What's Going on @SPNS

AN UPDATE FROM THE RWCA SPNS PROGRAM, HRSA HIV/AIDS BUREAU JULY 2007

Information Technology: Improving HIV/AIDS Care

The increasing costs and complexity of HIV treatment and the continued barriers to reaching underserved people living with HIV/AIDS (PLWHA) add to the challenges of providing comprehensive, coordinated HIV care. New applications of information technology (IT), however, offer a set of tools to help HIV care providers meet those challenges.

IT is being used to improve health care service delivery, and rapid advances in the technology have made it possible to help providers and patients alike. Many people are familiar with IT innovations such as automated laboratory reporting, electronic medical records (EMRs), and computerized provider order entry (CPOE). Patient-oriented IT tools include computer-based education, self-care and social support modules, and applications that promote adherence to medications and treatment.

EMRs are fundamental to patient- and provider-oriented clinical information management systems. Patient databases can be linked to provide clinicians and other staff with integrated access to medical, laboratory, service utilization, and billing information from different sources. An EMR can contain a wide range of documentation, including multimedia elements such as digitized images (e.g., CT scans, x-rays) and lab values. Other IT applications include the following:

- On-screen reminders and prompts for providers to improve productivity and quality of care.
- Integrated clinical workstations that offer one-stop access to medical records, clinical data, billing information, and knowledge bases (e.g., clinical practice guidelines).
- "Smart cards": portable records that consist of a microchip embedded in a card; the chip contains basic patient information along with the patient's medical record and insurance and billing information. The cards can be updated as necessary.
- Automated medication bottles, which record each instance that they are opened.
- Simple medication reminder systems (e.g., automatic pill dispensers, medical ID watches, and personal digital assistants [PDAs]).
- Interactive health communication programs for patient education and behavioral change, such as Web sites that provide patients with information and support through communication with other patients and experts.
- Computer-based interactive health surveys that promote patient adherence to treatment and encourage healthy behaviors.

IT and Quality of Health Care Delivery

IT can improve health care delivery. One study found that EMRs were more likely than paper records to be understandable and legible and to have recorded a diagnosis, services provided, referrals made, and dosage of medications prescribed.[1] Electronic reminders and alerts can improve clinician adherence to practice guidelines,[2,3] and CPOE can improve physician prescribing practices and compliance with guidelines, shorten length of hospital stay, decrease medical errors, and decrease costs.[4,5]

Moreover, IT can improve patient involvement in and adherence to care regimens. Patients disclose information about health-related behaviors more readily when they respond privately to computerized surveys than when speaking with interviewers,[6,7] and providers who have information from audio computer-assisted self-interviewing (ACASI) applications are in a better position to engage their patients in adopting healthier behaviors and adhering to treatment. Web-based interactive patient support systems also have proven to be useful.

Although the research is promising, IT has not been incorporated to a significant degree in the HIV clinical setting. Accordingly, the Health Resources and Services Administration, HIV/AIDS Bureau (HAB), Special Projects of National Significance (SPNS) Information Technology Initiative evaluated the impact of IT interventions on the delivery and quality of primary care for underserved PLWHA. Six grantees were funded in the 4-year initiative, which began in 2002 and ended in 2006. The six project sites conducted comprehensive evaluations of IT interventions (see table, p. 3) that encompassed care provided to 24,232 clients by 700 clinicians.[8] The HAB AIDS Education and Training Centers also were involved in the initiative.

The most important work related to any IT intervention—indeed, any program implementation—takes place well before any new software is installed or new data collection procedures are implemented. One outcome of the initiative was the

creation of guidelines for providers who want to adopt IT systems to improve HIV care delivery. Those guidelines are summarized below.

It's All in the Planning

Many people think IT will take care of all kinds of problems, but staff must ask, "Is IT the solution?" says Manya Magnus, SPNS project evaluation consultant at the George Washington University School of Public Health and Health Services and evaluator for the SPNS project at the Louisiana State University (LSU) Health Care Services Division (HCSD). "Perhaps it's not really the answer to the problem."

