

AUDIT REPORT



CITY OF NEW YORK
OFFICE OF THE COMPTROLLER
BUREAU OF FINANCIAL AUDIT
WILLIAM C. THOMPSON, JR., COMPTROLLER

Audit Report on the Development and Implementation of The Enhanced Syndromic Surveillance Data Capture System by the Department Of Health and Mental Hygiene

7A03-077

May 29, 2003



THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER
1 CENTRE STREET
NEW YORK, N.Y. 10007-2341

WILLIAM C. THOMPSON, JR.
COMPTROLLER

To the Citizens of the City of New York

Ladies and Gentlemen:

In accordance with the Comptroller's responsibilities contained in Chapter 5, § 93, of the New York City Charter, my office has performed an audit of the development and implementation of the Enhanced Syndromic Surveillance Data Capture System by the Department of Health and Mental Hygiene. The system's primary purpose was to collect data from a variety of sources for monitoring trends in non-specific symptoms of illness and enable the Department to detect disease outbreaks as quickly as possible. The results of our audit, which are presented in this report, have been discussed with officials from the Department of Health and Mental Hygiene, and their comments have been considered in preparing this report.

Audits such as this provide a means of ensuring that City agencies are developing computer systems in an efficient, timely, and cost-effective manner.

I trust that this report contains information that is of interest to you. If you have any questions concerning this report, please contact my audit bureau at 212-669-3747 or e-mail us at audit@Comptroller.nyc.gov.

Very truly yours,

A handwritten signature in cursive script that reads "William C. Thompson, Jr.".

William C. Thompson, Jr.

Report: 7A03-077
Filed: May 29, 2003

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*The City of New York
Office of the Comptroller
Bureau of Financial Audit
EDP Audit Division*

**Audit Report on the
Development and Implementation of the
Enhanced Syndromic Surveillance Data Capture System
By the Department of Health and Mental Hygiene**

7A03-077

AUDIT REPORT IN BRIEF

We performed an audit on the development and implementation of the Department of Health and Mental Hygiene's (the Department) Enhanced Syndromic Surveillance Data Capture System (SSDCS). The system's primary purpose was to collect data from a variety of sources for monitoring trends in non-specific symptoms of illness and enable the Department to detect disease outbreaks as quickly as possible. Our audit also covered enhancements to the initial system.

Audit Findings and Conclusions

The enhanced SSDCS meets the overall goals as stated in the system justification. As developed, the enhanced SSDCS allows for future enhancements and upgrades by being capable of receiving and processing data files from up to 50 different sources. The Department's two business objectives for the development and implementation of the enhanced SSDCS were to eliminate labor-intensive file handling and administrative tasks performed by Department staff and to provide a secure, reliable file handling and data processing environment.

In addition, the Department complied with the City Charter and §3-06 of the PPB Rules dealing with "Emergency Purchases" when it contracted with Information Builders Inc. (IBI) to develop and upgrade the system. Furthermore, our user satisfaction survey of the system's seven primary users as of November 27, 2002, found two users were very happy with the system, while the remaining five users were somewhat happy with the system.

We found, however, that:

- data from emergency rooms are still being transmitted through non-secure e-mails,

- testing certificates confirming that system errors were corrected were not provided, and
- an independent quality assurance consultant was not hired.

Audit Recommendations

To address these issues, we recommend that the Department should:

- Ensure that all data are transmitted through secure methods.
- Obtain all acceptance certificates from IBI.
- Meet with system users to assess their needs and to ensure that their concerns are addressed.
- Engage a quality assurance consultant to assist in monitoring and reviewing the development work and any system enhancements or subsequent work on SSDCS, as well as on any future systems development project.

INTRODUCTION

Background

The Department of Health and Mental Hygiene promotes and protects the health and mental health of City residents by enforcing compliance with the City Health Code and operating a broad range of public health programs and services to monitor, prevent, and control disease.

The events of September 11, 2001, and the intentional transmission of anthrax through the postal service compelled the Department to enhance its electronic Syndromic Surveillance Data Capture System, which was developed in 1998. The system's primary purpose was to collect data from a variety of sources for monitoring trends in non-specific symptoms of illness and enable the Department to detect disease outbreaks as quickly as possible. The original system collected only Emergency Medical Service dispatch data. The enhanced system receives data also from the emergency rooms of 39 public and private hospitals and lab results from the New York State Department of Health. In addition, the enhanced system receives daily worker absenteeism data from a large City agency and daily pharmacy sales data from a large pharmacy chain.

In December 2001, the Department hired IBI, through the City Charter and PPB's "emergency purchase" procedures, to design and develop secure data transmissions from the emergency rooms to SSDCS. Since this purchase was made pursuant to the City's 9/11 Emergency Declaration, specific written approval, was not required. The remaining portions of the enhanced SSDCS were developed in-house. The estimated cost for the IBI contract was \$624,301.

