered so if providers aren’t always entering stuff it won’t be up to date.” – “How often the information can be updated at each appointment or is it going to be certain websites where you go to and information is there from 2-3 years ago.”	Efficiency	
– “How it will affect the flow, if the system would be down for an extended period of time” – “My only concern is programs going down.”	Stability	
– “I think to make the website as user friendly as possible for the clinicians and case managers” – “To make sure that it is user friendly. Actually I mean that it is not extremely complicated.”	User friendly	
– “How comfortable will the client be knowing that pretty much all of their business is there and up for grabs for people to read?” – “I think that’s a big confidentiality issues ...because I know a lot of my clients tell me things they don’t tell their providers.” – “Not all of our patients want to access their delicate information in the library.” – “Are clients comfortable with the whole concept of that you know someone can actually see all of my information?”	Privacy	Potential breach of confidentiality
– “Many of our patients are guarded and quite paranoid about that kind of information being available.” – “Trust is a big issues with a lot a client especially clients that are actively using the substance.”	Trust	
– “I don’t know how they are going to get these temporary passwords but my biggest issue is that they are going to misplace it.” – “Hypothetically, I find it and I go and access the computer and if I want to be vicious say I know the person. I can take the information and start sending letters or packages to every family member.”	Lose password/access code	

Table 4**Enabling Factors of System Implementation and Adoption**

Utterances	Categories	Themes
- “Is SelectHealth gonna run some type of training for these patients (to) learn how to access their information?” - “Basically informational sessions so that the information can be empowering and consistent so that they will be able to make that decision as to whether they want to participate in this.” - “People learn differently some people virtually and some of our clients, as we were saying earlier are illiterate and maybe one of the ways of educating them is through the video.” - “The only disadvantage I see on my part is the skills of just learning how to navigate the system”	Initial Training	User training
- “Whenever there are changes you need to give us an in service.”	Update trainings	
- “There are not computers at every site.”	Case managers	Computer access

Table 5**Reinforcing Factors of System Implementation and Adoption**

Utterances	Categories	Themes
- "Less writing for us" - "I think you also will give us more time because we are running around we running we running around looking for providers to give us information and sometimes they don't even want to see CM."	Saves time	Work efficiency
- "PPD are outdated, we probably wouldn't look into the date of the last one, we'll say he is already due for the next one." - "Cost effective because it would allow not for repetitive tests to be done when not necessary like when sometimes they will order labwork and if I won't call for 2 weeks then they will think oh I didn't have that labwork or I need to have labwork but no you can just check the chart and say oh this was done."	Saves resources	
- "(The clinic) want the clients to come in still to get the documented information, copies of the information so that could take weeks and the client may need the services right away now." - "They will say maybe it was at this hospital or another hospital and then we send release forms to get medical records just to go through to see if that's the situation or to verify whether they are eligible for housing so this will be an easy way to track their diagnoses."	Service initiation	Continuity of care
- "When they are changing providers you can provide the new provider with the information." - "We will know in fact if they have attended their appointments because we will know the last time they have seen a doctor and get them back to care."	Service continuation	
- "I think it will prepare us for educating the client as to how to keep themselves up to par with their treatment and medication adherence because you know once you sit down with them and say since those are the records and you cannot actually deny to live with the information in their record you can actually show them what areas look low and educate them."	Adherence to medications	
- "I think that would be helpful as an exchange of information because sometimes we need that information especially if they are pregnant." - It automatically pops up if he has been in the hospital before so that we can get that information that will also be extremely helpful."	Improved access	Information quality
- "I think the system would help generally it would help the client in terms of their organization skills. I mean they come in sometimes with papers everywhere and it is so hard for them to stay organized." - "One thing we see a lot is a bunch of times our clients' labs and progress notes are missing from their charts. So I guess this would be good because everything would just be online and it would definitely eliminate the possibility of something getting lost."	Organized information	
- "I think this will also help with errors." - "The documentation should be a lot more clear and more precise because we can get it from the system"	Accurate information	
- "It can open up the dialogue because they know you at least understand where the client is medically." - "Sometimes when you talk to the doctor they want an update on the client, the CD4 everything so we will be able to know and to tell them."	Provider – case manager	Communication
- "It's a tool to have a conversation with a client about their care."	Case manager – client	