What are the main health economics issues challenging health care systems present and future. From equity to efficiency what are the rationale, a

28th PCSI Conference Workshop

A Smooth Introduction to Case Mix for new comers

Avignon , 17 September 2012

Prof. Jean Marie Rodrigues, University of Saint Etienne, INSERM U S872 Paris FRANCE

rodrigues@univ-st-etienne.fr

Prof. Terri Jackson, Northern Clinical Research Centre ,The Northern Hospital , Victoria , AUSTRALIA

terri.jackson@ualberta.ca

Dr Béatrice Trombert, University of Saint Etienne, FRANCE

Trombert@univ-st-etienne.fr

Introduction en douceur a la méthodologie des systèmes dits “Casemix”pour les nouveaux venus

17 Octobre 2012, Montreal, 28e Conférence PCSI
Prof. Jean Marie Rodrigues
Pr Terri Jackson
Dr Beatrice Trombert Paviot
Université St Etienne, France
Northern Hospital Victoria Australia

Traduire Case mix

- Eventail de cas
- Mélange de cas
- Variété des cas

- Donc Case Mix!

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PROGRAM OF THE WS

1. Introduction and basic principles
(JM Rodrigues – 15 minutes)

2. Overview of Case Mix systems and components around the world
(Terri Jackson Béatrice Trombert– 20 minutes)

3. Case Mix and quality of care
(Terri Jackson – 20 minutes)

4. The topics of a week Winter and Summer School
(Jean-Marie Rodrigues – 10 minutes)

5. DISCUSSIONS

Agenda

1 Introduction, Historique et principes de base DRGs et Case mix :Jean marie Rodrigues et Béatrice Trombert

2 Mise en œuvre des différents systèmes Case mix dans les différents pays : T Jackson et B Trombert

3 Qualité ,sécurité et Case mix T Jackson et JM Rodrigues

4 Conclusion les Universités d'été et d'hiver de l'association PCSI

Why do we need Case Mix in health care (acute care hospitals)?

1 Introduction

2 The different health care systems funding mechanisms

3 How to pay the hospitals by performance

4 Conclusions

The specific or wearied nature of the health care system

1. The nature of the good health care
   - Good unclear: health status/ health delivery
   - Non-homogeneous
2. Multiple explaining variable (In /Out:)
3. Uncertainty
   - Unpredictability of the disease
   - Unpredictability of the production results
4. Asymmetry of Information: top role of physicians
5. Imperfect Market
   - Barriers to entry, not for profit sector, interdependence between demand and supply

Pourquoi avons-nous besoin des systèmes Case Mix en soins de santé

- 1 la nature particulière des Biens « Santé »
- 2 malgré des différences les systèmes de soins de santé utilisent des mécanismes de financement collectifs et doivent rendre compte de l'efficience et de l'équité
- 3 la gestion et le financement doivent se baser sur la performance et donc l'activité

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La nature particulière et bizarre des systèmes de santé

1. La nature du bien “Santé”
   - Quel Bien : Etat de santé ou Distribution de soins
   - Non-homogène
2. Multiple variables explicatives (Dedans /Dehors)
3. Incertitude
   - Caractère imprévisible de la maladie
   - Caractère imprévisible du résultat produit
4. Asymétrie de l’ Information : rôle prédominant des médecins
5. Marché imparfait
   - Barrière à l’accès au soin, importance du secteur sans but lucratif, interdépendance entre offre et demande

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Implications for health policy

- Equality of access to health care
- Public funding and individual payment
- Health insurance (Risk)or Bismarckian insurance(Social)
- Prices are not important at the moment of consumption
- Payment through fees, salary or capitation
- Intervention of the State

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Classifying the Healthcare Systems

- The health insurance system model based on contracting between partners: health care professionals, insurers-funding - risk management within market and a restricted role for state government (but present in any case)

- The integrated healthcare system model associating the partners based under the management of the state government to satisfy health care needs to support the demand side of the Keynes model (there are private and public actors in any one)

Il y a 2 grandes catégories de systèmes de santé dans le monde

Les systèmes basés sur l'assurance maladie et les contrats entre les professionnels de santé, les assureurs et les assurés avec une intervention variable de l'Etat allant jusqu'à l'Assurance Maladie Obligatoire (systèmes Bismarckien). Exemple : Allemagne

Les systèmes dits intégrés où la puissance publique (Etat ou régions) gère l'ensemble des partenaires de façon à assurer la satisfaction des besoins de santé essentielle au maintien de la demande (systèmes Beveridge Keynes) Exemple : Royaume Uni ou Canada