Objectives

The audit's objectives were to determine whether the enhanced SSDCS:

- meets the initial business and system requirements;
- is designed to allow for future enhancements and upgrades;
- as a finished product, will meet overall goals as stated in the system justification; and,
- was procured in compliance with City Charter provisions PPB Rules.

Scope and Methodology

Audit fieldwork was conducted from September 2002 to January 2003. To achieve our audit objectives, we reviewed and analyzed the Department's:

- Contract with IBI and related procurement documentation;
- System Requirements Definition;

- Project Plan;
- Functional Design; and,
- User Acceptance Test Plan.

In addition, we interviewed Department officials about how the enhanced system is used, and we conducted a user satisfaction survey.

We used Comptroller's Internal Control and Accountability Directive 18, *Guidelines for the Management, Protection and Control of Agency Information and Information Processing Systems*, and New York City Procurement Policy Board Rules as criteria for this audit. As the City does not have a formal system development methodology, we used the National Institute of Standards and Technology Special Publication #500-233, *A Framework for the Development and Assurance of High Integrity Software*, to assess whether a system development methodology had been followed.

This audit was conducted in accordance with Generally Accepted Government Auditing Standards (GAGAS) and included tests of the records and other auditing procedures considered necessary. This audit was performed in accordance with the City Comptroller's audit responsibilities, as set forth in Chapter 5, § 93, of the New York City Charter.

Agency Response

The matters covered in this report were discussed with Department officials during and at the conclusion of this audit. A preliminary draft report was sent to Department officials and discussed at an exit conference held on March 11, 2003. On April 30, 2003, we submitted a draft report to Department officials with a request for comments. We received a written response from the Department on May 21, 2003, in which it agreed with the audit's findings and recommendations.

The full text of the Department comments is included as an Addendum to this final report.

FINDINGS AND RECOMMENDATIONS

The enhanced SSDCS meets the overall goals as stated in the system justification. As developed, the enhanced SSDCS allows for future enhancements and upgrades by being capable of receiving and processing data files from up to 50 different sources. The Department's two business objectives for the development and implementation of the enhanced SSDCS were to eliminate labor-intensive file handling and administrative tasks performed by Department staff and to provide a secure, reliable file handling and data processing environment. IBI helped the Department accomplish these objectives by creating a system capable of receiving and processing data files from many sources and building security infrastructure at the application service provider and Department servers. (See Appendix I for system deliverables and implementation status.)

In addition, the Department complied with the City Charter and §3-06 of the PPB Rules dealing with "Emergency Purchases." In this regard, the Department filed a written determination with the Corporation Counsel and the Comptroller and received oral approvals to contract with IBI. Since this purchase was made pursuant to the City's 9/11 Emergency Declaration, specific written approval was not required.

Furthermore, our user satisfaction survey of the system's seven primary users as of November 27, 2002, found two users were very happy with the system, while the remaining five users were somewhat happy with the system. Five of the users reported that although the information displayed on screens is somewhat easy to work with, the screen format and information flow could be enhanced and are not very user friendly.

We found, however, that:

- data from emergency rooms are still being transmitted through non-secure e-mails,
- testing certificates confirming that system errors were corrected were not provided, and
- an independent quality assurance consultant was not hired.

Data Not Secure

Data from 22 of the 39 emergency rooms are still being transmitted through non-secure e-mails even though IBI implemented the secure electronic transmissions that were required by the contract. As previously stated, one of the business objectives for the development and implementation of the enhanced SSDCS was to provide a secure, reliable file handling and data processing environment. Although the data do not contain confidential information that identifies patients, data transmission through non-secure means may result in unauthorized access or alteration of data.

Testing Certificates Not Provided

During the system's testing phase the Department identified two system errors. One error related to the incorrect display of messages, and the other to the archiving of documents to the wrong directories. Department officials stated that these errors were corrected; however, they were unable to provide the testing certificates to document this statement. Testing certificates would show that Department users acknowledge that the functions work and are satisfied with the function. This is particularly important with the archiving of documents since this provides the back up to the information contained in the system.

Independent Quality Assurance Consultant Not Hired

The Department did not engage in an independent quality assurance consultant to assist in monitoring and reviewing the development work for the SSDCS enhancement as required by Comptroller's Directive 18. §9.5.1 of Directive 18 states, "for very large and/or highly critical projects, engage an independent quality assurance consultant to assist the agency monitor and review the work of the development and integration team." Although we do not believe that the lack of the consultant led to delays or other problems with SSDCS, it is imperative that the Department engage independent quality assurance consultants to assist in monitoring and reviewing the development work and future enhancements for SSDCS and any future system development project.

Recommendations

The Department should:

1. Ensure that all data are transmitted through secure methods.

Agency Response: "DOHMH continues to work with our partners to encourage the use of secure data transfer methods, and will require their use for confidential data exchange."

2. Obtain all acceptance certificates from IBI.

Agency Response: "Certification letter of completion provided to auditors."

Auditor Comment: At the exit conference, Department officials stated that they would provide the certification letter along with their response. However, the letter was not provided.

3. Meet with system users to assess their needs and to ensure that their concerns are addressed.

Agency Response: "Agree."

