CAN WE OPEN THE BLACK BOX OF HEALTH SYSTEMS?

What can be learned from using a disease-based approach in understanding the performance of health care systems across countries

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THE AGEING-RELATED DISEASE PROJECT

- Three conditions to date
  Ischaemic heart disease, stroke, breast cancer
- We acknowledge support from
  the US National Institute on Aging
  the Ministry of Health, Labour and Welfare in Japan
- Key contribution from networks of experts
  60 to 80 experts per network
- Over 20 countries participated in the project
The goal of the project: *Use the variations in treatment of particular diseases across countries as a “natural experiment”*

- Are these variations due to
  - Incentives / payment systems?
  - Health policy / regulation / planning?
  - Medical knowledge?
  - Economic circumstances?

- How do countries achieve value for money in treating these diseases?

- Implications for monitoring of health systems
The approach

- A focus on treatments, costs, and outcomes
- An emphasis on ageing
- Contributions from existing research networks
An evaluation of technology: Ex “post”

FIGURE 1, THE PERFORMANCE MEASUREMENT AND MANAGEMENT CYCLE AND THE INTRODUCTION OF NEW TECHNOLOGIES

- Definition of relevant indicators
- Collection of patient records

Conceptualisation/Measurement

Action/Management

Analysis

EX ANTE

EX POST

DIFFUSION OF THE TECHNOLOGY

RESOURCE IMPLICATIONS
OUTCOME IMPROVEMENTS

The health care system

TECHNOLOGY AUTHORISATION

POLICY CHANGES
IMPROVEMENT IN PERFORMANCE
Reporting on performance

The value of a disease-based perspective

- A disease-based model
  
  *The potential epidemiological “phases”*
  
  *Interventions/treatments*
  
  *Resources/inputs*

- Actual practice and not clinical trial

- Disease definitions ensure some control for unobserved heterogeneity

- But specific and narrow: several diseases
A disease-based model of health care system

Determinants
- social, economic, lifestyle, biomedical

Disease

Functional limitations
- physical and mental

Interventions/treatments
- prevention, treatment and care, rehabilitation

Policies

Resources/inputs
1. financial, material, human
2. research, evaluation/monitoring

Adapted from Evans & Stoddart 1990, AIHW 2000
And its relationship to performance monitoring

**Outcomes**
- Health OUTCOMES
- Disease phases
  - (determinants, disease, disability)
- Interventions/treatments

**Costs**
- Direct COSTS
- Indirect COSTS

**Resources/inputs**
Building the knowledge
Making use of existing patient-based health records

- The value of hospital administrative databases
  - Comprehensive population coverage
  - Link with other records (e.g., death registries)

- Low cost information infrastructure

- Under-exploited for analytical purposes

- Patient-based versus event-based data:
  - Tracking the “episode of care”

- Outcomes measure: case fatality and readmissions
  - Further need for patients’ perceptions
Understanding the drivers of performance
*Medical knowledge, technology and economic incentives*

- The rising tide of new technologies and the growth in health expenditure
- Patterns of diffusion and decreasing returns
  - Good technologies “gone bad”?
  - Assessing the marginal health benefits
- Understanding the results in relation to health outcomes deserve careful examination
Key revascularisation procedures
Ischaemic heart disease

- **PTCAs**: percutaneous transluminal coronary angioplasty (PTCA).
  Catheter into the arterial system + balloon inflated to clear the obstructed area.

- **Bypass**: the obstructed area is bypassed by grafting veins or arteries.

- **Stent**: technique to avoid restenosis, narrowing of the artery: a wire rim to keep the blood vessel open.