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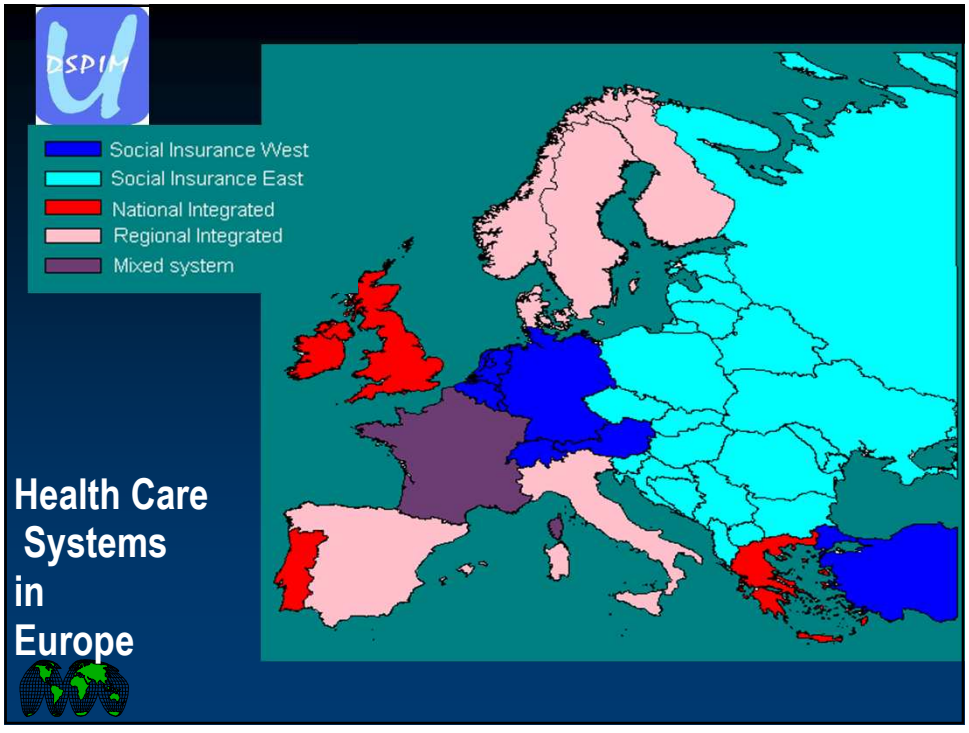
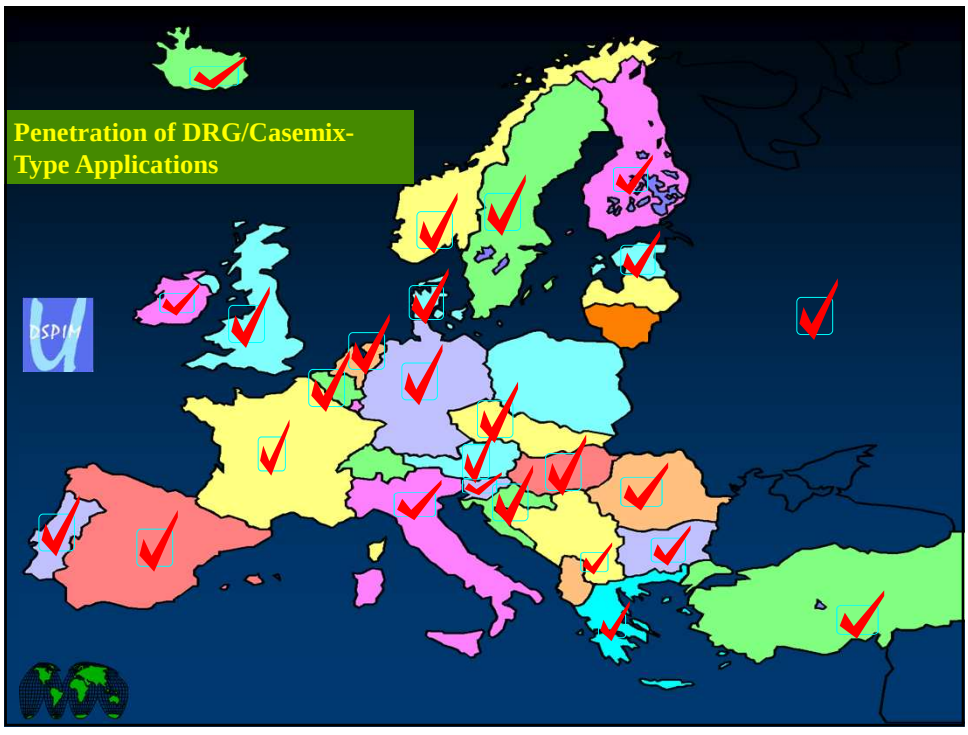


CLASSIFICATION SYSTEMES DE SANTE OCCIDENTAUX

Idéal type intégré Centralisé	Idéal type contractuel Bismarckien
Royaume Uni	Allemagne — Belgique
République Irlande	Autriche — Japon
Portugal	Pays Bas — Suisse (2000)
Grèce	Luxembourg — France (avant 1996)
	Turquie
	Pays post communistes
FRA	NCE
½intégré	½ Bismarckien
Décentralisé	**Libéral ?**
Suède — Espagne	
Finlande — Italie	USA? Chine?
Norvège — Canada	
Danemark — Australie	



Why do we need Case Mix in health care (acute care hospitals)?

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Why do we need Case Mix adjusted hospital data?

- "Every patient is unique…"
- But to manage and fund hospitals we need to understand for groups of patients:
  - Differences in clinical outcomes which are not related to the mix of cases
  - Differences in clinical setting unrelated to casemix
  - Differences in cost unrelated to casemix
- "Comparing apples with apples"

Pourquoi avons nous besoin de données hospitalières ajustées par leur Case mix

- Si «Chaque patient est unique ..."
- pour gérer et financer les hôpitaux, nous devons comprendre pour les groupes de patients:
  - Les différences dans les résultats cliniques qui ne sont pas liés à la répartition des cas
  - Les différences de contexte clinique sans rapport avec le mélange (la variété) des cas
  - Les différences de coûts sans rapport avec le case-mix
- «comparer des pommes avec des pommes»

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DRGs Definition Following FETTER

