

NEDSS Base System (NBS): Electronic Data Exchange and Workflow Decision Support

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Objective

The NEDSS Base System (NBS), an integrated disease surveillance system, implemented extensible functionality to support electronic data exchange for multiple use cases and public health workflow management of incoming messages and documents.

Introduction

The NBS is an integrated disease surveillance system deployed in 22 public health jurisdictions to support receipt, investigation, analysis and reporting, and data exchange for state reportable conditions. The NBS is governed by the Centers for Disease Control and Prevention (CDC) and state, local, and territorial users that make up the NBS Community. In the early 2000's, electronic laboratory results reporting (ELR) was implemented in an effort to improve timeliness and completeness of disease reporting. As standards-based electronic health records (EHRs) are adopted and more surveillance data become available, modern surveillance systems must consume information in an automated way and provide more functionality to automate key surveillance processes.

Methods

Many use cases exist for exchanging data with an integrated public health surveillance system. These can include exchange of electronic case and laboratory reports from healthcare, data sharing between public health entities, data migration from legacy systems, and ongoing exchange with other public health systems (e.g. immunization registries). The NBS implemented an interface specification called the Public Health Document Container (PHDC). PHDC is based on HL7 version 3 Clinical Document Architecture (CDA). It allows import of patient (cases and contacts), investigation, treatment, interview, and laboratory information into NBS. CDA was chosen as the building block to facilitate data exchange with the healthcare community. Through use of data integration tools, incoming data can be mapped from any format to PHDC and imported into the system. Existing services, such as patient, provider, and organization deduplication are applied. To assist with management of incoming electronic documents, NBS implemented a functionality called Workflow Decision Support (WDS). WDS uses configurable algorithms to automatically process incoming documents (including case reports, laboratory reports, etc.) into the public health workflow. Users can choose to mark an incoming document as reviewed or automatically create an investigation and case notification message to CDC (for nationally notifiable conditions).

Results

Through PHDC, NBS is able to receive data from healthcare using national standards, such as the HL7 Electronic Initial Case Report (eICR). Three NBS partners are currently collaborating to pilot eICR functionality. PHDC was successfully used to migrate large volumes of data from a legacy surveillance system into the NBS. Two NBS states are using PHDC to implement ongoing data exchange between separate surveillance systems within their jurisdiction. In several NBS jurisdictions, WDS is used to automatically create investigations and case notifications for high-morbidity conditions such as gonorrhea

and chlamydia. In other jurisdictions, WDS is used to assist with managing high volumes of Hepatitis B and C reports.

Conclusions

CDA-based PHDC does require that public health have knowledge of standards and data integration resources to transform incoming messages to the PHDC interface; however, the flexibility provided by this approach ensures the system is able to respond to new and changing standards without system development. Additional enhancements are needed to support data exchange with immunization registries. WDS functionality does reduce burden on public health staff, especially when dealing with high-volume diseases. Future functionalities include the ability to define more criteria (such as age or gender) to drive the actions taken on an incoming lab or case report.

Keywords

Data exchange; case reporting; Decision support; Interoperability; Laboratory reporting

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