

Primary Care: 21st Century Challenges to Quality

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CONVENTIONAL APPROACHES TO QUALITY

Resources: Are there enough of ...

Health services structures: e.g., medical records, hours of availability

Technical quality: disease-oriented processes of care

Outcomes: biological, functional

Challenges for Quality Assessment

1. Person-focused assessments rather than disease-focused assessments
2. Dangers of medical interventions
3. Impact of the mode of delivering services
4. Equity (systematic disparities) as an important outcome

I. Co-morbidity

Increasing likelihood of survival due to scientific and technologic advances will result in larger proportions of people with continuing morbidity and disability and with more co-morbidity.

Co-morbidity

- Only one-third of visits of adult patients with hypertension are for that diagnosis.
- Adults with migraine have 33% greater costs for unrelated conditions.
- Actual co-prevalence of the most common childhood chronic conditions is 1½-4 times greater than expected.
- Low grade and largely asymptomatic infections, or even low birthweight are associated with increased likelihood of subsequent ischaemic heart disease.

Co-morbidity

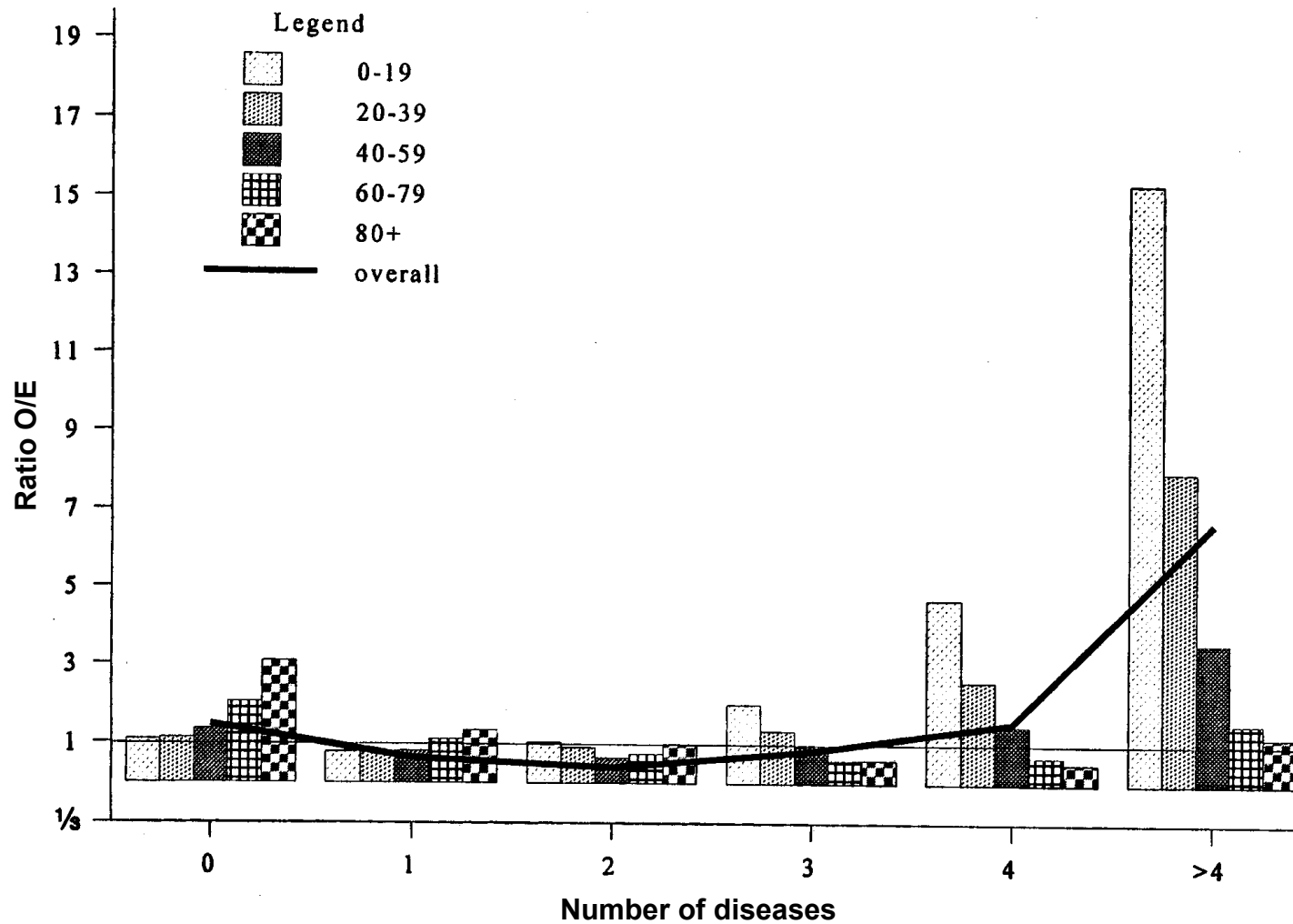
- The average number of diagnosed conditions in adults over age 60 is 2.
- Over 80% of females of ages 65-85 have at least one chronic condition; 50% have more than one; 25% have three or more.
- For the US population as a whole, 41% have one type of morbidity; 33% have 2-3 types; 6% have 4-5 types; 1% have 6-9 types.*

*Diagnoses are based on medical visits.
15% have preventive visits only.