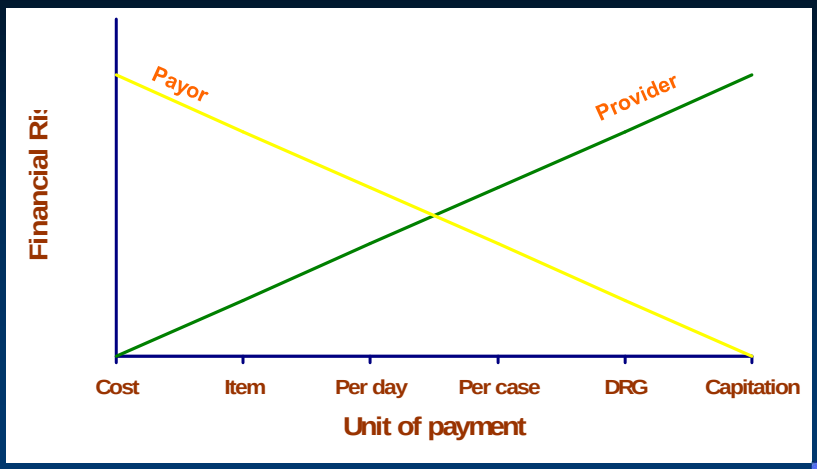
The groups were defined as clinically coherent

Coherent means that they suggest a set of clinical practices needing the same level of resource consumption (lab tests, imaging, surgical procedures, nursing care, psychological support et.)

2 methods
-data bases statistical analysis
-clinical knowledge

No clinical guidelines or clinical specificity (Clinical pathway, pmc et.)

Efficiency
Sharing risks



Case Mix Definition Following HORNBROOK

A classifying system which restricts the infinite variety of patients in groups of patients similar in regard with some characteristic (or dependent variable or explained variable)

This dependent variable can go from clinical description to resource allocation and outcome (quality)

The classifying variables of the system (or independent variables or explaining variables) are specific to the explained or dependent variable

Table 1: Theoretical Framework for Case Mix Measures According to Hornbrook (modified)

Grouping homogeneous with respect to

iso-symptoms/ iso-syndroms groups the types of symptoms /syndroms present

iso-disease/illness groups the primary diagnosis/all the diagnosis

iso-health issue groups the health issue required care profiles

iso-resources groups the level and mix of resources used in their treatment

iso-outcome groups the change in health status produced

iso-value groups their social value

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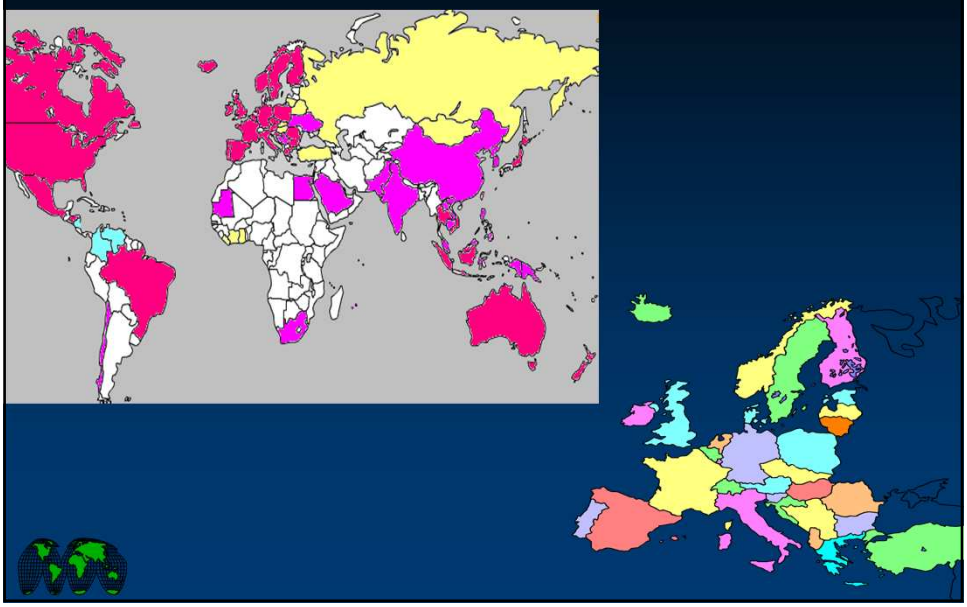
Overview of Case Mix Systems and Components Implementation Around the World

- WHERE are DRGs used?
- Technicalities of the Case Mix systems; uses, activities (coding, costing, grouping, paying/ reimbursement etc)
- Countries examples

DRG Countries 2006



Chemins parcourus par les case-mix au cours des 1990's

- Debut USA 1967-1983
- Majorité des pays EU et proches
- (Autriche ,Belgique, Danemark,France, Irlande, Italie,Norvège, Portugal, Espagne, Suède,Suisse ,Finlande, et…enfin Allemagne 2003);
- Plusieurs pays de Europe du centre et de l 'est(Hongrie, Russie, Tchéquie, Bulgarie ,Roumanie …)

Chemins parcourus par les case-mix au cours des 1990's

- Sans parler des autres continents
  - - Amérique (Canada,Mexique,Costa Rica)
  - - Asie Pacifique (Australie,Nouvelle Zélande, Singapour ,Thailande,Japon)
  - - Afrique (Afrique du sud)

UNU Case mix grouper

- Université des Nations Unis Kuala Lumpur (Malaysie):plateforme open source et enseignement à distance
- Malaysie, Indonésie, Philippines,Uruguay Mongolie et Vietnam
- Explorations Kenya, Arabie Saoudite

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Main Uses of DRG Systems

- Activity measurement
- Contracting and/or payment
- Costing of health services
- Research (epidemiology, economics etc)
- Monitoring and measurement for the quality of care
- Standardization of medical practice
- Services management
- *Others...as we speak; please attend the Winter and Summer Schools and the Conferences for details on each ☺!!!*

Les principales utilisations des systèmes DRG

- Paiement
- Recherche (épidémiologie, économie, etc)
- Etude de coût
- Qualité des soins
- Standardisation de l'activité
- Autres ... Vous êtes les bienvenus à l'école d'été et aux conférences PCSI pour plus de détails ☺!