Michael Kaiser, acting chief medical officer, LSU HCSD, notes that it's easy, for instance, to set up a reminder system to prompt clinicians to administer TB skin tests, but "[reminders] won't change the fact that the patient has to have the test read. The issue might appear to be low PPD test rates, but it's not; it's getting the patient back to the clinic to have the skin test read."

Support for IT solutions can come from financial or clinical data demonstrating, for example, problems with billing or patient monitoring. A recent article in the *Journal of Public Health Management* describes six factors identified by the SPNS grantees that HIV care providers should consider before moving forward with an IT solution to their problems: "existing IT and programmatic capacity, expectations, participation, organizational models, types of end users, and challenges."[8] As with any new program, an evaluation component that includes monitoring, process evaluation, cost studies, outcomes evaluation, and performance indicators should be incorporated from the start.[8]

1. IT Infrastructure

Before an organization can implement an IT solution, it needs the appropriate computer resources.[8] Those resources must match the goals of the proposed system, and ongoing maintenance and support for users must be incorporated into the implementation plan. Building on existing infrastructure may be possible; in other cases, it may be better to start over with new resources (e.g., if the required software for the IT system is incompatible with existing computer hardware). Programs generally should choose software created by an established company that offers ongoing customer support and upgrades and has received favorable reviews from software-certifying entities.

The SPNS project at Columbia was an interactive, Web-based tool that provided clinicians with decision support for selecting HIV medication regimens. Mari Millery, associate research scientist at the Mailman School of Public Health at Columbia University and an investigator with that project, notes that bringing cutting-edge technology to community-based clinics is a challenge: "Only half of clinics have computers at the point of care," she observes. Moreover, "most of the staff does not have work-based e-mail. Using it is not routine." In general, the information technology infrastructure in resource-poor settings is weaker than in more affluent health care settings.

The system should be designed to accommodate growth but should be sustainable with the program's current resources. For example, if staff will be needed to maintain the system, staff time and costs should be assessed and allocated from the start. Programs may have to hire someone full or part time to maintain the system and generate reports; otherwise, programs could find important tasks left undone.

For More Information . . .

For additional information on the SPNS IT Initiative, visit www.hab.hrsa.gov/special/it_index.htm. The SPNS Project Officers for the initiative are:

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2. Organizational Capacity

In designing an IT system, an organization must assess its capacity to integrate the proposed system into its current operations. For example, how will users be trained, both initially and over time? Other considerations are as follows:

- *Why should personnel use the IT system?*[8] Is use of the system mandatory? If not, are there incentives for users to adopt the system? An important lesson for most SPNS projects was that all benefits of using the system, whether extrinsic or intrinsic, should be clearly stated and made known from the start.
- *How will patient confidentiality be protected?*[8] Elements of implementing the system that involve HIV-related medical information (e.g., data entry of patient medical records) should be performed only by appropriately trained personnel and should be overseen by people with expertise in medical confidentiality issues or protected health information compliance. Policies for data sharing, access to patient records, and user monitoring must be developed.
- *Who are the system "champions?"*[8,9]—those who eagerly adopt the IT system, talk about its value, and are strong advocates for it? They are vital to encouraging use of the new system and countering resistance to its implementation among individual users.

Beulah Sabundayo, research associate at Johns Hopkins University, emphasizes that the SPNS project there relied heavily on system champions: "You have to have your champion/advocate for the program—someone respected and accepted by the end users," she says. In the Johns Hopkins project, a research assistant in the clinic helped patients with using the ACASI system, and Sabundayo worked with the providers to encourage them to participate and provide the reports needed for the project evaluation.

Millery notes that getting users on board is a challenge even in the best of circumstances. Even a well-designed innovation may need extensive "marketing," she explained in a recent presentation at the American Public Health Association annual meeting, and her project encountered many challenges in recruitment "despite a free service designed to cause minimal disruption." For example, a full two-thirds of the clinics that were approached refused participation; most refused simply through "avoidance," or not responding to contact attempts. Of the clinics that expressly refused participation, the most common reasons were perceived lack of time and perceived adequacy of HIV knowledge.

