AN International Diagnostic Grouping algorithm for use with ICD-11 AND ICHI

Ric Marshall – 30 June - 11 University of Sydney with thanks to Steve Sutch and PCSI for background material.
GRANULARITY OF CATEGORIES

Terms concept labels
- +/- 600,000 Snomed CT
- +/- 300,000 Snomed RT
- Others
  - Galen
  - Read
  - Loinc

Classification categories
- +/- 15,000 Diagnoses
- +/- 5,000 Procedures
- 500<->1000 DRGs
- 300<->400 ADRGs
  - [ +/- 200 SRGs - +/- 100 Clinical service types]
- 23 MDCs
Other -

- Care types
  - Rehabilitation, aged care, specialised nursing
  - Chronic care, Mental health.

- Risk adjusted capitation groupings
  - DCGs

- Care-staging-associated unbundled groupings – eg DBCs
DRG Design Goals

- Clinical and cost homogeneity,
- Exhaustive and mutually exclusive ???????
- Materiality, Transparency,
- Data burden – routine clinical/admin data
- Quality inputs – required precision
  - clinical,
  - policy, and
  - cost
Primary data requirements

- Underlying classifications
  - ICD/Morbidity, Procedures, Patient function
  - Patient demographics

- Available design and test data sets
Dependent variable

- E.g. EPISODE:

- Cost or proxy eg
  - Length of Stay, price, charges

- Quality indicators
  - Validation standards, variability measures, reconciliation totals
Design process

- Formal timetable of representations, Design and response
  - Germany, USA/Medicare (annual)

- Semi formal, biannual/annual processes
  - Australia, UK, Nordic

- Engagement with stakeholders
  - Hospitals, Clinicians, Policy, Commissioners

- Education
Statistical/classification tools

- Discriminant analysis (DA)
  - Uses least squares methods

- Regression models (multiple and logistic)
  - relationship between multiple variables

- Artificial Neural Networks
  - interconnected simple processors

- Tree-based algorithms (CART)
  - Classification and Regression Trees (CART), CHAID, AUTOGRP (Yale)

- Rules for new groups
  - Size, homogeneity
Clinical input and design

- Clinical Panels, representatives of medical associations
  - Australia, UK

- Formal representation from hospitals, medical associations
  - USA, Germany

- Direct clinical design input and evaluation
  - Practicing clinicians, full time design
## Design Issues

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<th>USE CASE ISSUES</th>
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<td>• Iso-Resource Groupings</td>
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<td>• Design principles</td>
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<td>• Review and Revising process</td>
<td>• Readily available data</td>
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<td>• Currency, DRG unit of activity for payment</td>
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<td>• Unbundling</td>
<td>• Improving the Explanation of Variance</td>
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</table>
Grouping Process

Data cleaning and input
- Standardise data
- Fixed file format
- One or multiple files
- Single patient (interactive) or Multiple patients (Batch)

Data Edits Grouping
- Face validity
- Consistency
- Warnings or failures
- Apply algorithm(s) – Table driven
- Ungroupables

Modelling Reporting
- Predictive models
- Concurrent models
- Observed v Expected
- Aggregate statistics
- Grouping variables

Output
- Input file & grouping variables
- Expected values
- File format(s)
Design Structure

Body System Or Specialty

Surgical Groups
- Major Surgery
- Intermediate Surgery
- Minor Surgery
  - With/WO CC/Age

Medical Groups
- Neoplasms
- Specific Diagnoses
- Non Specific/Symptoms
  - With/WO CC/Age

Major CC, Severity Scale

*APDRG, APRDRG
Check list of modifiers

- CC levels, multiple levels
  - Minor, Intermediate, Major + multiple

- Multiple procedures
  - Procedure escalators, effect of ITCs

- Treatment packages
  - E.g. renal dialysis, chemotherapy

- Chronic care
  - Stable, non-stable, catastrophic events

- Generic design

- Primary care
  - Cross over with outpatients
Options

- Build your own DRG system
- Adapting another country’s system
  - (no adaptation)
- International examples
  - Adopt a grouper (e.g. Ireland)
  - Adapt a grouper (e.g. Germany)
  - Develop new grouper (e.g. UK, Australia)
Options (2)

- Adoption of a procedure classification
  - Separate decision to Casemix classification
    - E.g. Germany
  - Joint decision
    - E.g. Ireland, Portugal

- International Standard Grouper
  - Countries need to make decisions on grouper for domestic use (support national policies)
  - Can make a separate decision for international comparisons
  - Advantage in having the two related.
International Evolution of DRGs

Medicare’s evolution to MS-DRGs

- In 2008 Medicare adopted Medicare-severity DRGs
- From 1989 to 2007 differences in severity of illness were captured by presence or absence of a CC
- Early in the 2000s, many hospitals were beginning to take strategic advantage of opportunities for selection:
  - Specialization in cardiac care and orthopedic surgery
  - Development of physician-owned specialty hospitals
- CMS contracted with 3M to develop MS-DRGs, which:
  - Expanded the number of DRGs from 500 to 750
  - Completely revised the CC and CC-exclusion lists
  - Many base DRGs are split 3 ways, with MCC, CC, no/CC
How CMS revised the CC list

- Is a given diagnosis (Dx), when present as a secondary Dx, a Major CC (MCC), a CC, or not a CC?