Utilisations en dehors du financement

1. Incitation à efficience et équité par parangonage dans un cadre de contrôle des coûts mais à des niveaux differents selon le cycle économique
2. Planification régionale et stratégique
3. Développement de l'ambulatoire
4. Réduction des inégalités d'offre
5. Facilitation des études épidémiologiques et d'économie de santé.

Essential Case Mix Technical Activities for a Case Mix Payment Model Implementation:

- ***Coding, collecting MBDS of standardized clinical data and grouping data***
- Collecting and modelling cost data
- Establishing a payment model based on DRGs
- Establishing the institutional framework for all of the above

DIFFERENT IMPLEMENTATION GOALS AND SCENARIOS

Activités techniques pour la mise en œuvre d'un modèle de paiement Case Mix:

- Codage, la collecte de données normalisées cliniques et le groupage des données
- Collecte de données et modélisation des coûts
- Établir un modèle de paiement fondé sur les DRG
- Établir le cadre institutionnel pour l'ensemble de ce qui précède

Case mix based on the use of ICD9CM

COUNTRY	DIAGNOSIS	PROCEDURES
USA	ICD9CM	ICD9CM
Belgium	ICD9CM	ICD9CM
Bulgaria	ICD9CM	ICD9CM
Greece	ICD9CM	ICD9CM
Italy	ICD9CM	ICD9CM
Portugal	ICD9CM	ICD 9CM
Spain	ICD9CM	ICD9CM
Thailand	ICD9CM	ICD9CM
Hong Kong	ICD9CM	ICD9CM
UNU Grouper	ICD9CM	ICD9CM

Case mix based on the use of ICD10AM

COUNTRY	DIAGNOSIS	PROCEDURES
Romania	ICD10AM	ICD10AM
Ireland	ICD10AM	ICD10AM
Croatia	ICD10AM	ICD10AM
Turkey	ICD10AM	ICD10AM
Moldova	ICD10AM	ICD10AM
New Zealand	ICD10AM	ICD10AM
Samoa	ICD10AM	ICD10AM
Australia	ICD10AM	ICD10AM
Fidji	ICD10AM	ICD10AM
Qatar	ICD10AM	ICD10AM
Slovenia	ICD10AM	ICD10AM

Case mix based on the use of ICD 10 and national coding systems for procedures

COUNTRY	DIAGNOSIS	PROCEDURES
Austria	ICD10	MEL, Medizinische Einzelleistung)
UK	ICD10	OPCS4
Canada	ICD10	CCI
Denmark	ICD10	NCSP
Estonia	ICD10	NCSP
Finland	ICD10	NCSP
Sweden	ICD10	NCSP
Norway	ICD10	NCSP
Iceland	ICD10	NCSP
Netherlands	ICD10	ICPM-DE
France	ICD10	CCAM
Germany	ICD10 (GM)	OPS

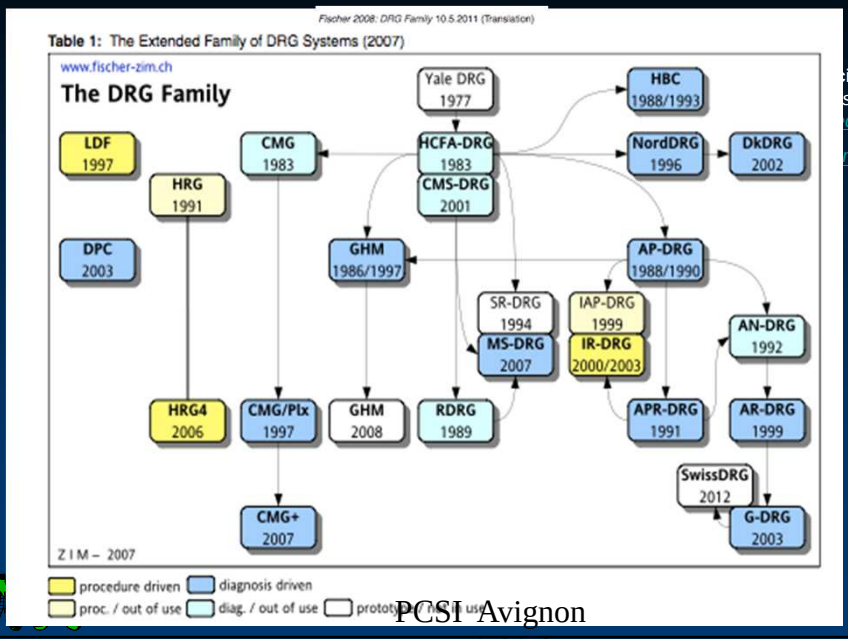
Case mix based on the use of ICD10 and national coding systems for procedures

