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An Overview of Health Economics Data and Expertise in Cancer

Peter Smith, (Professor of Health Policy, Imperial College London)
Mauro Laudicella (Research Fellow, Imperial College London)

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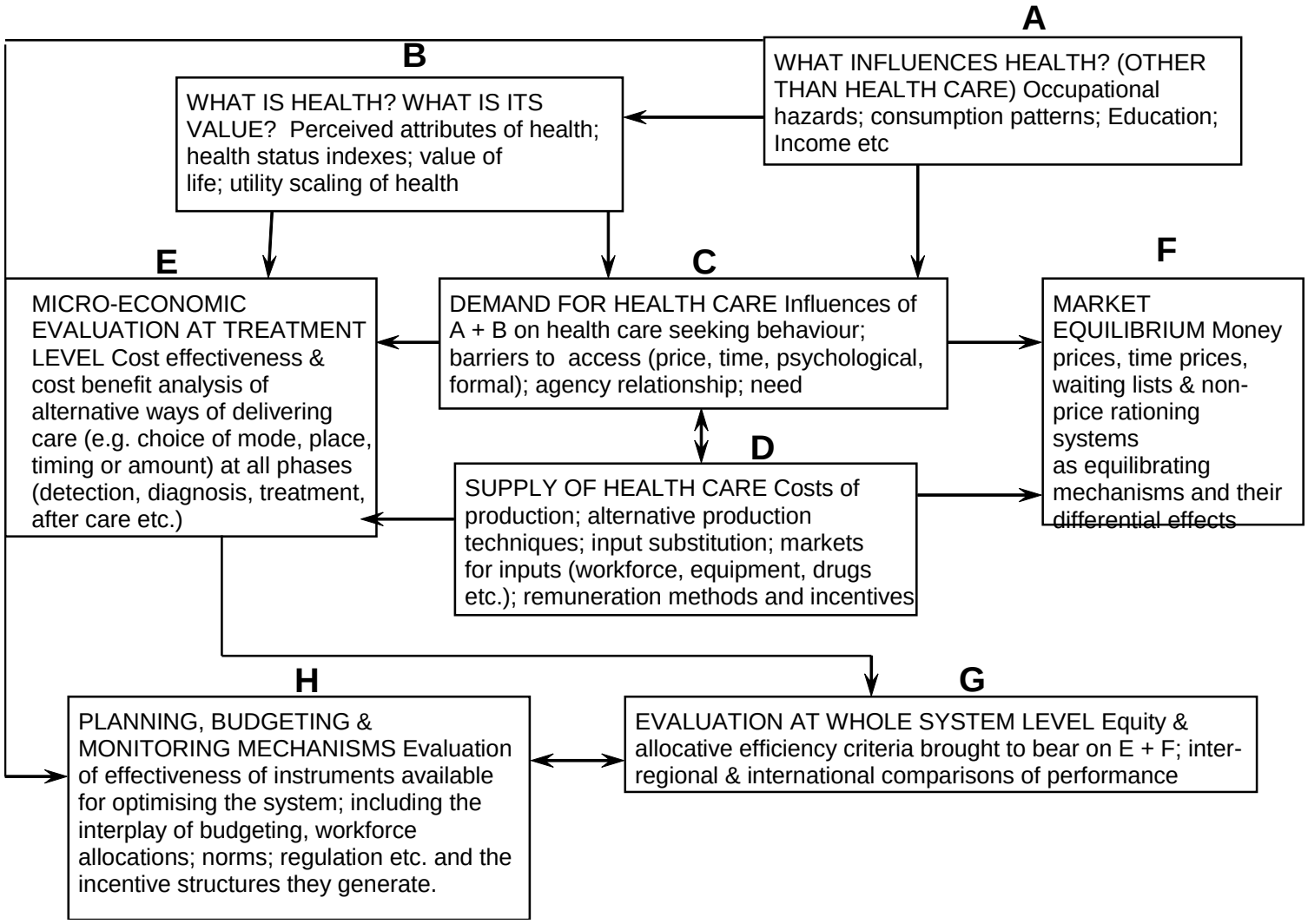
Source: A. Maynard and K. Bloor, “Health economics and policy: the challenges of proselytizing”, In Glied, S. and Smith, P. (eds) (2011), *The Oxford handbook of health economics*, Oxford: Oxford University Press.

