

THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY



LOCATION:
*Atlanta, Georgia,
United States*

YEAR:
2006

STATUS:
Laureate

CATEGORY:
*Government and
Non-Profit Organizations*

NOMINATING COMPANY:
Deloitte

ORGANIZATION:

Centers for Disease Control and Prevention

PROJECT NAME:

HIV Prevention Program Evaluation and Monitoring

Summary

HIV/AIDS remains a threat to citizens of, and visitors to, the United States. Prevention is key to curbing the spread of the epidemic, and developing new techniques for reducing individual risk of infection. CDC's Division of HIV/AIDS Prevention (DHAP) faces increasing pressure to improve the efficiency and effectiveness of its HIV prevention programs around the United States. Program evaluation and monitoring programs are proven to identify program weaknesses, improve efficiency of service delivery, and increase accountability. The Program Evaluation and Monitoring System (PEMS) responds to White House, congressional, Health and Human Services (HHS) and Office of Management and Budget (OMB) reporting requirements, by establishing a consistent national data collection, submission, analysis and reporting system.

Introductory Overview

HIV prevention is a complex process. CDC, through the Divisions of HIV/AIDS Prevention, provides financial, technical, and human assistance to health departments (HD), community-based organizations (CBOs), national and regional minority organizations, academic institutions, and others to conduct a wide range of science-based behavior change and other prevention activities. DHAP works with these prevention partners to accomplish six evaluation goals:

- Evaluate the design, implementation, and effectiveness of HIV prevention programs that CDC funds either directly or indirectly
- Enhance the evaluation capacity of health departments and community-based organizations
- Develop and maintain a standardized data system to facilitate evaluation activities across CDC
- Evaluate the process of technology transfer and the effects of technology transfer activities on HIV prevention strategies, programs, and techniques
- Evaluate the effects of changes in HIV prevention policy
- Develop and advance evaluation theory and methodology

Before PEMS, there was no comprehensive and standardized system for monitoring HIV pre-



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vention programs, resulting in CDC being unable to effectively:

- Demonstrate accountability for taxpayer funds used to support the program
- Assess the consistency of program implementation nationwide
- Understand how data are being used to improve program and service delivery
- Analyze and report on program effects (e.g. service utilization and behavioral outcomes)

PEMS was designed and developed in response to the need to provide more comprehensive and reliable programmatic data as well as to measure accountability for CDC/DHAP funded HIV prevention activities. PEMS supports the provision of information for the President's Management Agenda (performance indicators), OMB requirements, requirements associated with the Government Performance Results Act (GPRA), evaluation of the Advancing HIV Prevention (AHP) initiative, and goals management associated with the CDC Futures initiative.

Benefits

The PEMS program provides numerous benefits for the CDC and agencies that receive grants to fund local HIV/AIDS prevention programs. These benefits include:

- Improved outcomes - agencies having consistent data collection and reporting of how their funds are spent. Over time, they are able to analyze the data and determine which programs are most effective in meeting program goals. Agencies will have information to support decisions to improve to their programs and the populations to which they are targeted, and to make informed decisions on how to best allocate funds in the future.
- Identification of underserved populations - better data quality and improved reporting helps identify underserved populations around the country who are at high risk of contracting the virus that causes AIDS.
- Improved interagency communication - sharing of data, facilitating collaboration and perpetuating best practices
- Improved intervention quality - information to support tuning and targeting of prevention interventions will help enhance the quality of interventions. Client level information will allow workers to develop relationships with clients and support case management.
- Improved agency efficiency - Data collection forms and multiple input mechanisms (form scanning, on-line data entry) help to standardize the approach for collection the data required to report to the CDC. Once users are familiar with the forms and how to enter the data into PEMS, the workers become efficient in capturing and entering the data. Agencies are able to leverage the program data entered into PEMS in previous years to more efficiently develop annual programs. Finally, agencies can leverage the data entered in PEMS when writing grant proposals.

The Importance of Technology

The PEMS program depends on a sophisticated technology infrastructure. While previous aggregate reporting programs were able to be managed with spreadsheets and point database applications such as Access, new reporting guidelines (requiring data at the client level, the inter-



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vention level, the program level and the agency level be collected) demanded robust, enterprise wide information systems support.