COUNTRY	DIAGNOSIS	PROCEDURES
Hungary	ICD10	ICPM -HE
Japan	ICD10	Billing Coding system
Korea	ICD10	Billing Coding system
China	ICD10	CCHI
Lithuania	ICD10	
Slovakia	ICD10	
Turkey	ICD10	Billing Coding system
Developing countries 1	ICD10	
Developing countries 2		

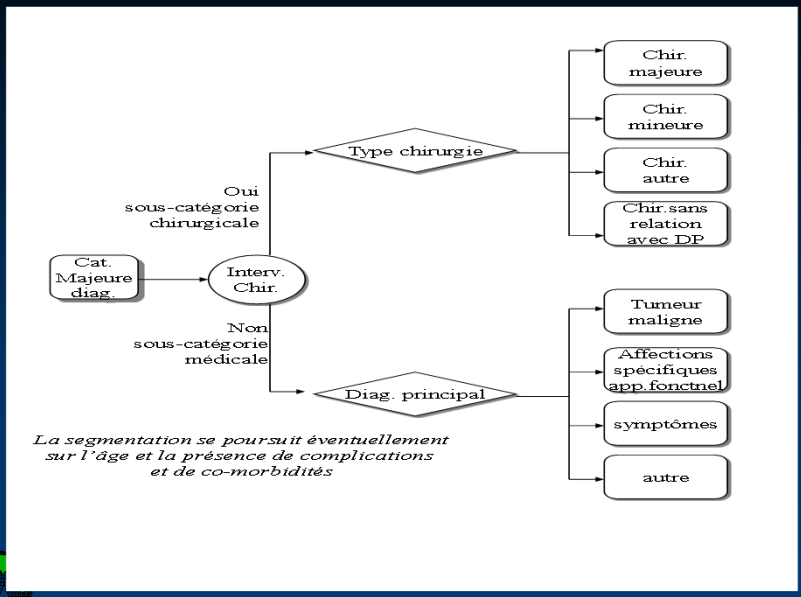
The Case mix systems follow the Procedures

- ICD 9CM : HCFA DRG, APDRG,APRDRG, IRDRG, UNU Case mix
- ICD 10AM : AN DRG, ARDRG
- National Procedures: LKF (Austria) G DRG (Germany) GHM (France), HRG (UK), NorDRG (Denmark, Estonia, Finland, Iceland, Norway, Sweden) DPC (Japan) DBC (Netherlands) HBCs (Hungary) et.

La famille DRG



Structure typique d'une HCFA-MDC



Most Common Institutional Arrangements for:

- CODING:
  - **Institutions affiliated with MoH/public sector at national or regional level (Germany, Austria, Nordic Countries etc)**
- CLINICAL DATA COLLECTION:
  - **Mostly the same institutions as for coding, HIFs or independent agencies related to health informatics (Germany, Hungary, Romania)**
- CLASSIFICATION/ GROUPING:
  - **Various central institutions, the Hospitals**

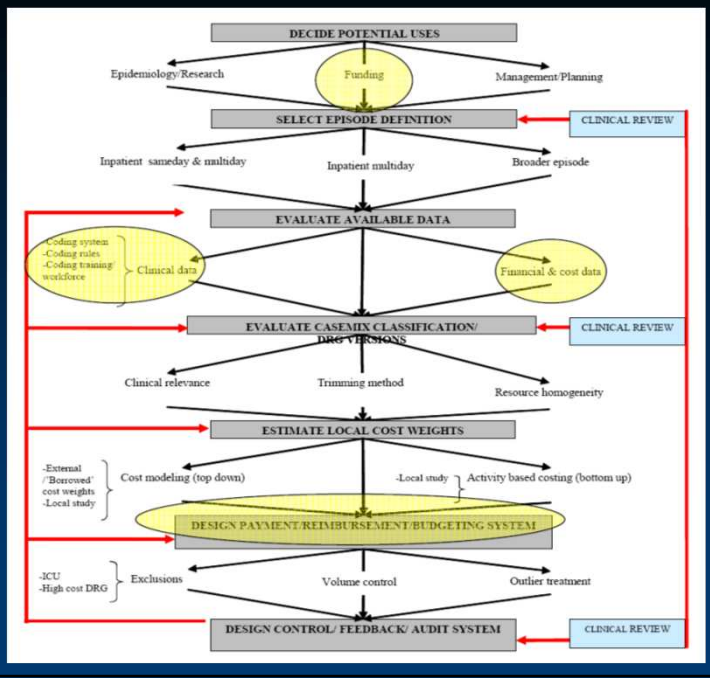
PILOT OR NATIONAL LEVEL,
DEPENDING ON THE LOCAL CONTEXT

Most Common Institutional Arrangements for:

- COSTING:
  - **Variable, based on national, regional or local arrangements, not very common to be done by the reimbursing agency (France, Nordic Countries, Belgium)**
- REIMBURSEMENT POLICY:
  - **Payment agency as a general rule**
- QUALITY MONITORING:
  - **Usually central agencies, dedicated to Q monitoring activities or related to MoH**

PILOT OR NATIONAL LEVEL,
DEPENDING ON THE CONTEXT

"Ideal Model" (prepared by Terri Jackson)



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COUNTRIES EXAMPLES

(using PCSI Case Mix Summer School materials)

