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### *Report from the Field*

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# Using Technology to Enhance Prevention Services for Children in Primary Care

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*Primary care is the principal setting for implementation of prevention services for children and their families. However, aspects of primary care practice and lack of patient adherence to therapeutic regimens that ultimately lead to lifestyle and behavior changes are barriers to the delivery of prevention services. The authors of this paper present descriptive information about how a web-based computer application is being used to assist physicians in a major medical center overcome some of these impediments. This information is presented in the hopes of generating discussion about the utility of computer based support for prevention services in primary care settings. Additional steps to optimize the care of patients are also described.*

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**KEY WORDS:** preventive services; primary care; computer technology; adolescent screening; motivational interviewing; telephone support services.

## INTRODUCTION

Columbus Children's Hospital, Inc. is using computer technology in nine of our pediatric primary care clinics to enhance screening and intervention services for youth who self-report risky behaviors (e.g., carrying a weapon, fighting, drinking and driving, illegal substance use, having serious thoughts of ending one's life). Clinical personnel using the "Health *e* · Touch" system, including

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web-based, wireless computer tablets, have screened over 1,500 youth (from age 11 to 20). Due to the large percentage of youth with positive screening results, institutional health care changes are underway to meet demands associated with these preventable health care issues. The authors briefly discuss: (1) primary care as a potential setting to deliver preventive services; (2) the pros of using technology to enhance prevention services as well as some of the cons; (3) a case study about the use of this technology within our health care system; (4) its impact and future directions; and (5) implementation recommendations.

This information is presented in the interest of generating discussion concerning the utility of using computer-based technology to facilitate delivery of preventive interventions in primary health care settings. Conventional wisdom suggests that few prevention services related to behavioral health issues such as substance abuse, suicide, and violence are delivered by physicians in primary health care settings. Several of the reasons for this state of affairs are discussed below. Computer technology may provide a means of identifying issues at the individual patient level relatively quickly and inexpensively. Comprehensive results to support these claims are not currently available. However, our experience with the technology described below and anecdotal evidence suggest that this is an idea worthy of further discussion and development.

## Primary Care as a Setting to Deliver Prevention Services

Primary care is viewed as an ideal setting for providing prevention services because it is often the public's first entry point into the health care system. Additionally, it is well accepted by patients and family members that clinicians, such as pediatricians and family physicians, collect information from them, coordinate their care, and act as their advocates as they interface with the health care system (American Academy of Pediatrics, 2000). Unfortunately, primary care continues to be underutilized as a venue for providing optimal prevention services to the public (Bonow, 2002; Centers for Disease Control & Prevention, 1997; Karoly, Kilburn, Bigelow, Caulkins, & Cannon, 2001; Mosca et al., 2005; U.S. Dept of Health & Human Services, 2003; Wang & Dietz, 2002).

## Barriers to the Delivery of Preventive Services in Primary Care

There are many reasons why the delivery of preventive services is problematic in primary care settings. An initial step in providing appropriate prevention services is an accurate health history. Obtaining a thorough patient/client history in order to determine patient risk factors takes time. It has been estimated that implementing the U.S. Preventive Services Task Force recommendations would require

a clinician to spend roughly seven hours each day on these activities (Yarnall, Pollak, Ostbye, Krause, & Michener, 2003). Thus, the large number of recommended prevention activities far exceeds the capacity of even the most organized practices because of intense time pressures.

Additionally, traditional paper and pencil screening formats used to assess risk factors may leave room for errors. For example, interviewers may miss questions, read the wrong question, or bias responses by the emphasis they place on certain words. Incorrect scoring of paper and pencil instruments as well as illegible handwriting are other areas of concern.

Some screening tools require a trained person to distribute the correct instrument(s) to the appropriate patient(s). If this individual is available in the primary care setting, patient "no shows" become very expensive and thus make it difficult for a health care institution to justify such positions. Other costs may result from staff support issues associated with transcription of screening results to medical charts and filing of information.

In some cases even when screening questions are asked, a brief office encounter does not lend itself to the counseling and follow-up necessary to address complex and immediate, patient health care concerns (e.g., suicidality) or to initiate life-long changes in patient behaviors (Ockene, Hayman, Pasternak, Schron, & Dunbar-Jacob, 2002). Others contend that many clinicians do not know how to manage and influence lifestyle-related factors (Ades et al., 2002). For example, two decades of screening literature for adults with depression and more recently for children and adolescents with psychosocial problems point out the weak impact of screening alone in improving patient health outcomes (Shapiro, German, Skinner, & VonKorff, 1987). Hankin, Goodman, and Starfield (1987) found no change in prescribing, referral, or counseling behaviors with increased screening in a large pediatric practice group, confirming the need for alternative steps to help clinicians implement preventive services like health risk screening.