4. Engage a quality assurance consultant to assist in monitoring and reviewing the development work and any system enhancements or subsequent work on SSDCS, as well as on any future system development project.

Agency Response: “DOHMH agrees that the utilization of an independent quality assurance consultant should be incorporated into project planning for certain projects, and will evaluate the benefit of using a QA consultant for future development work.”

Syndromic Surveillance Data Capture System Deliverables

Deliverables	Provided
1) Written user requirements describing:	
a) Security infrastructure	Yes
b) Secure File Transfer Protocol site	Yes
c) Web page for the Secured Socket Layer attachment	Yes
d) Automatic file receipt and alert	Yes
e) Data discrimination, editing, and transformation	Yes
2) Project Plan	Yes
3) System Design document	Yes
4) Test Plan	Yes
5) Training Plan	Yes
6) Implementation Plan	Yes
7) End user documentation	Yes
8) User acceptance test	Yes
9) Operational system to include:	
a) Security Infrastructure at both application service provider and Department sites	Yes
b) Secure File Transfer Protocol process at both application service provider and Department sites	Yes
c) A Web page enabling the Secured Socket Layer attachment.	Yes
d) iWay Software Transformation Engine procedures for the File receipting and Alerting process	Yes
e) iWay Software Transformation Engine procedures for the editing, error process, and transformation processes	Yes
10) Production implementation	Yes
11) Ongoing application support and maintenance	Yes

THE CITY OF NEW YORK
DEPARTMENT OF HEALTH AND MENTAL HYGIENE
OFFICE OF THE COMMISSIONER



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May 20, 2003

Greg Brooks
Deputy Comptroller for Policy, Audits, Accountancy & Contracts
The City of New York Office of the Comptroller
Bureau of Audits
1 Centre Street, Room 530 South
New York, New York 10007-2341

Dear Mr. Brooks:

The Department of Health and Mental Hygiene (DOHMH) is responding to the draft audit report on the Development and Implementation of the Enhanced Syndromic Surveillance Data Capture System.

We were pleased with this report. It confirms that the system meets the overall system goals, allows for future enhancements and upgrades, and was procured in compliance with PPB regulations relating to "Emergency Purchases." All the deliverables were provided.

Attached is a response to the findings and recommendations.

We appreciate the courtesy and professionalism of your audit staff in the performance of this audit. If you have any questions or need further information, please contact Charles Troob, Assistant Commissioner, Business Systems Improvement at (212) 788- 4757.

Sincerely,

A handwritten signature in black ink, appearing to read "TRF", written over a horizontal line.

Thomas R. Frieden, M.D., M.P.H.
Commissioner

cc: Vince Liquori, Assistant Director for Support Services

TRF/et

Response to audit report 7A03-077

Audit Report on the Development and Implementation of the Enhanced Syndromic Surveillance Data Capture System by the Department of Health and Mental Hygiene

Finding: Data not Secure

- The syndromic system was developed to enable secure patient data transmissions, using the security options provided by the system. Presently, identifiable patient data is not transmitted between ERs and DOHMH, as the auditors observe. However, a number of providers are using email for their transmissions.
- DOHMH staff are currently working with 12 participating EDs to switch from non-secure email transmission to one of the automated and secure data transmission options. As this effort proceeds DOHMH will approach all remaining hospitals in an effort to phase out email transmission over the next six months. When new facilities are added to the system DOHMH no longer accepts email as an option for data transmission.
- While we agree with the finding, we believe that the audit should recognize that a highly significant and innovative surveillance function is being performed without undue risk.

Finding: Testing Certificates not Provided

- During user testing and acceptance, two system errors were identified and documented by both DOHMH and the vendor. The vendor subsequently corrected these errors, and the system was formally accepted by DOHMH. DOHMH and the vendor did not formally document these corrections and acceptance in a revised testing certificate. However, the auditors were given a letter of certification from the vendor that errors were corrected, so it is unclear to us what further documentation is required.

Finding: Independent Quality Assurance Consultant Not Hired

- DOHMH agrees that the utilization of an independent quality assurance consultant should be incorporated into project planning for certain projects, and will evaluate the benefit of using a QA consultant for future development work. We do note that the auditors stated that they "do not believe that the lack of the consultant led to delays or other problems with SSDCS."

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Recommendations

The draft audit makes the following recommendations:

“The Department should:

1. “Ensure that all data are transmitted through secure methods.”

DOHMH continues to work with our partners to encourage the use of secure data transfer methods, and will require their use for confidential data exchange.

2. “Obtain all acceptance certificates from IBI.”

Certification letter of completion provided to auditors.

3. “Meet with system users to assess their needs and to ensure that their concerns are addressed.”

Agree.

4. “Engage a quality assurance consultant to assist in monitoring and reviewing the development work and any system enhancements or subsequent work on SSDCS, as well as on any future system development project.”

DOHMH agrees that the utilization of an independent quality assurance consultant should be incorporated into project planning for certain projects, and will evaluate the benefit of using a QA consultant for future development work.