In addition, Millery notes, many different stakeholders must be on board in any given clinic, including clinic staff, the medical and administrative directors, potential users, and the IT department. Sometimes one stakeholder could be responsible for a refusal even though others were enthusiastic. Recruitment seemed to be more successful when financial incentives were provided and formal contracts were initiated.

Finally, planners should be willing to use paper (e.g., hard copy of reports or patient charts) during the transition to the IT system. Several grantees observed that this redundancy was useful during the implementation process but could be phased out later.

3. Reality Check

Planners should "reality check" their expectations: IT alone cannot compensate for staff or financial shortages, management problems, staff training, or other issues.[8] Again, planners should make sure that IT is actually the solution for the problems they hope to solve.

Michael Green, director of planning and research for the Office of AIDS Programs and Policy, County of Los Angeles, says that the challenge is "what one does not anticipate but should have." The Los Angeles SPNS project was intended to provide an "electronic bridge" between the database that houses HIV counseling and testing information required by the Centers for Disease Control and Prevention and the care services database required by HRSA. A component of the project was an electronic referral system that would help bring people receiving counseling and testing services into care. The system was not as successful as it could have been because rather than enter referral information on a real-time basis—i.e., when the patient was still in the clinic—busy staff at the clinics would enter the data in batches, long after the patient had left. Yet, the system had enough success that the next generation will be able to remedy the problem and, ultimately, "eliminate lots of work for agencies, who won't have to work with multiple databases," says Green.

4. Stakeholder Input

Planners should consult and involve key stakeholders (e.g., providers, end users, clients) on an ongoing basis.[8] In the SPNS initiative, IT system implementers sometimes ran into personal and cultural hurdles that someone on the inside might have been able to identify. Consultation with end users can flag not only issues related to office culture but also unanticipated barriers to IT adoption.

5. Approaches to Selection and Implementation

How an IT system is selected and implemented affects its success.[10,11] In the SPNS project, IT projects were implemented under one of three models:[8]

- *Top-down:* Administrators identify IT as a solution and design the implementation process.
- *Ground-up:* Users identify the need for the IT program and spur its development and implementation.
- *Stand-alone:* The IT system is self-contained and does not require extensive organizational support.

Each model has advantages and disadvantages. Understanding the model being used can help identify problems with implementation and ongoing operation.[8] With a top-down model, for example, the workplan should include meetings with clinicians and other stakeholders to ensure that the IT system will meet their needs, that they are willing to use the system, and that staff are in agreement about the proposed IT solution.[8] Laura Gibson, SPNS project support technician

SPNS Grantees

Provider Systems	**Columbia University: Internet-Based IT to Reduce Prescription Errors With HIV/AIDS Antiretroviral Medications (HIVTIPS)** *Web-based system that provides interactive decision support for HIV medications, adherence counseling, and patient education.*
	Los Angeles Co. Dept. of Health Services, Office of AIDS Programs and Policy (OAPP): HIV/AIDS Interface Technology System (HITS) *A countywide integrated data and technology system to be used by all OAPP grantees offering HIV counseling and testing.* HITS uses the OAPP Extranet to integrate multiple databases and application system modules. The system is intended to manage all data collection for and technological and information resources of OAPP's HIV/AIDS prevention, care, and treatment systems.
	Louisiana State University Health Sciences Center: Evaluating IT's Impact on a Statewide System of HIV Care *A management and reporting system for clinical staff of the HIV outpatient clinics in eight Louisiana public hospitals.* Clinicians can access patient data, including laboratory data and medication regimens, and the system collates data for Ryan White Program reporting. The clinical data can be shared with providers across the eight HIV outpatient programs.
	Duke University: HIV Integration Health Outcomes Project Evaluation (HIHOPE) *Database allowing infectious disease clinics to share clinical data with community-based, HIV ancillary care providers.*
Patient Systems	**Johns Hopkins University: Computer Adherence Technology Study (CATS)** *ACASI adherence surveys administered immediately before appointments with primary care providers.* In this experiment, summaries of the ACASI data were either immediately relayed to providers (experimental group) or remained confidential (control group); impact on clinical outcomes (viral load and CD4 counts) was assessed.
	Weill Medical College, Cornell University: Evaluation of a Patient-Centered EMR in a Medicaid Special Needs Program *ACASI surveys on medication adherence, depression, and substance use administered before appointments with providers.* The results were summarized and immediately transmitted to the clinician for use during the visit.

at the LSU program, says, "Buy-in is important; lack of buy-in can compound a problem and obscure other implementation issues."