Additionally, referral processes warrant important, patient specific health care communication exchanges between primary care physicians and relevant support services, especially in screening for risky behaviors associated with suicidality, severe depression, and substance use and abuse. Screening and behavior change strategies take time, repeated office visits, and/or referrals to other health care system resources. Unless these issues are addressed, preventive health care may continue to be compromised in the primary care setting.

## Using Technology to Enhance Preventive Services

Innovative strategies are needed to enhance patient health screening and to promote follow-through of care. Information technology may play a role. For example, computer software programs can be modified to collect a variety of patient health care information and wireless computer tablets can provide the

necessary mobility to screen patients in multiple settings. Web-based technology allows for data to be transmitted, analyzed, and summarized. The electronically captured data can present specific outcomes to enhance the clinician's assessments, differential diagnoses, and care plans. It also can assist with understanding the patient's treatment engagement activities and motivation toward the treatment plan (e.g., include screening scales to determine how confident or important it is to the patient to change his/her behavior related to a specific health care concern).

### *Advantages of Using Screening Technology*

There are many benefits to using computer technology to assist with screening as compared to paper and pencil assessments. Importantly, there is no need to have a trained individual on hand and there are typically fewer problems associated with paper and pencil assessments. In fact, technology can enhance screening efficiency with the use of questionnaire algorithms and skip patterns, thus, individualizing screening to the health needs of each patient and practice site. Algorithms are only limited by the creativity and expertise of the provider and the programmer. Another key feature is that computer technology allows for data to be immediately analyzed, summarized, and printed or charted (with teaching tools and/or referral recommendations) for clinicians to use for that same day office visit.

Patients also seem to be eager to use computers, and the vast majority are capable of doing so. Of particular interest, and of great value to the clinician, is that patients appear to be more comfortable self-reporting personal information to a computer rather than a person [e.g., gynecological details (Slack & VanCura, 1968), medication noncompliance, sexual activity (Millstein & Irwin, 1983), sexual abuse (Bagley & Genuis, 1991), suicidal ideation (Greist et al., 1973) or consumption of alcohol (Lucas, Mullin, Luna, & McInroy, 1977)].

This is true with adolescents as well. Supple, Aquilino, and Wright (1999) state that adolescents reported greater anonymity with computers and preferred to answer socially sensitive questions in this format, thus yielding more valid results for such socially sensitive material as sexual behavior, drug use, violence (Turner et al., 1998) and alcohol use, criminality, and suicidality (Beck, Steer, & Ranieri, 1988; Levine, Ancill, & Roberts, 1989; Stanton et al., 1993). This is important because accurate data are critical for optimal patient care.

### *Advantages of Using Technology as an Aid to Intervention(s)*

A major concern with preventive health care is patient adherence (Ockene et al., 2002). Technology cannot address all such problems, but in an indirect way, may play a role in minimizing some adherence barriers. After health-risky

thoughts and behaviors have been identified, patients need the knowledge, skills, and attitudinal changes to follow an appropriate prescribed regimen. The health care team can provide the knowledge and skills, but the attitude modification comes from within the patient. Patient adherence to therapeutic regimens requires a change in behavior (Miller & Rollnick, 2002; Ockene et al., 2002; Prochaska et al., 1994). As stated earlier, a short office visit does not lend itself to the counseling and follow-up central to behavioral change necessary to live a healthy lifestyle.

Broadening clinical encounters to include non-physician personnel (Ockene et al., 2002), telephone support services for patients (Miller & Rellnick, 2002), and web-based technology to enhance health care communication exchanges may increase physician referrals and patient behavioral changes toward treatment engagement. Web-based technology increases the flexibility of obtaining and sharing important patient health information. Telephone support personnel may have access to a password-protected site to optimize clinician driven intervention services as well as patient screening data that are required to optimize attitudinal changes for lifestyle modification.

Another benefit of technology is that if an immediate dangerous risk behavior has been detected, an intervention team member can be alerted via a web-based alarm system. If this support service is not added, the questions asked in a busy primary care practice setting must be limited for safety and liability reasons. For example, if suicidality is included in a screen, clinicians may be concerned that they do not have the time or skill to intervene, due to comfort level and time needed to address a crisis situation. Thus technology provides a means of incorporating non-physician expertise into clinical encounters.

