

Use of Clinical Laboratory Results for Military Medical Surveillance: the Health Level 7 Experience

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Objective

This presentation describes the Health Level 7 (HL7) clinical lab results dataset and how it can and has been used for medical surveillance in the military.

Background

Medical surveillance in the military can be improved through the use of clinical laboratory results collected within the Military Health System (MHS). This presentation describes an effort to establish Electronic Laboratory Reporting (ELR) in the military using existing HL7 messages. HL7 data is being evaluated for data integrity, completeness, reliability and validity. In addition, initial efforts to evaluate, standardize, and use this data to support investigations of interest over the past year are presented.

HL7 project

A central laboratory results repository has been developed through an HL7 pilot project. HL7 lab result messages, sent via MTF (Military Treatment Facility) Composite HealthCare Systems (CHCS, an electronic administrative tracking system used by MTFs to track ancillary patient services including lab orders and results), are converted into a database. Certified lab results have been regularly collected since May 2004 and are organized into three data tables: chemistry/serology, microbiology, and anatomic pathology. Data elements include patient demographics, test name and result, collection specimen and body site, collection date, certification date, requesting facility, performing facility, and inpatient versus outpatient status.

Methods

Initial evaluation of the database in general included reviewing available data fields and their contents, ensuring message integrity, and determining completeness of the data. Current epidemiologic assessments include: evaluation of data gaps/limitations, identification and standardization of pertinent data, establishment of methods to flag potential cases of disease, and assessment of timeliness and reliability of identified cases of disease. Methods have been established to use

microbiology and/or chemistry data for antibiotic resistant organism surveillance, case finding to support emerging public health concerns, and estimation of outcome prevalence in support of policy or intervention decisions. Methods are now being developed to use this data for syndromic surveillance.

Results

Initial assessments of the HL7 data showed the need to refine the message parsing process and database design, standardize pertinent data elements including lab test name and results, and address MTFs that were not represented in the data. Specific data gaps and limitations will be presented. A general description of the Navy and Marine Corps lab data will be presented marking the top organisms identified and the top infectious disease chemistry labs performed. Data in support of operational concerns associated with drug resistant *Acinetobacter baumannii* infections will be presented including graphs by service, infection status, and sensitivity pattern. Case finding strategies in support of *Fusarium* eye infections investigation will also be presented. Preliminary methods to estimate outcome prevalence for sickle cell trait, in support of a policy review of the need for screening at recruit camps, will be presented. Preliminary efforts to map chemistry and microbiology results to Influenza-like illnesses will also be presented.

Conclusions

This project underscores the potential epidemiologic value of existing data in the MHS. HL7 lab results messages containing non-standardized data can be evaluated and standardized centrally for use in capturing medical events that are laboratory results-based. Such capabilities have never before existed in electronic form in the military and investigations have often been resource intensive. Our surveillance efforts demonstrate the utility of HL7 data to track antibiotic resistance and antibiotic resistant infections, provide an initial and rapid analysis of medical event concerns, initiate epidemiologic investigations as needed, and generate hypotheses for further study.