The role of economics: Alan Williams’ plumbing diagram



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Characteristics of the studies covered:

- Studies on the direct cost of cancer
  - Prevalence costs studies: snap shot of the total costs associated with people diagmised with the disease in the year (cross-section)
    - Useful for planning future expenditure
  - Incidence costs studies: newly diagnosed patients followed through the various stages of the disease (longitudinal)
    - Useful for evaluation of policy interventions
- USA evidence: results are sensitive to different data souces. Keys factors are the number newly diagnosed patient included, proportion of long term survivals included, methods for estimating longitudinal costs (Yabrnoff et al 2009)

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Evidence from high income countries

- Sullivan et al (2011) in Lancet Oncology:
  - Expenditure on cancer care in high income countries $895 billions.
  - Acceleration in:
    - Expenditure per patient
    - Total number of newly diagnosed patients
  - Main drivers:
    - Overuse of drugs and treatments (chemotherapy) when no longer effective
    - Shortening of lifecycle of cancer technologies
    - Lack of integrated economic evidence and evidence based political debate

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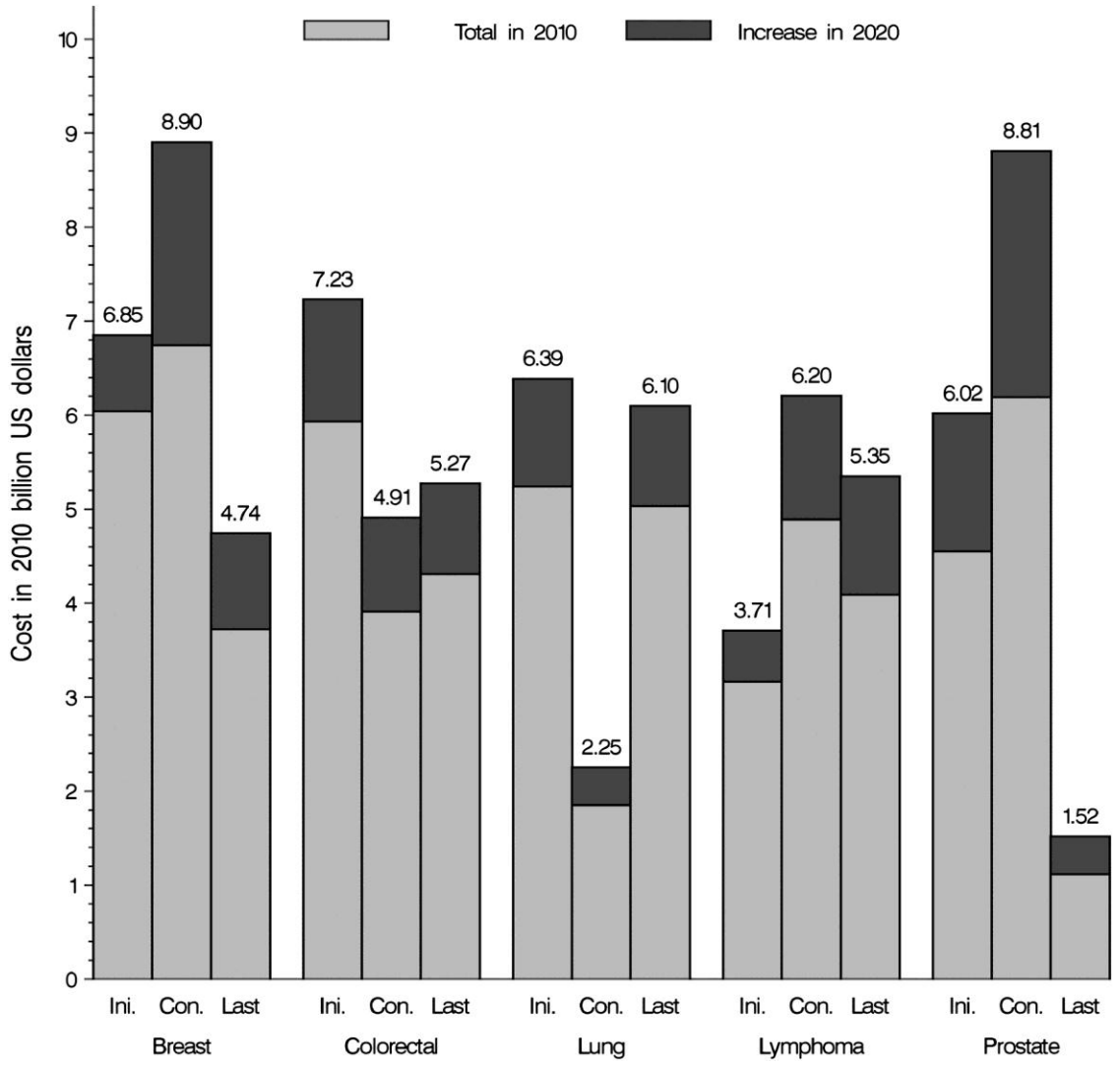
Evidence from US

