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COLORADO *Chapter*

Health Information Management Systems and Society

Building a decision support system for third world needs

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Presentation Outline

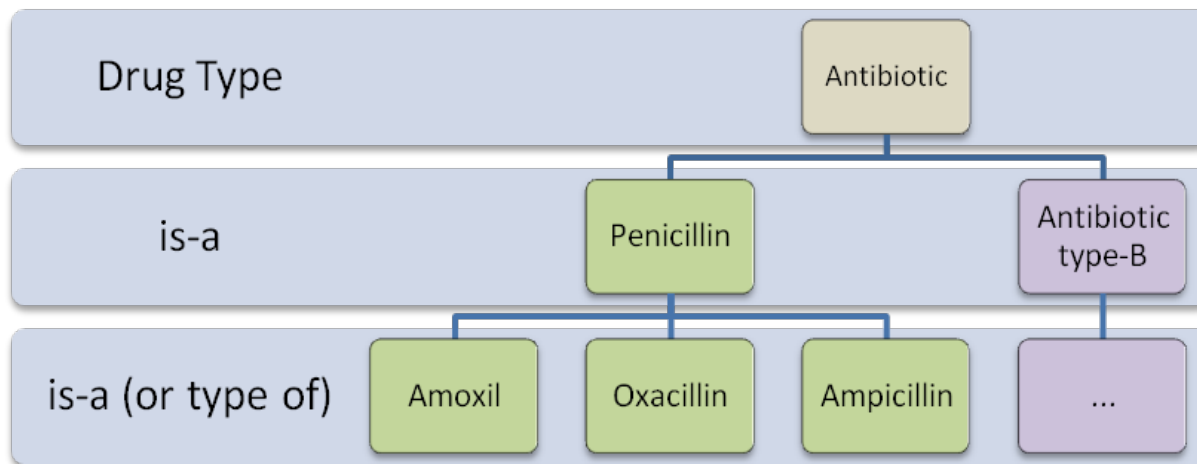
- Integrated disease management decision support system (DSS)
 - International project – team, locations, countries
 - Technologies utilized, product description and its applicability to third world countries
- Ontology, a semantic technology - 2 minute tutorial
- Challenges, opportunities and lessons learnt
- Applicability to US projects
- Questions and Answers (Q&A)
- Credits

Ontology

- “..An **ontology** is a formal representation of the knowledge by a set of concepts within a domain and the relationships between those concepts.” (source Wikipedia)
 - Describes a domain (e.g. medical billing domain)
 - Stores relationships – e.g. “*is-a*”, “*has-a*”
 - Provides knowledge representation about the domain
 - Captures human knowledge into machine representation, enables automated reasoning

Ontology Example

- Drug Example



- Disease Example

- Vector Borne- West Nile, Malaria, Dengue

Ontology Benefits

- Shared vocabulary – enabling data reuse, shared data, information system data exchanges
- Abstracts enterprise knowledge
- Complex decision making and inferences
- Advantages over relational databases
 - Ease of adding additional relationships without major database re-architecture or changes
 - They cannot store hierarchical relationships between data

Disease Management Video

- Courtesy: youtube, link http://www.youtube.com/watch?v=mSsmW7N_scY, MaximsNewsNetwork: Malaria – New Treatment Guidelines, World Health Organization



Integrated DSS

- GIS, semantic technologies and data analysis based decision support platform
 - One country and one disease specific module in use
 - Dozens of use cases (scenarios or queries), all data is geo-tagged
 - Deployed at all levels of political structure – e.g. state, district, county, city
 - Forwards local data to a central collection system for aggregate reporting
 - Being expanded to multiple countries, and multiple diseases
- Dispersed team in Europe, Africa and Americas
- Modifiable geo-political hierarchy
 - E.g. District, Ward in one country and state, county in another

Integrated DSS- Product



Map from - http://go.hrw.com/atlas/norm_map/zimbabwe.gif

3rd World Country Technology Challenges

- Internet access
 - Not ubiquitous, limited bandwidth and connectivity
- Application needs to run on every conceivable machine imagined!
- Legacy data consolidation – spreadsheets, MS Access, paper
 - Geopolitical entities misspellings
 - E.g., Harare vs. Herare vs. Hararre all meaning Harare
- Multi-machine installs and data synchronization*
 - Master (top level) changes need to filter down to all levels
 - Data collection from lower levels need to bubble up to Master level for aggregate reporting
- Localization – language, time representation, context
- Different country, different language (e.g. Arabic) and code reuse issues

Solutions

- Internet ready applications, but assumes no internet
- Lightweight applications for machines less than 3 year old
- Freely distributable copies (just as in Adobe reader)
- Cross platform software – Linux, Apple, Windows
- Data consolidation using spreadsheet importer
 - uses ontological principles to resolve misspellings of geopolitical entities. User uses combination of
 - Best sounding match AND
 - Using the geo-political ontology
 - New association added to the ontology

Opportunities and Lessons

- Potential to improve the program
 - Mobile solutions
 - Address multiple diseases using the same platform
- Lessons
 - Each country, region and zone has its own nuances
 - Embrace low tech where necessary
 - Do not assume infrastructure in place even if told so!

Applicability to US

- US has a strong infrastructure
- Initiate disease management program in monitoring, controlling and auditing
 - H1N1
 - West Nile Virus
 - TB and other programs
- Patient care management
 - CMS
 - Business intelligence
 - Data integration between different Healthcare IT systems using ontologies

Conclusion, Q&A

- Third world countries are adopting newer technologies to address healthcare issues
- They are good at blending technical solutions with local environment and infrastructure to get the desired effects
- International health and human service organizations and foundations are committed to assist the third world countries in their efforts
- Questions and Answers

Credits

- The Integrated Ontologies and GIS Decision Support System was built by:
- TerraFrame, Inc., 11005 Dover Street, Ste. 1000, Westminster, CO 80021, Tel: 1-877-444-3074
- Website: <http://www.terraframe.com>
- nmceachen@terraframe.com
- jpbatra1@yahoo.com