## Disadvantages of Using Technology in Primary Care Settings

Both youth and adults prefer interacting with computer technology, and even computer illiterate individuals can operate simple software programs. However, patients with low literacy skills will often need someone to read questions to them and/or may require supplemental audio support. If the software is not written in the language of the patient, an interpreter is warranted. [We have also found having a translated version of the paper questionnaire on hand, helpful.]

Web-based systems require linkages to medical record data for confirmation of patient identification. This is critical to reduce mistakes in charting and treatment. It is also vital to the exchange of health care information to enhance the patient's care and treatment plan. Because computer generated information may be integrated into the information systems of health care settings, on-going information security risk assessments and strategies are required to keep medical records secure. If the health care setting does not have the appropriate information

system support services, on-going security may be an issue. Additionally, start up of such web-based technology may be more difficult.

## CASE STUDY: THE APPLICATION OF COMPUTER SCREENING TECHNOLOGY IN A MAJOR MEDICAL CENTER

Columbus Children's Hospital, Inc. implemented the Trial of Automated Risk Assessments of Adolescents (TARAA) project beginning in late 2005. As part of a larger study, TARAA tested a web-based technology to facilitate screening for high-risk behaviors in youth aged 11–20 in nine pediatric-based, primary care settings. Wireless computer tablets presented web-based screening questions to youth while they were waiting to be seen for a well or sick visit. The tablets were called the "Health $e \cdot$ Touch" screen.

The screen was set up so that the patient answered questions by touching yes, no, or multiple choice buttons directly on a color touch display. The questionnaire tool was easy to use and had the ability to branch to alternative questions based on previous responses. Additionally, the survey questions were presented in clear, one question per screen format. When children responded to a question, the screen immediately went to the next question so the response was not left on the screen. Some other HIPAA safety features included a computer screen that restricted the view to one user, a time-out feature with variable delay that required a new login for reentry, and data storage only on the central server, not the wireless computer tablet.

The data collected were viewed by our institution as protected medical health information and were included with a youth's medical records. Thus, prior to answering screening questions, the youth was logged into the program with his/her medical record number and his/her birth year. Importantly, there were further safeguards in place to make sure that each child was registered as him-/herself (e.g., youth must be registered in the hospital's information system for an office visit that day and at that clinic site). After three tries, if this information was not correct, the screen locked.

Upon completion of the screening, the computer tablet displayed a "Thank You" on the screen and instructed the youth to return the tablet to the front desk. Within a few seconds, the patient's self-reported results were summarized and scored and printed onto a "laboratory form." The laboratory form was printed near an office staff member who then placed the form on the youth's chart following HIPAA guidelines. [Note: Screening data were also stored electronically on a password protected site.] In fact, the summarized laboratory report had its own medical record form number and was placed in the youth's chart in a specific section. Thus, individualized and summarized risk screening data were used for same day office visits.

If risks were identified, the laboratory form presented recommended preventive services as well as specific agency numbers and/or staff pager numbers depending on the results. Because increased screening led to increased identification of youth with high-risk behaviors, it was necessary to link busy primary care office clinicians and staff with key prevention services information and support services. For example, if a youth indicated current suicidality, a team member (centrally located on campus) was alerted with a flashing red light on her computer screen (via web-based technology). This individual waited for a call or a page from the clinician, but if this did not occur within a few minutes, the suicide prevention person would contact the doctor at the clinic. Depending on the needs of the patient, this intervention specialist went to the primary care practice site and/or set up an appointment for the patient and family with the appropriate service (e.g., in-patient hospitalization, counseling sessions, etc.).

## Patient Support Services

In order to provide additional patient support, our program gave clinicians the choice to have youth with these risky behaviors receive telephone support calls from a registered nurse. During the call, the nurse utilized a motivational interviewing (MI) approach in order to move youth toward treatment. MI is a directive, client-centered counseling style used to promote behavioral change. Miller and Rollnick (2002), through their years of research, found it to be particularly effective with persons who were significantly ambivalent about or resistant to the idea of changing a problem behavior. In fact, researchers found that the more an individual used "change talk" the more likely he/she would make a behavioral change toward a healthier lifestyle (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). Thus, during the telephone support call one MI strategy was to elicit behavioral change talk so that the youth might explore any ambivalent feelings he/she had regarding his/her risky behavior.