- Cancer care accounted for 104 billion in 2006 with acceleration in the number of newly diagnosed and costs of drugs
- Yabroff et al (2007) identify 60 papers published between 1995-2006 on the cost of cancer in US.
- General evidence of a U-shape cost curve following the phases of cancer: high costs after the diagnosis and in the last year of life and lower costs in the continue phase
- Costs for lung cancer and colorectal cancer generally higher than for breast and prostate cancer within phase of care.
  - But total costs more similar when lifetime costs are considered because of the difference in survivals within phase of care.

2010-2020 Projections of total medical costs of cancer in US
Authors: Mariotto et al (2011)



Source of variation:
aging and growth of US population under assumptions of constant incidence, survival and costs for the major cancer sites.

Costs by phase of care:
- *Initial year after diagnosis (Ini.)*
- *Continuing care (Con.)*
- *Last year of life (Last).*

Results:
- *27% increment in costs by demographic factors only*

- *39% if cost of care increases by 2% every year*

- *Largest in creases in prostate and breast cancer*

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Variation in expenditure & outcomes in US and UK (1)

- Geographical variation in Medicare spending reported in many studies in US.
- Also variation in outcomes and expenditure across Primary Care Trusts in the UK
- US evidence:
  - large part of the variation linked to variation in medical practice in the pattern of care, e.g. Inpatient and outpatient visits, diagnostic tests and specialist visits
  - Some evidence of higher expenditure not linked to better services or better health outcomes suggesting scope for savings (Wennberg et al 2002)
  - However, Landrum et al (2008) find evidence that not all extra-spending is wasteful in high spending areas: positive outcomes from higher use of recommended care are often offset by negative from higher use of not recommended care in these areas

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Variation in expenditure & outcomes in US and UK (2)

- UK evidence:
  - Martin et al (2008) effect of health expenditure on health outcomes might be underestimated due to endogeneity:
    - More spending improve health outcomes
    - But poor health outcomes call for more spending
    - The two opposite effects might cancel out
    - IV approach can be used to disentangle the two effects
  - They find that 10% increase in cancer programme expenditure leads to 4.9% reduction in deaths from cancer

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Cost of cancer for society

- Evaluate the monetary value of a life lost to cancer
  - Willingness To Pay (WTP) approach:
    - Aspects of productivity as well as preferences for avoiding the distress caused by cancer
    - Equal value by age and sex
    - Yabroff et al. (2008) estimate $232 billion in 2000 in US
      - Lung cancer largest impact due to incidence and mortality rates (also under the HC approach), then breast and colorectal.

  - Human Capital (HC) approach:
    - Lost of productivity in terms of earning, i.e. value of labour people contribute to society
    - Narrow definition of cost of illness and favours the high earning individuals (male aged 40-55)
    - Bradley et al. (2008) estimate $116 billion in 2000 in US
      - Lung cancer largest impact, then colorectal because of impact on productivity

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Evidence from the UK (1)

- Bending et al (2010) estimates the direct cost of bowel cancer in 2005
- Analysis based on service pathway model that includes the possible options for an individual at each stage of the disease: screening, diagnosis, primary treatment, follow-up, stoma care, palliative treatment.
- Model populated with data from Hospital Episodes Statistics and Reference Costs.
- Bowel cancer costs in excess of 1 billion in 2005
- 35% of costs due to testing patients with suspected bowel cancer then diagnosed as negative