- **Thrombolytics**: streptokinase, tissue-plasminogen Activator (tPA) to break down the blood clot and restore the blood flow.
Number of PTCAs (1990-1998) per 100,000 inhabitants

- Che
- Swe
- Grc
- Esp
- Fin
- Ita
- Ukq
- Hun
Use of stents (1990-1998) as a percentage of all PTCAs
Further questions

- Are facilities “efficiently used”? 
- What happens to patients?
- How much does it cost?
Utilisation rates for CABG and Number of cardiac surgery units per 100 000 inhabitants
Utilisation rates for PTCA and number of catheterisation facilities per 100 000 inhabitants
Technology utilisation and survival one year after a heart attack

Men (40 to 64)
Technology utilisation and survival one year after a heart attack

Men (70 to 74)

Proportion of AMI patients received a CABG-PTCA 90 days after admission

Proportion of AMI patients died one year after admission

Oxf90, Fin90, Swe90, Ont92, Fin96, Swe97, Ont96, Oxf98, Usa95, Usa90
Unit costs as a proportion of GDP per capita

Elective PTCA

AUS  BEL  CAN  DEN  GRE  ITA  JPN  UK  US
Unit costs as a proportion of GDP per capita

Bypass
Breast Cancer

- Epidemiology is endogeneous
- Breast cancer: role for screening and treatment
- New less invasive treatments but more costly in the short run
  - Breast Conserving Surgery with follow up radiation therapy
  - Chemotherapy (as opposed to mastectomy)
- Goal of treatment: survival, avoid recurrence, improve quality of life
The role of organised screening programmes

- Implemented following cost-effectiveness studies, targeting usually women aged 50-69
- Different methods (CBE; mammography)
- Large proportion of women still receive screening outside programmes in many countries
- Tendency to extend the programmes to higher and younger age groups
- Organised health systems work better in this field, but they need some resources
Organised screening participation rates
As a percentage of eligible women

Source: health interview surveys, experts reports, Health Canada 2001
Key results

- Prevention is key
- Supply incentives important factors for diffusion of surgical procedures
- Patterns of treatment depend on medical guidelines but also on institutional aspects
- Excessive restriction in spending may constrain access to treatments in some countries for some groups
Proportion of women receiving a mammography and availability of mammography machines

Women receiving a mammography in the past years*

Mammography machine density per million women aged 40 and over (1995)

*standardised rates from available surveys
Breast cancer patients receiving breast conserving surgery followed by radiation therapy and availability of radiation therapy machines (1995-99) ALL PATIENTS

Note: a corrected point has been inserted for the US, as the SEER registry data underestimates radiation rates by 14-18%
Breast cancer patients aged 70-79 receiving breast conserving surgery followed by radiation therapy and availability of radiation therapy machines (1995-99)

OLDER PATIENTS

Proportion of women diagnosed with breast cancer and received BCS receiving radiation therapy

Radiotherapy machines per million women aged 40 and over
5-year relative survival rate and availability of mammography machines in a recent year

![Graph showing 5-year relative survival rates and mammography machine density per million women aged 40 and over (1995).]
5-year relative survival rate and availability of radiotherapy machines in a recent year

Radio machine density per million women aged 40 and over (1995)

Five-year relative survival rates (1985-95)
Mortality rates: A tale of two cities...

per 100 000 women age 40 and over

Note: for France, Hungary, Japan, Norway and the United Kingdom (E&W); 1983 and 1996 for Australia; 1996 for Italy.
Variation in costs by stage, first 6 months of treatment as a percentage of GDP per capita.
Policy implications

- Economic constraints facing health systems have multiple and convergent implications
- Trends towards “ambulatory/non invasive care” consistent across diseases
- Caution is needed in interpreting outcomes
  - prevention
  - treatment
  - non controlled variables
- Results strongly “suggestive” but not “conclusive”
- The results by themselves inform performance “measurement”
A further step in assessing performance?

- Different perspectives
  - Payers and the “macro/public health” perspectives
  - Patients/physicians with the micro/medical view
- Where to locate the economic constraint?
- Which parameters are to be optimised?
  - These depend on countries various economic and political consensus about health and the role of health care systems
- The irreplaceable value of information systems
  - Long-term investments to improve the performance of health care systems