1. DRGs in the United States of America

- Medicare (HCFA, now CMS) DRGs
- Revisions since PPS in 1983
- Aged care population
- All Patient DRGs (AP-DRG)
- Revised for other payers
- Maternity and paediatrics added
- All Patient Refined DRGs (APR-DRG)
- Refinements for severity
- 1000+ classes
- Inpatient focus (other classifications for same-day treatment)

Characteristics/ strengths of US DRGs

- Clinical coherence/relevance
- Intensive refinement to account for patient differences and thus fairness to hospitals
- Resource homogeneity
- Evaluated against data on hospital charges
- Administrative simplicity
- Use ICD-9 diagnosis codes
- Single 'layer' of data
- Splits only on clinical factors (age, co-morbidity)
- Episode definition
- Acute inpatient treatment, not same day
- Population size
- Variable (national Medicare through small payers)

2. Canadian CMGs

- Casemix Groups (CMGs)
- Casemix Groups (CMG+) introduced in 2007

Matrix overlay to define cells based on:

- age group
- co morbidity level
- flagged interventions
- intervention events
- out-of-hospital intervention

Inpatient focus

Characteristics/strengths of CMGs

- Clinical coherence/relevance
- Intensive refinement to account for patient differences
- Resource homogeneity
- Evaluated against data on hospital costs and LOS
- Administrative simplicity
- Uses ICD-10 diagnosis codes & Canadian proc class
- Multiple 'layers' of data
- Episode definition
- Acute inpatient treatment, not-same day
- Population size
- Variable (Provinces pay hospitals)

3. UK – Development of DRGs

- **English DRGs – Healthcare Resource Groups (HRG)**
- **Ambulatory HRGs**
- **Non-hospital HRGs**
- **Population, Need based groupings – Health Benefit Groups (HBG)**

UK Casemix Policy

- England

– Costing HRG since 1994

• Wales

– Costing APDRG since 1994

– HRG from 1/4/2000

• Northern Ireland

– 1st limited HRG costing 1999

- Scotland

– Central costing exercise 1997

Characteristics/strengths of HRGs

- Clinical coherence/relevance

Extensive consultation with UK physician groups

- Resource homogeneity

Linked to a 'national tariff'

- Administrative simplicity

Uses ICD-10 diagnosis codes

Large number of classes (≈1400-1600)

- Episode definition

Site independent (unbundled)

- Population size

Whole of NHS

4. AUSTRALIA
The Casemix Development Program

10 YEARS NATIONAL FUNDED PROGRAM

- Built on US APR-DRG system
- Data standards and reporting, National Health Information agreements for all states and jurisdictions
- Exhaustive process of clinical review ('96-'99)
- ANDRG1, ANDRG3, ARDRG 4
- Grouping reflects weighting for multiple CCs (up to 5 CC levels--PCCL)
- Covers same day admissions
- Linkages to

 BUDGETS
 FUNDING (4 jurisdictions)
 PAYMENT

Characteristics/strengths of AR-DRGs

- Clinical coherence/relevance
- Extensive consultation with Australian physicians
- Further tested in Ireland, Singapore, Germany, Romania and Turkey
- Resource homogeneity
- Evaluation against LOS and cost data
- Administrative simplicity
- Uses ICD-10-AM diagnosis and procedure codes
- 665 end classes
- Episode definition
- Includes both same day and multi-day admissions
- Population size - Small (≈5-20 mil)

5. HOLLAND
The DBC concept

Episode of care based

- Healthcare product defined by Diagnosis and Therapy
- Drive to increase the speed of the introductions of health innovations
- DBC product integrates Hospital and clinicians payment
- Negotiations between Health Insurer and Hospital on Cost AND Quality

6. German DRG System
The Classification System

- Introduced in 2003 (neutral as payment)
- Local adaptation of AR DRG – 824 DRGs and 71 additional fees
- Public independent institution for design and operation of the DRG system – InEK
- Owned by Insurance Funds AND Hospitals Association
- Initial voluntary clinical AND cost data collection (for local adaptation)- 16% of total 2004 cases
- Continuous process of refinement and adaptation (anyone can suggest modifications and they are analyzed by InEK; adopted if they impact less than 50% of the Hospitals)

German DRGs

Payment Arrangements

- National tariff, state level rates adjusted with economic factors
- Fixed activity levels contracted for 1 year; if more, 35% of the exceeded target reimbursed, or 60% given back by Hs for underachievement (protects Insurance for sudden increase or upcoding)
- Running cost, capital investment, depreciation, salaries – all included in the DRG tariff
- Transition period from 2004 to 2007 to national average tariff (from 10% to 100%)
- Standard costing methodology and standard cost data collection, voluntary for Hospitals; cost reports results are public
- Clinicians ownership – training, information and CODING responsibility

Take Home Messages:

- **Casemix classifications need to be evaluated in the context of the individual health care system**

- **Most DRG-type classifications are similar**

Differences are driven largely by:

- *National procedural coding systems*
- *Scope of care settings*
- *Level of detail and severity adjustment*
- *IMPLEMENTATION GOALS AND POLICY*