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Evidence from the UK (2)

- Okello et al. (2011) examine association between cancer spending reported by PCTs and population characteristics, disease burden and service activity in South East England in 2005-2007
  - Lower per capita spending is associated with PCTs with smaller populations and higher prevalence of deprived areas
  - Higher expenditure is associated with higher proportion of radiotherapy and higher use of hospital bed days per capita
  - Spending seems associated with the supply of care (type of services) rather than the demand (burden of disease)
- Flaming et al. (2008) Investigate factors explaining hospital costs of lung cancer patients in Northern Ireland.
  - £5,956 the average cost per patient with non-small cell and £5,876 with small cell lung cancer
  - The main driver of costs is length of stay accounting for 62-84% of total costs depending on cell type.
  - Other factors are : the stage of cancer, patient age, co-morbidities and deprivation.

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Main Data Sources for the UK (1)

- Reference Costs (collected: 1998 to now)
  - Detailed picture on NHS expenditure used by over 400 NHS organisations including providers and commissioners of health care services.
  - Unit costs at the level of treatments and procedures since reported by all NHS providers of health services in England.
  - All NHS organisations allocate their total costs to service unit costs following a top down accounting procedure (rather than seeking to measure directly the costs incurred by individual patients).
  - Reference costs use case-mix adjusted measures, in which the care provided to a patient is classified according to its complexity (HRGs).

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Main Data Sources for the UK (2)

- Programme budgeting data (collected: 2003 to now)
  - Data on the allocation of health expenditure at commissioner (i.e. PCTs) and Cancer Network level.
  - Enable commissioners to identify how they spend their allocated funds across 23 diseases and their subcategories and how their allocation compare nationally and over time.
  - Programme Budgeting data is also presented at Cancer Network level from 2006-07 in the 2008-09 Cancer Networks workbook.

Programme budgeting estimated for England

Programme Budgeting Category	Gross Expenditure (£billion)						
	2003	2004	2005	2006	2007	2008	2009
Cancers & Tumours							
Cancers & Tumours - Head and Neck	-	-	-	0.15	0.14	0.14	0.17
Cancers & Tumours - Upper GI	-	-	-	0.21	0.23	0.24	0.28
Cancers & Tumours - Lower GI	-	-	-	0.33	0.34	0.37	0.41
Cancers & Tumours - Lung	-	-	-	0.20	0.23	0.24	0.28
Cancers & Tumours - Skin	-	-	-	0.10	0.11	0.10	0.11
Cancers & Tumours - Breast	-	-	-	0.40	0.45	0.50	0.57
Cancers & Tumours - Gynaecological	-	-	-	0.16	0.16	0.16	0.18
Cancers & Tumours - Urological	-	-	-	0.41	0.43	0.44	0.46
Cancers & Tumours - Haematological	-	-	-	0.47	0.55	0.56	0.65
Cancers & Tumours - Other	-	-	-	1.93	2.32	2.39	2.75
Totals	**3.39**	**3.77**	**4.30**	**4.35**	**4.96**	**5.13**	**5.86**

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Main Data Sources for the UK (3)

- Hospital Episode Statistics (from 1991 to now)
  - Data on the hospital care provided by NHS and non-NHS providers for each NHS patient.
  - Includes all secondary care services provided under inpatient, outpatient and day cases admissions.
  - Data collected at the level of Finished Consultant Episode defined as the time the patient spends under the care of a consultant.
  - The HES dataset contains detailed information on the patient diagnoses, performed procedures, and characteristics of the area of residence.

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Main Data Sources for the UK (4)

- Eight regional cancer registries in England and one in each of Northern Ireland, Scotland and Wales
  - Collect information about every patient diagnosed with cancer.
  - The NCIN organise these data into a National Cancer Data Repository for England and link them to additional data including surgery, radiotherapy and care in general practice.