In a ground-up model, in contrast, clinicians should work with administrators to develop workplans and resources governing maintenance, day-to-day operations, and sustainability. In a stand-alone model, IT staff should meet with other program staff to ensure smooth integration into the program.[8] Millery observes that one challenge for her project was that there was no strong top-down mandate throughout the participating clinics. The decision support system was more of a stand-alone model. According to Millery, "you need buy-in from administrators and users; you need both."

Conversely, Green attributes the successful implementation of the Los Angeles project to its top-down structure. "Los Angeles was completely different from [the other SPNS projects]. Our success was due to the fact that we are the contracting agency and can require agencies to use the system. It's written into the contract language." Even though the project ran into problems with data entry, its implementation was facilitated because the agencies were required to use the software.

6. End Users

Planners must be clear on who will use the IT system. Across SPNS projects, different staff used their system in different ways. In one project, for example, one staff person helped patients understand how to use the computer terminal to fill in the ACASI survey, and the physician used the data summary to inform clinical decision making. "If the IT is truly part of a process improvement, it must be designed to meet the needs of end users and be fully integrated into their work processes," adds Jane Herwehe, MPH, SPNS study coordinator at LSU HCSD.

Evaluation Is Essential

From the start, IT systems should be designed with evaluation in mind. It makes no sense to go to the trouble of implementing an IT system if it cannot be linked to HIV-related outcomes. Evaluation should be an ongoing process of data collection and analysis that results in continual fine-tuning of the IT system and, ultimately, care. Programs would do well to work with a skilled evaluator from the start.

Resource-poor organizations often have scarce time and resources for evaluation; no staff may have time to evaluate the system, and no funds may be available for evaluation consultants. Even when evaluation is based on automatically generated data, few personnel may be able to analyze the findings and determine how to adjust the IT system accordingly.

But organizations with limited resources can perhaps benefit most from data showing funders that their program is effective. Staff need to be able to identify (and explain to funders) exactly where and how the program has succeeded if they are to replicate that success. Thus, "ongoing documentation of IT implementation, expectations, barriers, and outcomes is crucial."[8] Failing to plan for evaluation may result in an inability of the IT system to improve itself and have implications for sustaining both the IT system and the clinical program.

SPNS grantees used a variety of evaluation strategies, including randomized controlled trials, patient surveys, cost analyses, and cohort studies. The ongoing evaluations "identified strengths and limitations in IT implementation and enabled rapid assessment and correction."[8] Collecting data on an ongoing basis reinforced the strength of the findings.

Sabundayo emphasizes the importance of ongoing evaluation. "You have to think about it up front, the little things that are needed to tweak the project," she says. Sabundayo goes on to say that her project was successful because of the "constant oversight and evaluation. For any program, you can't just put it out there and hope it runs." She adds that regular team meetings and examination of how the data were being collected in the database were key components.

Conclusion

In 2004, HHS announced a 10-year plan to build a national electronic health information infrastructure in the United States. The lessons from the SPNS IT initiative can guide those and other efforts to improve the health care information infrastructure. The SPNS IT initiative highlights implementation issues, particularly for smaller and resource-poor HIV care settings. IT could greatly enhance the quality of care across settings, but it requires much more than simply installing a software program or obtaining a grant for a new computerized billing system.

The guidelines summarized in this bulletin are just a starting point: As use of IT in HIV care expands, the guidelines will need to incorporate new lessons from SPNS and other projects. In the meantime, the lessons from the SPNS IT initiative will help address IT implementation and sustainability issues across all types of programs.

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