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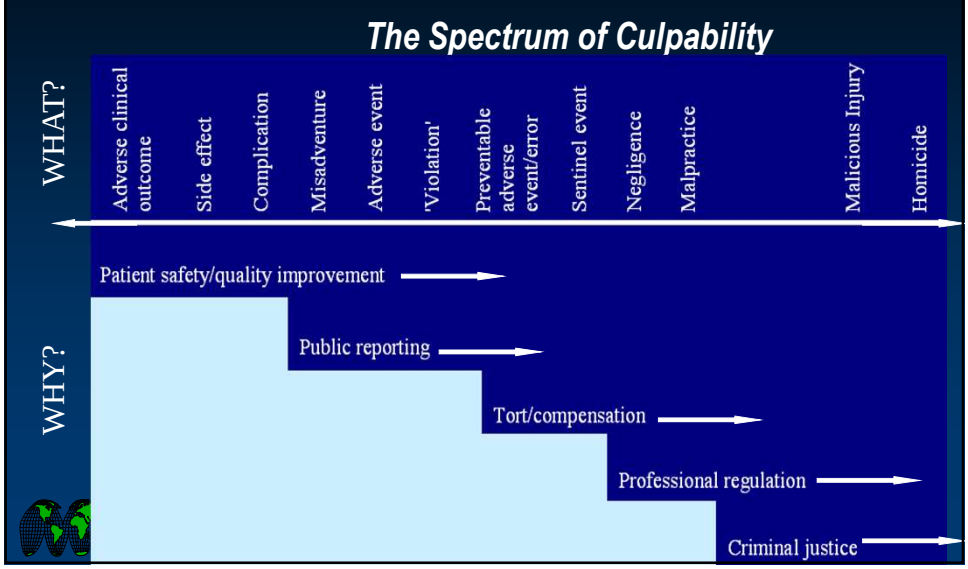
Overview

- What is it possible to measure with routine hospital data?
- What different approaches have been used?
- Strengths and weaknesses
- Towards ICD-11

What and how you 'count' depends on *why* you want to count it



Hierarchy of data 'rigour'

- 'Forensic' evidence
  - Criminal charges
  - Compensation/professional deregistration
- Clinician verified evidence (record review studies)
  - Epidemiological studies
  - Public reporting
- Hospital routine (ICD-coded) data
  - Public reporting ('risk adjustment')
  - In-hospital quality improvement

Using routine hospital discharge data

ICD-9 and 10 have specific codes, eg:

- T80.0-88.9 'Complications of surgical & medical care'
- 'End of chapter' codes
- Y40-84.9 'External cause--complication of surgical or medical care'
- Y92.22 'External cause--location in health care facility'

ICD does not currently:

- cover the full range, eg: Hospital-acquired pneumonia
- Distinguish between comorbidity & complication

Systems using routine hospital discharge data

US/ ICD-9-CM Systems

- Hospital Acquired Conditions (HACs)
- Patient Safety Indicators (PSIs)
- 3M Suite of Potentially Preventable Indicators

Australian/ ICD-10-AM Systems

POA (Present On Admission)

- Classification of Hospital Acquired Diagnoses (CHADx)
- Variable Life Adjusted Displays (VLADs)

US Hospital Acquired Conditions (HACs)

- **'Highly preventable' events are excluded from payment when recorded as secondary diagnoses**
- **Four associated with specific surgical codes, eg**
  - **DVT/PE after hip replacement**
  - **Mediastinitis after CABG**
- **22 regardless of PDx or procedure, eg**
  - **Blood incompatibility**
  - **Air embolism**
  - **Hypoglycaemic coma**
- **Codes freely available:**
  - **https://www.cms.gov/Medicare**

AHRQ Patient Safety Indicators (PSIs)

- Examples:
  - Accidental puncture or laceration
  - Iatrogenic pneumothorax
- Codes freely available:
  http://www.qualityindicators.ahrq.gov/Modules/PSI_TechSpec.aspx
- Translated into ICD-10

3M Suite of Potentially Preventable Events

- Potentially Preventable Complications (PPCs)
  - 64 categories grouping 1,450 ICD-9 codes
  - Uses 'present on admission' flag
  - Clinician panels used to determine 'preventability'
  - Numerator, denominator & exclusion specifications
  - Incorporates PSIs
- Potentially Preventable Readmissions (PPRs), Admissions (PPAs), Emergency Room Visits (PPVs) and Ancillary Services (PPSs)
- Definitions are proprietary to 3M

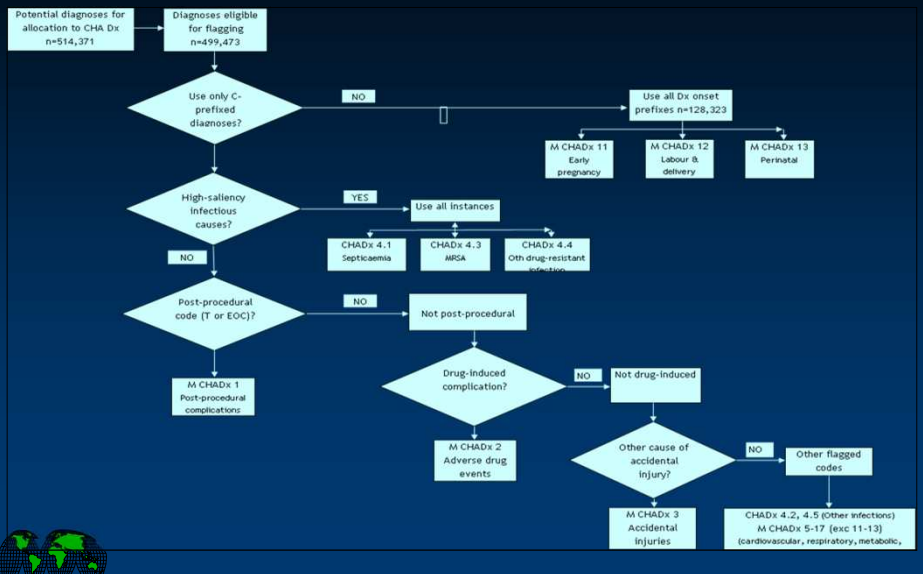
'Present on admission' (POA) flagging

- **Can distinguish co-morbidities from complications**
- **Assigned by coders for each diagnosis**
- **Adds valuable information:**
  - **41% of all hospital-acquired diagnoses were missed by specific ICD codes ('T' and 'Y') alone;**
  - **eg, UTI, atrial fibrillation, pneumonia**
- **Audit (Victoria, 2008) shows trained coders reliable at assigning POA**
- **Likely under-counting of NPOA, as default is POA**