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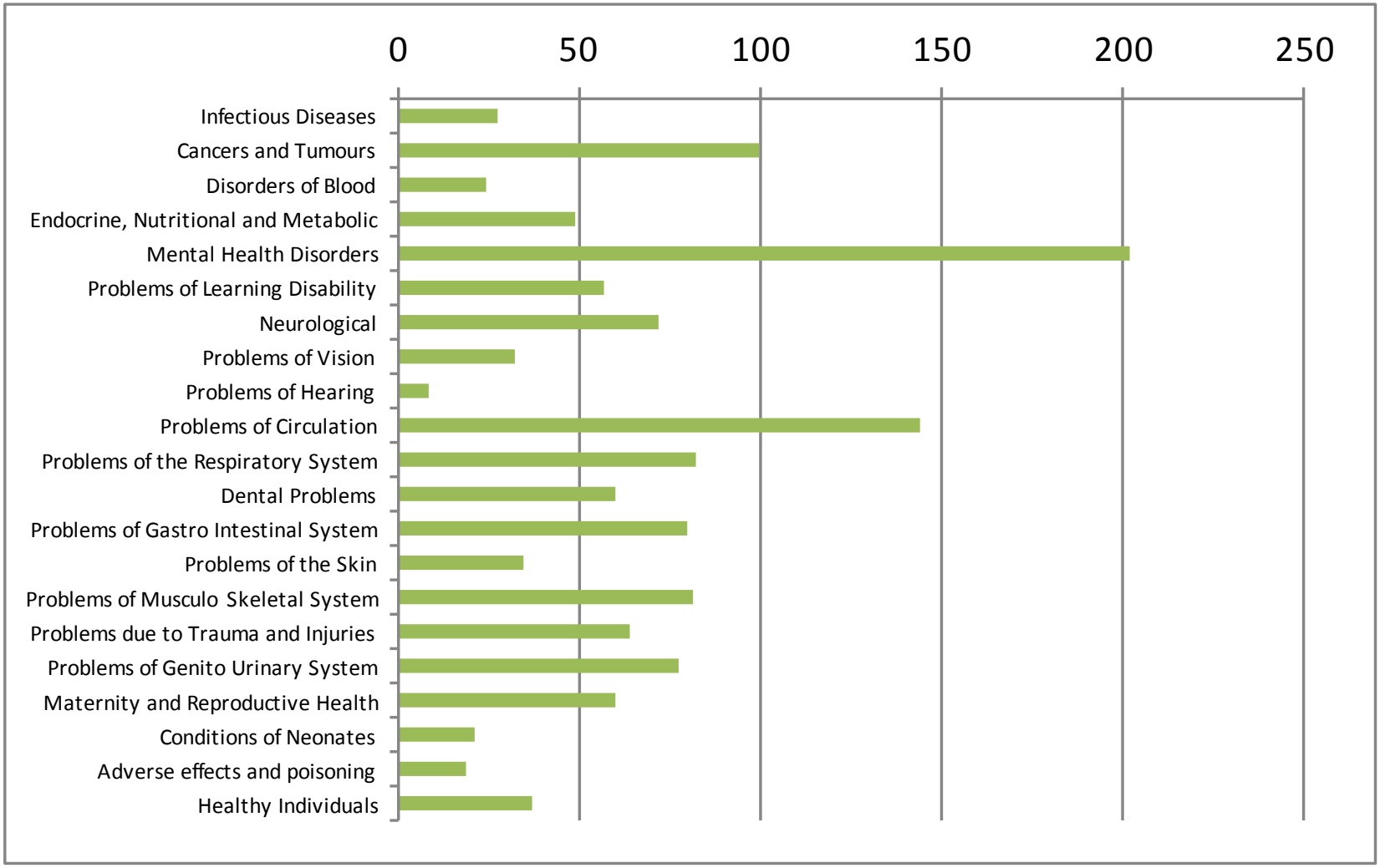
Programme budgeting data 2008/09 (£ *per capita*)