CDC designed the PEMS software development and deployment initiative with a release-based incremental delivery approach. This incremental delivery approach increases the likelihood of user acceptance, allows grantees and CDC time to adapt to new and modified business processes, and enables early releases to stabilize prior to adding new systems features. In addition, the multiple releases support a phased-in approach for implementing the new data variables which are collected and entered into the software.

The PEMS software approach entailed three major releases, each including design specifications and associated software functionality to be used by over 225 grantee organizations of CDC, including the 50 US state health departments, 6 local (large city) health departments, health departments within the US territories, and over 150 CDC funded community based organizations (CBOs).

The initial release, Release 1.0, was implemented in September of 2003. This initial release established the PEMS software foundation and associated information technology infrastructure. Release 1.0 also established the deployment model for PEMS. Three separate models provide maximum flexibility to states and community based organizations:

- 1.CDC offers a nationally hosted version of the CDC developed software to accommodate organizations without the monetary and human resources required to support a complex application within their organization.
- 2.CDC supports states preferring to install the CDC designed and developed PEMS software within their organizations.
- 3.CDC works with approximately twelve states electing to modify versions of their own data collection systems to comply with the specifications defined by CDC.

Careful planning was required for the nationally hosted version of the software due to the anticipate size of user audience and associated software usage. With 35 states and more than 100 community based organizations using the nationally hosted system, PEMS is poised to be amongst the largest hosted online transactional processing software systems of the US federal government. Careful planning went into the hosted implementation model in order to accommodate a large user population, high transaction activity and large volumes of data being entered. Functionally, the initial release enables grantees to enter agency and budget planning information as well as programming planning data that describes intervention activity plans, target populations and related setting, session and activity plans.

Functionality included in the initial release includes:

- Core software components - including log in, security, home page, help
- Administration - captures end user information and establish user roles and functional access (privileges)
- Agency information - captures information for own agency and for contract agencies
- Community planning - captures current years community plans, target populations and prevention intervention worksheets



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- Program planning - captures current funded program plan information, including the program, program model, intervention, sessions and activity plan data

- Reports - generates basic summary reports on the data entered into the other areas of functionality

The second major release of PEMS, Release 2.0, was implemented in November of 2005. This second release is significant in that it provides the functionality that enables the capture and reporting of detailed intervention activities across the United States. This detailed intervention activity better enables CDC, state and local health departments and CBOs to assess the effectiveness of interventions they are providing to the clients within their jurisdictions. This functionality also enables CDC and its grantees to evaluate what impact the services have on clients' HIV-related risk behaviors and service utilization. CDC and its grantees are better able to identify program improvements with the goal of ultimately reducing the number of New HIV infections. This release consists of seven functional components:

- Client and Aggregate service data - captures client service data collected during the delivery of intervention sessions. Features of this functionality include aggregate level services and client level services

- Network agency - functionality will allow agencies to enter information for agencies belonging to a referral network or coalition of service providers

- System administration - builds upon existing R 1.0 functionality by providing user permissions based on a combination of access rights to modules/sub-modules and interventions

- Data extract - will allow agencies to extract data from the system

- Reports - generates basic summary reports on the client service data

CDC anticipates over 500 organizations (health departments, community based organizations and contract agencies) and thousands of users to be live on PEMS by the fall of 2006.

Each agency directly funded by the CDC for HIV/AIDS prevention services is expected to use PEMS to enter and report their data to the CDC. This includes State Health Departments, Local health departments, and community based organizations throughout each jurisdiction of the US.

Originality

PEMS has ushered in a new era of managing program accountability and program efficiency, with the ultimate potential being realized by the constituents and visitors of the United States through the reduction of new incidents of HIV/AIDS. Being unique in its software deployment approach, CDC was able to rapidly deploy a vital community impact tool and associated program changes to a broad geographical audience. PEMS introduces a paradigm shift for CDC with its approach to tracking and measuring client service interventions. PEMS is innovative because:

- PEMS incorporates data quality management for each method of data entry – for non-profit or cash-strapped community service agencies, the CDC offers multiple ways to enter data into the PEMS system.