Problems/ solutions in developing CHADx

- Comorbidity or complication?
- Unknown reliability of flagging
- Multiple codes record the same 'event or complication
- Optimal classification size to maximise grandularity but minimise empty classes
- Present on Admission flagging
- Data cleaning algorithm
- Complex grouping algorithm to take account of coding standards, reduce double-counting
- Target frequencies guided by clinical panel

Simplified CHADx Logic Tree

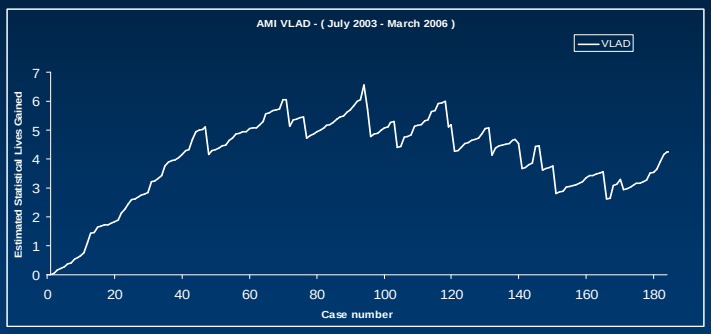


The first Major CHADx ('chapter') of 17

MCHADx1 Post-procedural complications
1.1 CCs of Infusion /Transfusion
1.2 Gas Embolism
1.3 Failed or Difficult Intubation
1.4 Haemorrhage & haematoma complicating a procedure
1.5 Accidental puncture/lac during proc
1.6 Foreign body or substance left following procedure
1.7 Other comps of Surgical and Medical NEC (Incl Shock T81.1)
1.8 Disruption of wound
1.9 Wound infection (Excl Septicaemia)
…1.23 Post-procedural genitourinary

Queensland Health's Variable Life Adjusted Display (VLAD)

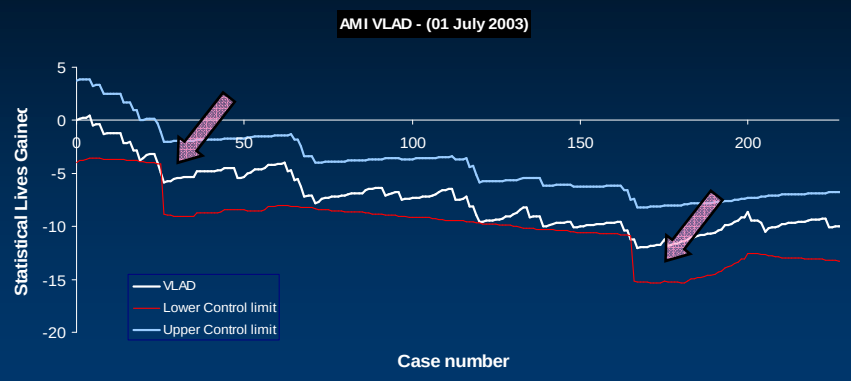
Plot of the cumulative difference between expected and actual outcomes over a period of time



Coory M, Duckett SJ, Sketcher-Baker K. Using control charts to monitor quality of hospital care with administrative data. *Medical Care*, forthcoming, 2007.

ACERH

Variable Life Adjusted Display
with control limits



Flagging criteria

- **30% higher** than expected mortality– automated message emailed to the district manager and clinical lead, encouraging internal investigation and report to Area Clinical Governance Unit (50% for non-mortality flags)
- **50% higher** than expected – flagged to Area Clinical Governance Units to ensure they are involved in further investigation (75% non-mortality)
- **75% higher** than expected - identified to State Patient Safety and Quality board and in public reporting as being statistically significantly different from the average (100% non-mortality)

Duckett SJ, Coory M, Sketcher-Baker K. Identifying variations in quality of care in Queensland hospitals. Submitted for publication, April, 2007.

PROGRAM OF THE WS

1. Introduction and basic principles
(JM Rodrigues – 15 minutes)

2. Overview of Case Mix systems and components around the world
(Terri Jackson Béatrice Trombert– 20 minutes)

3. Case Mix and quality of care
(Terri Jackson – 20 minutes)

4. The topics of a week Winter and Summer School
Winter February Sidney Australia
Summer June Tallin Esthonia

5. DISCUSSIONS

Merci pour votre attention

rodrigues@univ-st-etienne.fr
terri.jackson@ualberta.ca
trombert@univ-st-etienne.fr

- Thank you
- Vielen Dank für Ihre Aufmerksamkeit
- Merci
- Gracie
- Gracias
- Obrigado
- Efcharisto
- Kessenem
- Tag
- Arigato Gozaimasu
- Terima Kasih
  - Et BONJOUR

PCSI Avignon 17/10/2012