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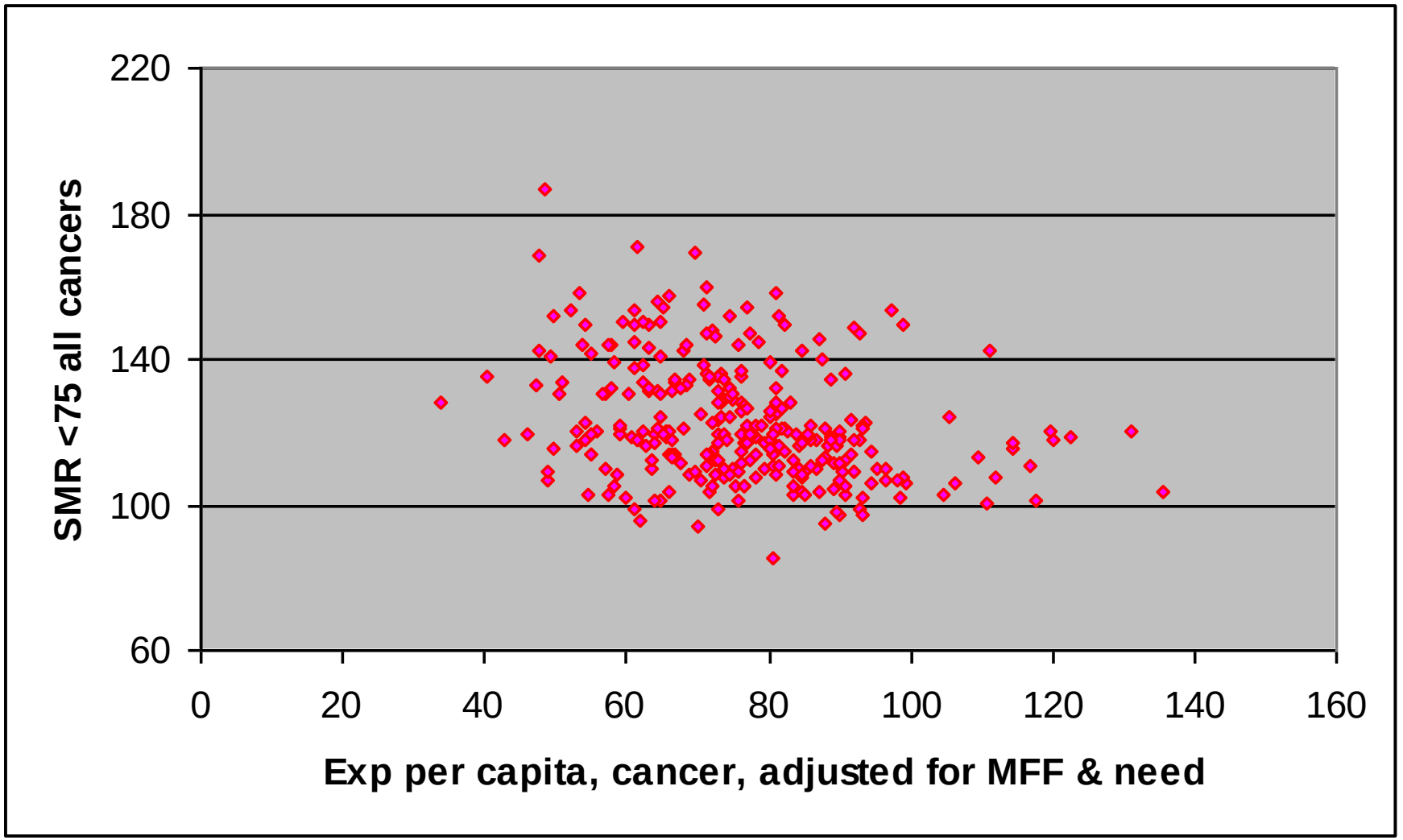
Cancer spending and mortality



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Marginal cost of saving a life year 2006/07

- £ 15,387 for cancer
- £ 9,974 for circulation problems
- £ 5,425 for respiratory problems
- £ 21,538 for gastro-intestinal problems
- £ 26,429 for diabetes