- Clinicians re-evaluated 13,549 Dxs to make initial MCC, CC, no CC assignments, and exclusions

- CMS measured resource impact for 3 patient groups:
  - The target Dx is present as a 2nd DX, and the patient has:
    1. No other 2nd Dx, or all other 2nd Dxs are not CCs
    2. At least one other 2nd DX that is a CC, but no 2nd Dx is a MCC
    3. At least one other 2nd DX that is a MCC
  - CMS calculated ratios of average charges for each group to average charges for all patients where no 2nd Dx is a CC.
Australian Refined DRG (ARDRG)

- AN-DRG v1.0
  - 1992 updated annually
  - 1998 biannually

- AR-DRG v6, 2008

- Commonwealth of Australia, Department of Health and Ageing
  - Clinical Casemix Committee
  - National Casemix and Classification Centre (NCCC), University of Wollongong

- 23 MDCs, 665 DRGs
  - Surgical hierarchy, principal diagnosis

- ICD-10-AM, ACHI

- Increase in groups with CC splits
AR-DRG CC Splits

- Complication and comorbidity level (CCL)
- Patient clinical complexity level (PCCL) assignment

<table>
<thead>
<tr>
<th>CC Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not a complication or comorbidity</td>
</tr>
<tr>
<td>1</td>
<td>Minor</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>Severe</td>
</tr>
<tr>
<td>4</td>
<td>Catastrophic</td>
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</tbody>
</table>
Canada CMG

- Introduced 1983
- Redevelopment in late 1980s, 1990 improved
- 1997, age & complexity overlays
  - Age, CC not splits in CMGs
  - 5 comorbidity levels
- 2001, ICD-10-CA introduced
- 2004 Redevelopment, 2007 CMG+
  - 2007 CMG+, 2010 (CA 10th revision)
    - 21 MCCs, 560 CMG
    - 5 Factor adjustments
    - Age Category, Comorbidity Level, Flagged Intervention, Intervention Event, Out-of-Hospital Intervention
- CACS, Ambulatory care
CMG+ Comorbidity Levels

- Comorbidities assign patient to one of 5 Comorbidity Levels, impact on resource consumption:
  - Level 0 (0% to 24%)
  - Level 1 (25% to 49%)
  - Level 2 (50% to 74%)
  - Level 3 (75% to 124%)
  - Level 4 (125% or higher)
Germany G-DRG

- Introduced 2003, adapted from AN-DRG v4.1
- Annual revision
  - via the structured dialogue
  - 40% of all suggestions resulted in adjustments of the weights or the classification
  - calculation of the relative weights of each DRG
- 2008, 1,137 DRGs, 26 Chapters
  - Incorporates hours on mechanical ventilation
G-DRG Functions

- 16 different types of functions, global split criteria:
  - OR-procedure not related to the principal diagnosis
  - Weight at admission (for patients with an age < 1 year at admission)
  - Specified procedures
  - Complex procedures
  - Complicating procedures
  - Dialysis
  - Polytrauma
  - Procedure on several locations
  - Intensive care therapy with a score above 552 points
  - Intensive care therapy with a score above 1104 points
  - Complex early rehabilitation therapy in geriatrics
  - Early rehabilitation therapy
  - Sequence of complex OR-procedures
  - Specified OR-procedures, conducted at four different time levels
  - Pre-transplantation hospital stay
  - Complicating procedures in conjunction with an allocation to the pre-MDC.
England
Healthcare Resource Groups (HRG)

- Payment by Results Timetable
  - Healthcare Resource Groups (HRG) and Service Classification Tools (SCT)
  - Implementation of limited HRG Tariffs
    - 2003/04 15 HRGs
    - 2004/05 48 HRGs (piloting of tariff)
  - Tariff based system 2005/2006
    - Objective 60% total NHS spend
    - Acute Inpatients, Outpatients, A&E, Critical Care, Mental Health
OTHERS

- FRANCE
- AUSTRIA
- JAPAN
- THAILAND
- COMMERCIAL – eg 3M
- MALAYSIA UNU

??VALUE IN A COMPREHENSIVE TABULATION
<table>
<thead>
<tr>
<th>Country</th>
<th>Diagnoses</th>
<th>Procedures</th>
<th>Casemix</th>
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<td>Australia</td>
<td>ICD-10-AM</td>
<td>ACHI</td>
<td>AR-DRG, local variations</td>
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<td>Japan</td>
<td>ICD-10, ICF</td>
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<td>DPG</td>
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<td>ICD-10</td>
<td>KHIC-PH</td>
<td>Korean DRG</td>
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<td>ICD-9-CM</td>
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TOWARDS AN INTERNATIONAL DRG?

- EURO DRG PROJECT – compatible goals?
- UNU SIMPLIFIED GROUPER PROJECT – collaboration?
- APPROACHING UPTAKE OF ICD-11 AND ICHI
  - NEED FOR INTERNATIONAL COMPARISONS
  - NEED FOR ACCESSIBLE - OPEN SOURCE MATERIAL
  - COST OF MAINTAINING MULTIPLE PLATFORMS -
- THE BUSINESS CASE FOR LOCAL VARIANTS
POTENTIAL GOALS

STANDARD INTERNATIONAL CORE

- At “adjacent” (general) DRG level.
- Approximately 400 categories
- Expandable to 800-1000 with complexity splits

- General CC tables but local levels values

- Local complexity splits.

- Initial scope - acute inpatients ??? but expandable to incorporate other care types and setting independence.