

An Enterprise Information Integration (EII) Approach for a Syndromic Surveillance System

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OBJECTIVE

EII is the *virtual* consolidation of data from multiple systems into a unified, consistent and accurate representation. An analyst working in an EII environment can simultaneously view and analyze data from multiple data sources as if it were coming from one large local data warehouse. This paper posits that EII is a viable solution to implement a system covering large areas and disparate data sources for syndromic surveillance and discusses case studies from environments external to health.

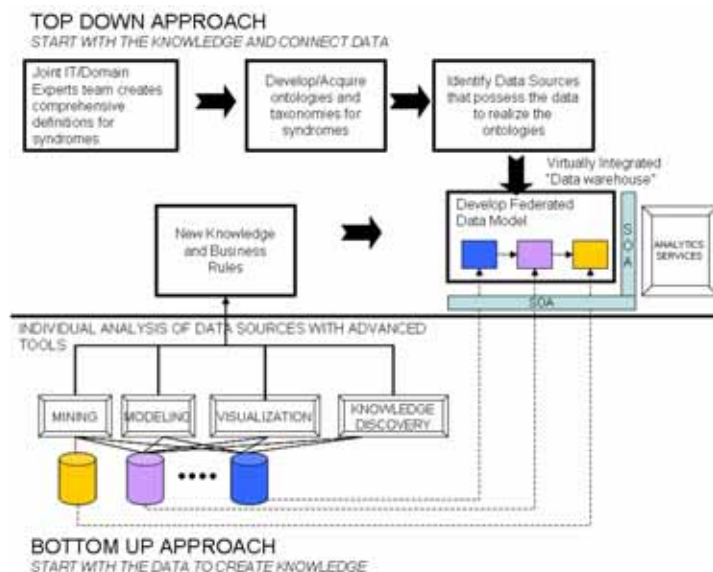
BACKGROUND

A comprehensive definition of a syndrome is composed of direct (911 calls, emergency departments, primary care providers, sensor, veterinary, agricultural and animal data) and indirect evidence (data from schools, drug stores, weather etc.). Syndromic surveillance will benefit from quickly integrating such data. There are three critical areas to address to build an effective syndromic surveillance system that is dynamic, organic and alert, capable of continuous growth, adaptability and vigilance: (1) timely collection of high quality data (2) timely integration and analysis of information (data in context) (3) applying innovative thinking and deriving deep insights from information analysis. In our view there is excessive emphasis on algorithms and applications to work on the collected data and insufficient emphasis on solving the integration challenges. Therefore, this paper is focused on information integration.

METHODS

There are four major integration aspects to building a real-time surveillance system: (1) Semantic integration – developing rich definitions of syndromes based on domain knowledge and observations from the field to provide in-depth and innovative context (2) Information Integration – mapping semantics to relevant diverse, distributed data sources owned by different organizations (2) Application integration – adapt and share isolated and highly specialized applications across the community as services and finally (4) the critical enabler – Cultural integration – creating, sustaining and growing a consortium of data and application providers who appreciate and adopt integration. Using the methodology shown, the system can be built iteratively, by modeling a few syndromes, integrating direct and indirect data, applying selected algorithms and demonstrating value quickly and continuously. EII eliminates the burden of timely

transmission to centralized locations. Local data sources are loosely connected to the federated data model so changes in data formats and database management systems have minimal impact on the system.



RESULTS

Data is accessible to analysts from different organizations simultaneously to conduct specialized analysis. Isolated applications and algorithms tightly coupled to local databases can be converted into shared services based on Service Oriented Architectures and easily discovered throughout the virtual "surveillance enterprise" to provide real time surveillance. We will share our implementation successes and failures with the surveillance community.

CONCLUSIONS

Fundamental challenges to integration are cultural that in turn create process, organizational and technology challenges. An EII based approach helps to address these challenges holistically.

REFERENCES

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