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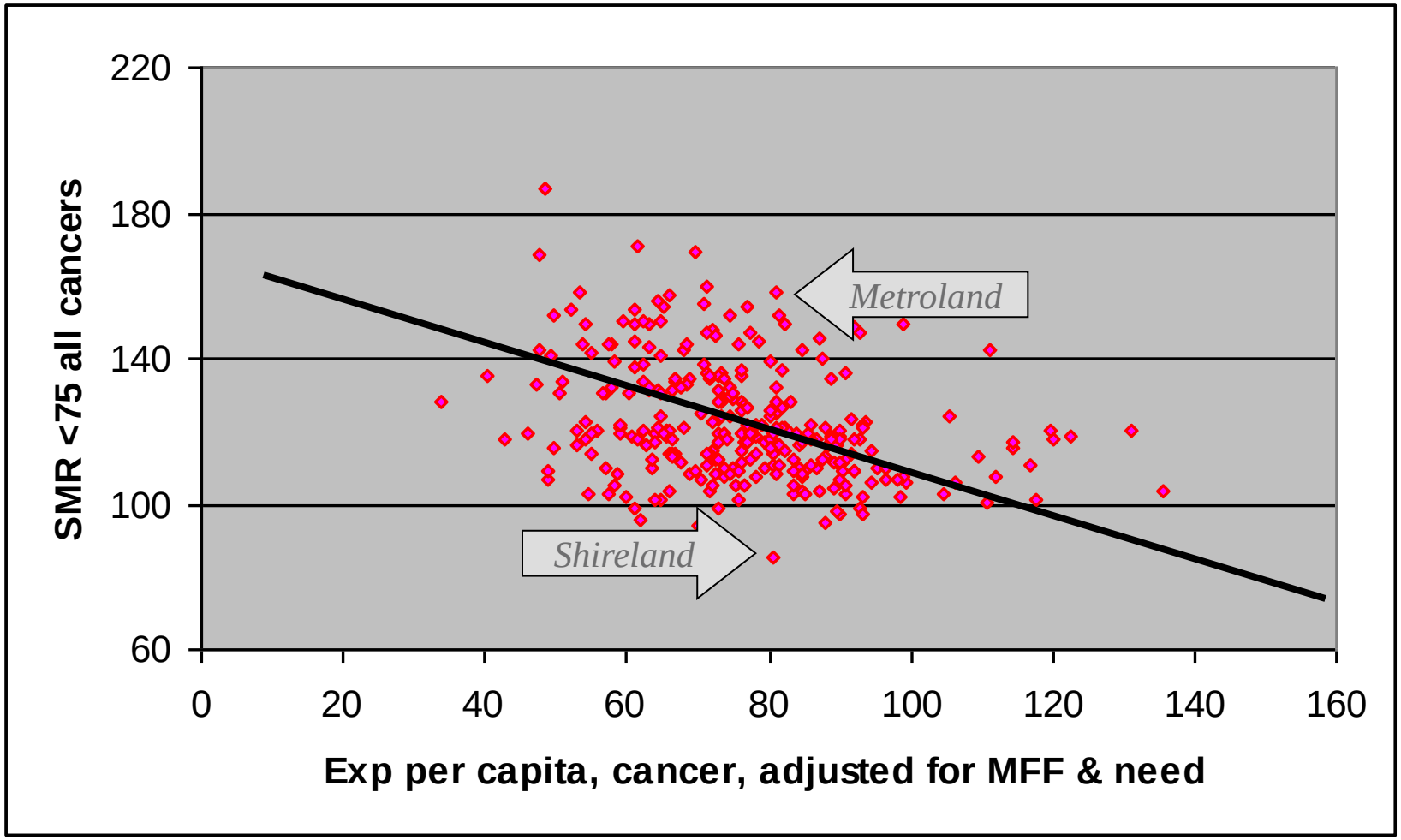
Spending and mortality: cancer



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Cancer variations

	Metroland	Shireland
Reported incidence	Low (c. 0.45%)	High (c. 0.8%)
Expenditure per case	High (£16,000)	Low (£9,500)
5 year survival	Poor	Good
Typical stage at diagnosis	Late: often through emergency	Early: through primary care referral

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Types of information needed

	Type of information
Reported prevalence	Epidemiological
Expenditure per case	Accounting
5 year survival	Patient outcomes
Stage at diagnosis	Service processes

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Some potential contribution of health economics

- Understanding causality: analysis of observational data
- How people value different health states
- What determines people's use of health services
- Optimal configuration of health services: screening; diagnosis; treatment; palliative care
- Economic evaluation of treatments
- Rationing devices: user fees & top-ups
- Priority setting: cancer care vs other health services
- Performance monitoring and provider incentives