Collection, integration and analysis of patient clinical data
Clinical data sources

› GP clinical data
  - GP EHR data – 10 different systems
  - GP survey data – BEACH – standardised data

› Hospital clinical data
  - ‘Live’ data – held in a variety of systems within and between hospital
  - Statistical data – held at State and commonwealth level – standardised data

› Disease specific data
  - Held in a variety of disease registers – various data standards

› Mortality data
  - Held at State and National level (can be linked to patient data)

› Private sub-specialist and allied health data – mostly inaccessible
Consistent data element labels and data definitions

- Each system uses vendor designed data labels, frequently without any definition of content

Linkage of data elements within EHR systems (a defined data model)

- Current EHRs frequently do not allow linkage of management action to specific patient problems (standards established by Dr Larry Weed in the 1960s)

Use of standardised terminology sets for each data element in the record

- Currently many vendors make up their own data sets which are not compatible between systems

Standardised mapping of terminologies to clinical classifications for data analysis.

- Most clinical terminologies in EHRs and not suitable for data analysis because of duplication of concepts
Semantic interoperability:

the capture, transfer and use of information in a manner in which the meaning of the information is retained between different parties in the health care system

(*Semantic interoperability for Better Health and Safer Healthcare: deployment and research roadmap for Europe*)
Achieving semantic interoperability

- Consistent mapping of data elements in EHRs to a standard minimum data set/data model for extraction
- Using standard terminologies or validated mapping from vendor terminologies to standard terminologies
- Grouping terminologies with clinical classifications for decision support and analysis
- (patient record access requires terminologies understandable to patients)
Three kinds of terminology

- **Interface terminology:**
  - a systematic collection of health care–related phrases (terms) that supports clinicians' entry of patient-related information into computer programs, such as clinical “note capture” and decision support tools. (Rosenbloom)

- **Reference terminology:**
  - a terminology designed to uniquely represent concepts, by listing the concepts, and specifying their structure, relationships and, if present, their systematic and formal definitions.

- **Classification:**
  - The categorisation of relevant natural language or terminologies for the purposes of systematic analysis
  - A type of aggregating terminology, a logical system for the arrangement of knowledge
Conceptual framework for semantic interoperability

Clinical terminologies

<table>
<thead>
<tr>
<th>Interface terminology</th>
<th>Reference terminology</th>
<th>Aggregate terminology or classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms used in day to day clinical practice, ‘lay’ terms</td>
<td>Set of unique standardised concepts e.g.: SNOMED CT</td>
<td>A system that categorises terms e.g.: ICD-10-AM; ICPC-2</td>
</tr>
</tbody>
</table>
Starting the data integration process

- Some data is now being coded in SNOMED CT which is the government endorsed reference terminology standard
- Virtually all coded hospital and mortality data is classified in ICD10AM
- GP standardised data is classified in ICPC-2
- THEREFORE:
  - As a starting point we need to be able to map GP clinical terminology to SNOMED CT, ICD10AM and ICPC-2
  - ICPC-2 Plus (used in 8 of 10 GP systems) is already mapped to ICD10AM and ICPC-2 and mapping to SNOMED CT is 70% complete
  - We need to map the two most used terminologies MD terms (Docle) and the BP (Pyfinch) terms.
Quick and mostly clean roadmap

MD Terms

PYFINCH terms

ICPC-2 PLUS

ICD-10-AM (~20,000 concepts)

ICPC-2 (~4,500 concepts)

SNOMED CT (mapping currently in progress)
General practice termsets

Local termsets used in other clinical areas

SNOMED CT

ICD-10-AM
(\(\sim 20,000\) concepts)

ICPC-2
(\(\sim 4,500\) concepts)

SNOMED CT RefSets
- General practice
- Emergency department
- Other medical specialties
- Allied health
Mapping process (simplified)

- Terminology
- Mapping specialist 1
- Mapping specialist 2
- Map lead review (to review inconsistencies between specialists)
- Consensus review (wider discussion by Project Group)
- Editorial issues (for SNOMED CT, ICD-10AM or ICPC-2)
- Completed map ready for publication

Family Medicine Research Centre