The following example illustrates how the telephone support process worked. The clinician requested that the patient be called to make sure that he/she attends an identified counseling program. The telephone-support nurse logged into the password protected, web-based data to see the youth's screening information. The nurse called the youth and used MI. Depending on how the client-centered telephone call was going, the nurse accessed various components of the youth's screening assessment information. For example, being knowledgeable about the specific behavior-related consequences the youth self-reported (e.g., receiving a traffic ticket for drinking and driving) was helpful in individualizing the MI-based conversation.

Each youth received three telephone support calls that were guided by the patient's schedule and a voiced behavior change activity (e.g., specifying a date

that he/she would attend a counseling session). At the end of each call, a Telephone Support Services (TSS) form was filled out that summarized the interaction and was sent to the referring clinician.

## IMPACT AND FUTURE DIRECTION

Children's Hospital, Inc. played a leadership role in implementing technology to improve primary care screening and assessment in low income patients through the TARAA project. There were several costs including staff time for training about the "how" and "why" of the use of the "Health $e \cdot$ Touch" computer tablet. However, identification of unmet needs in this high risk population was dramatic with many youth screened in a short amount of time.

Reactions by office staff were variable and ranged from denial (e.g., "No, we cannot have that high a number of depressed and suicidal youth.") to the development of new services to respond to the needs identified. For example, a high percentage of our youth, screened using the Center for Epidemiologic Studies Depression Screen for Children (CES-DC), were positive for depression and/or suicidality. The numbers were overwhelming for our primary care and behavioral health care services. In response, a suicide prevention team was organized through a local grant from the county mental health board, and we elected to focus our depression screening on moderate to severe cases. An interdisciplinary hospital committee was formed to bridge the gap in mental health specialty services for underserved youth and families.

In addition, a grant is being written to develop a medical social worker program within each of the clinics. It will be a self-sustaining program that will optimize the medical social workers' community connectedness and expertise related to individualized and group services to maintain a link between high risk youth (and families) and the behavioral health services unit. It is our ultimate goal to increase the sensitivity of the screening questionnaire and serve even mild depression in the future. Additionally, other practice sites, health care systems, and service agencies are becoming more interested in learning how they can implement a project such as TARAA for their patients and clients.

Long-term outcomes for behavioral changes are still under study. We recognize that true outcomes measures will be difficult to obtain (e.g., did we prevent a youth from overdosing, was mortality decreased due to increased seat belt usage, etc.), but changes in our delivery system and in individual physician actions to refer youth for services for risky behaviors are early, positive results of this project. While quantitative data are not currently available, anecdotal evidence seems to support this contention.

For example, a pediatrician in a primary care setting stated, "Without the Health $e \cdot$ Touch screening results I would not have known that this youth was

having such a severe side effect to the medication that I prescribed for her." A social worker working in a primary care site told staff, "Make sure this child does the Health *e* · Touch screen today, I want to see how she is doing. This patient has been moved to another foster home!" Even patients have attributed value to use of this computer technology. A youth reported, "I was very sad and I was not able to tell my family how I feel. But now my family knows and are trying to help me . . . I need counseling, there are lots of things I need to discuss."

## Recommendations

The results of the study let to four main recommendations regarding the implementation of computer technologies such as TARAA. First, invest in a designated server to support such web-based technologies. A designated server helps with data security and increases efficiency when changes to procedures are necessary. Second, select a technology company (vendor) that provides tools to modify forms and questionnaires. If such a vendor agreement in not possible, develop a contractual and communication process with the vendor that ensures that any procedural changes and/or changes to forms and questionnaires are made promptly and without additional charges. Third, keep all staff informed about screening and other critical protocols. Primary care sites are busy, fast paced places; thus, all personnel need to be informed about what is going on and how products such as the wireless computer tablet works. Fourth, collaborate with key individuals. This will strengthen project planning and implementation as well as lead to program longevity as various individual and systemic changes are managed proactively. Developing an active hospital interdisciplinary committee that includes members from the community is important in keeping a project such as TARAA running smoothly. For example, our data have helped us reach out to community resources to help provide and/or fund additional services for local youth.

In summary, the primary care practice setting is an entry point for many patients to be screened for multiple health care concerns, yet staff may be too overwhelmed to add preventive care to their repertoire of services. And even when screening is done, patient behavioral change is difficult to implement in a busy clinic. The TARAA project with its use of a web-based technology is producing some success in health screening and referrals and may provide a model that can be emulated in other settings. The authors encourage interested readers and experts to comment and provide their views regarding the use of computer technology in primary care settings.

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