

Evaluating syndrome definitions in the extended syndromic surveillance ontology

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Objective

We present the results of an online survey designed to evaluate syndrome definitions encoded in the Extended Syndromic Surveillance Ontology.

Introduction

The Extended Syndromic Surveillance Ontology (ESSO) is an open source terminological ontology designed to facilitate the text mining of clinical reports in English (1, 2). At the core of ESSO are 279 clinical concepts (for example, fever, confusion, headache, hallucination and fatigue) grouped into eight syndrome categories (rash, hemorrhagic, botulism, neurological, constitutional, influenza-like illness, respiratory and gastrointestinal). In addition to syndrome groupings, each concept is linked to synonyms, variant spellings and UMLS Concept Unique Identifiers.

ESSO builds on the Syndromic Surveillance Ontology (3), a resource developed by a working group of 18 researchers representing 10 syndromic surveillance systems in North America. ESSO encodes almost three times as many clinical concepts as the Syndromic Surveillance Ontology and incorporates eight syndrome categories, in contrast to the Syndromic Surveillance Ontology's four (influenza-like illness, constitutional, respiratory and gastrointestinal). The new clinical concepts and syndrome groupings in ESSO were developed by a board-certified infectious disease physician (author JD) in conjunction with an informaticist (author MC). In order to evaluate and audit these new syndrome definitions, we initiated a survey of syndromic surveillance practitioners.

Methods

We designed an online survey that presented respondents with all the clinical concepts associated with each syndrome definition, and the question 'To what extent do you agree that the following concepts are potentially indicative of SYNDROME?' For each clinical concept, the respondent then indicated their agreement from 'Strongly disagree' to 'Strongly agree'. We publicized our survey through the ISDS Newsletter.

Results

As September 5, 2011, 24 people have participated in the survey, with 14 completing all the questions. Although providing personal information was optional, half the respondents supplied biographical details. Most of the respondents were based in North America, typically from state or county public health departments, although three were based outside North America (one from Taiwan and two from the UK NHS). Apart from one assistant professor, all the respondents had either 'public health', 'epidemiologist' or 'syndromic surveillance' in their job titles.

Strong disagreement was expressed by a minority of respondents on 7 of the 279 ESSO concepts (see Table 1). Only 2 concepts—'hoarseness' (respiratory syndrome) and 'concussion' (neurological syndrome)—elicited disagreement (or strong disagreement) with ESSO syndrome definitions among a majority of respondents. We are currently developing a strategy to 'flag' concepts with high levels of disagreement in order to better inform ESSO users.

Table 1. Concepts with strong disagreement

Clinical concept	Syndrome
'Spitting up'	GI
'Somnolence'	ILI
'Failure-to-thrive'	Constitutional
'Concussion'	Neurological
'Falling'	Neurological
'Koplik's spots'	Rash
'Fainting'	Neurological

Keywords

Ontology; terminology; informatics

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References

- Conway M, Dowling J, Chapman W. Developing an application ontology for mining free text clinical reports: the extended syndromic surveillance ontology. Proceedings of the Third International Workshop on Health Document Text Mining and Information Analysis (LOUHI 2011); 2011:75–82.
- Extended Syndromic Surveillance Ontology: <http://code.google.com/p/ss-ontology/>.
- Chapman W, Dowling J, Baer A, Buckeridge D, Cochrane D, Conway M, et al. Developing syndrome definitions based on consensus and current use. *J Am Med Inform Assoc.* 2010;17:595–601.

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