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- Online web portal
- Optical character recognition of paper-based forms – a method that goes beyond traditional document management and distribution in that edit and validation is done at the local site and at the point of form scanning
- Batch data import from legacy or non-hosted systems
- Multiple deployment model support - non-traditional for federal government programs, PEMS accommodates different deployment models for its online transactional processing system software, affording differing options across its broad universe of funded agencies. For example for agencies or state health departments with limited IT resources CDC offers a hosted application model, requiring only a web browser and internet connectivity for its users.
- Creative approach to change management and training - with 225 agencies and thousands of potential users across the United States, CDC needed to reach a very large audience in a fairly short period of time. CDC accomplished this through the establishment of regional deployment coordinators, facilitation of centrally and regionally hosted deployment planning workshops, and the facilitation of routine deployment planning and implementation readiness calls. To address the training needs of its extensive user audience, CDC developed and facilitated centrally hosted data collection trainings and instructor led software train-the-trainer programs. CDC also developed and facilitated internet based distance learning training and knowledge transfer through use of “Webinars”.

Success

The PEMS program has been successful in bringing a large number of state and local agencies live on the PEMS software system in a relatively short timeframe. As of March 2006, 225 agencies across the United States have been trained and are live on the PEMS software. Those agencies are able to set up their programs and enter information about their agencies and associated HIV prevention budgets into PEMS. Many agencies also began entering data on services delivered, which will enable CDC to analyze key performance indicators, monitor the programs more effectively, improve the sharing of information between agencies, and ultimately assess detailed behavioral changes for select behavior change programs and interventions.

As additional data is collected and entered into the PEMS system, CDC will have more data to effectively monitor and evaluate how HIV prevention funds are being spent. CDC will be able to use the data to:

- Evaluate HIV prevention efforts as compared to plans.
- Ensure that HIV prevention resources are successfully reaching priority populations
- Provide enhanced reporting capabilities
- Help providers identify, develop and refine HIV/AIDS prevention programs
- Track success of HIV prevention programs
- Better understand community needs
- Obtain quality data across all programs to help determine best interventions for community
- Improve HIV AIDS Prevention activities by targeting them to appropriate populations and



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risk groups and reduce the spread of the disease.

- Increase awareness and change behaviors so people can be safer and healthier

Difficulty

The PEMS program has had to overcome many challenges; most significant among these is managing the diverse vision and opinions that exist in the passionate grantee and stakeholder base that collectively battle the HIV/AIDS epidemic. Being as inclusive as possible and reaching broad consensus while managing to an aggressive timeline presented CDC with numerous challenges.

PEMS is not only new software, but represents a new approach to program monitoring and evaluation. Designing the software, while building the program from the ground up, challenged the design team, creating an environment of business process definition and iteration throughout the process. While challenging, this has the benefit close alignment between the business process and the software solution.

There were a large number of stakeholders to contend with on the project. Each of the 225 directly funded agencies serves a large number of users requiring training. Over the upcoming two years the user population is expected to grow to several thousand. To address this challenge, CDC is establishing and facilitating the most cost effective approaches for reaching this extensive audience through effective communication and training programs.

Each grantee has unique needs and relationships with its sister and parent agencies. Some grantees are funded by multiple agencies, each having different reporting requirements. Others are required to use other software solutions for some portion of their prevention activities, or have alternative input devices to support. In order to have these agencies avoid entering data multiple times, PEMS design includes opportunity to import and export data, thus supporting the integration with external data collection systems.

Client-level HIV/AIDS data must be subjected to the highest levels of privacy protection. For this reason, PEMS includes comprehensive authentication and role-based security. Client-identified data elements are encrypted in the database, allowing only users with the encryption key to access the data. Data, although in many cases hosted at the CDC, is not accessible to CDC staff until it has been stripped of identifying information and authorized for sharing by the owning agency. In addition, each new release of PEMS is subjected to rigorous vulnerability testing, and must pass the new Federal Certification and Accreditation (C&A) process prior to being put into production.

In addition, CDC must balance the pace of grantee adoption with its need to establish a comprehensive data set for national analysis in the shortest timeframes feasible. CDC has addressed these concerns at various points by adjusting the data collection and reporting expectations of its grantee base that needed to balance the new program demands with its responsibilities of providing service to the clients within its jurisdiction.