Care Pathway Records and Ontologies for Medical Research and Healthcare

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Background

• This work has arisen from research for European Commission projects:
  • **SHARE** – Looking at the future of biomedical research, where healthcare and research are intelligently brought together.
    • Potential not only for controlled secondary use, but really bringing healthcare and research together, with each actively feeding the other.
  • **MammoGrid** – A validated database of digital mammograms.
  • **EuroPGDcode** – Examining future directions for research into Preimplantation Genetic Diagnosis (PGD) and Screening (PGS).
Integrated Care Pathways (ICPs)

A care pathway maps out a pre-defined set of activities and/or choices within a specified scope, which may be applied to one or more issues or problems. It defines what should be recorded about the care delivered in such a way that variance between proposed and actual care can be audited and local practice refined accordingly.

A care pathway may specify the goal and/or expected outcome, the data required, decisions and choices that may be appropriate (with supporting arguments) and actions to be carried out, when and by whom.

Benson, 2005 (NPfIT)
Pathways and Variance

- Pathways as a source of data for research.
  - Examples of situations where branching pathways and/or variance/audit data has been recognised as helpful in the alteration of a pathway.

- What variance tracking and analysis ‘should’ be; variance analysis leading to changes in pathways in response to emerging evidence from practice.
  - Current analyses – primary, secondary and tertiary analysis.
  - The need for coding, enabled by electronic pathways.

- Formal modelling (with PROforma, GLIF, etc.) is the norm.
  - Domain and operational knowledge are not separated.

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A general ontology for care pathways

- Used to unify pathways, aggregate data, and for embedding into an electronic health record

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An example from PGD research

- PGD and EuroPGDcode
  - Research questions: data required often relates to previous periods of care for patients of interest

- Gathering data for research into PGD
  - Using ontologies
  - Inferring pathways from electronic health records
Ontologies for healthcare

- Problem area: minimising and resolving drug interactions when a patient follows multiple pathways in parallel.
- Using ontologies to identify problematic drug interactions.
- Data from Cerner’s VantageRx and other sources could be used to provide more information and better guidance.
- Use of variance data.

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An ontology of drug interactions

With a modification of Hurley & Abidi’s ontology, this could provide useful information on alternate drugs for substitutions, the modification of pathways to incorporate drug management tasks, and allow variance data to feed into a ranking process for alternate drugs, as well as an ongoing evaluation of off-label prescribing.
Conclusion

Future work...

- Drug interaction ontology
  - Development of a decision support system for gastroenterology

- PGD research pipeline
  - A ‘fuzzy matching’ problem

Thanks for your attention!
For this presentation and related work, visit http://www.cems.uwe.ac.uk/~me2olive/

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