Co-morbidity (Medicare Data, 1999)

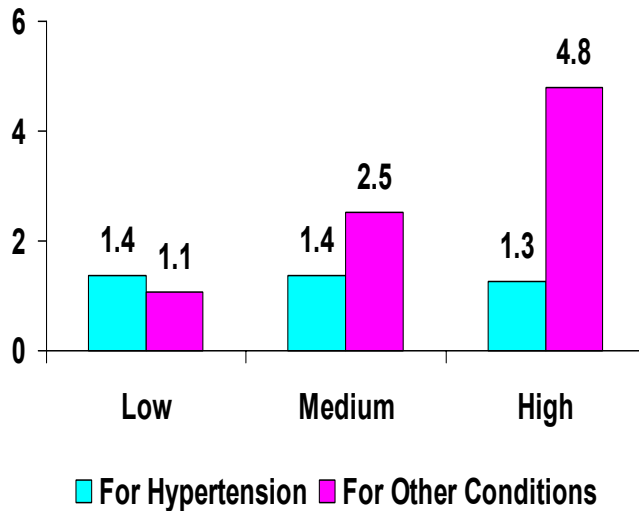
- 65% have two or more types of **CHRONIC** conditions.
- Per capita expenditures increase from \$1154 for those with one condition to \$2394 for those with two conditions, \$4701 for those with three conditions, and \$13,973 for those with four or more types of chronic conditions.
- Rates of hospitalization for ambulatory care sensitive conditions increase much more than linearly with each additional type of chronic condition, from 7.7/1000 for those with one type to 362.5 for those with 10+ types.
- Frequency of serious preventable inpatient complications increases more than linearly with each additional type of chronic condition, from 3.6/1000 of those with one type of chronic condition to 232.7 for those with 10+ types.

Ratios of Observed and Expected (Co-)Occurrences of Diseases, Overall and for Different Ages

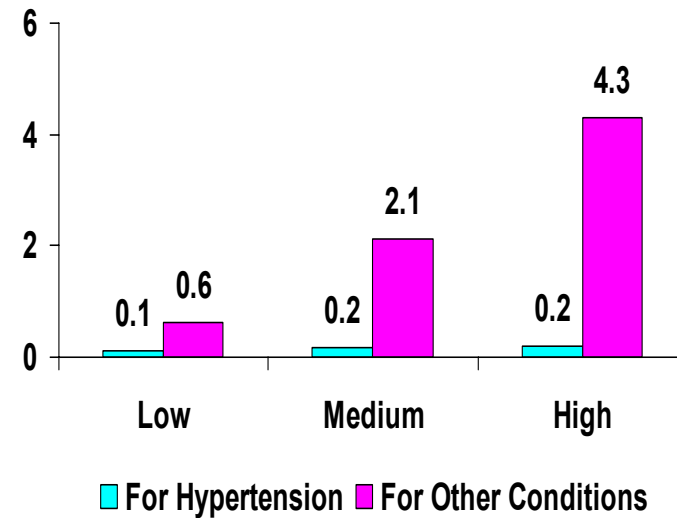


Adults with Hypertension

Visits to Generalist Physicians
(per Patient per Year)

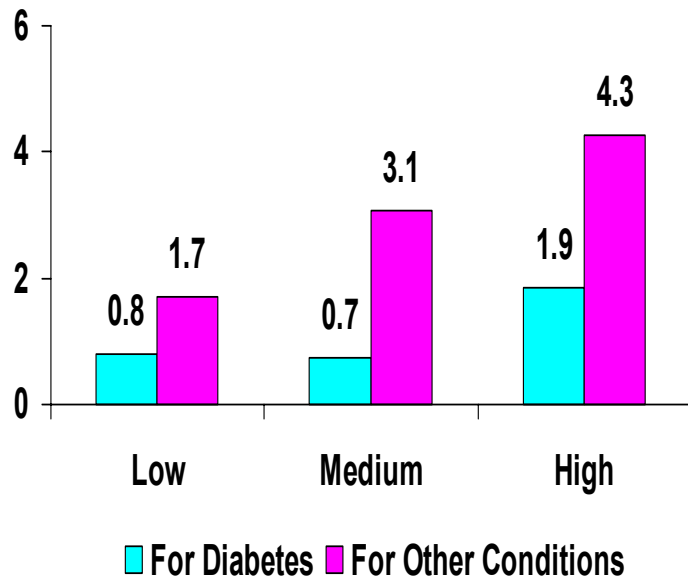


Visits to Specialist Physicians
(per Patient per Year)

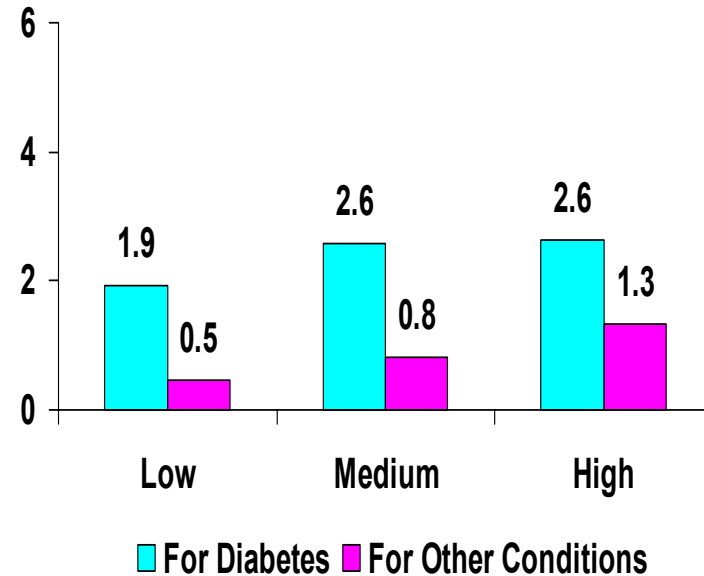


Children with Diabetes

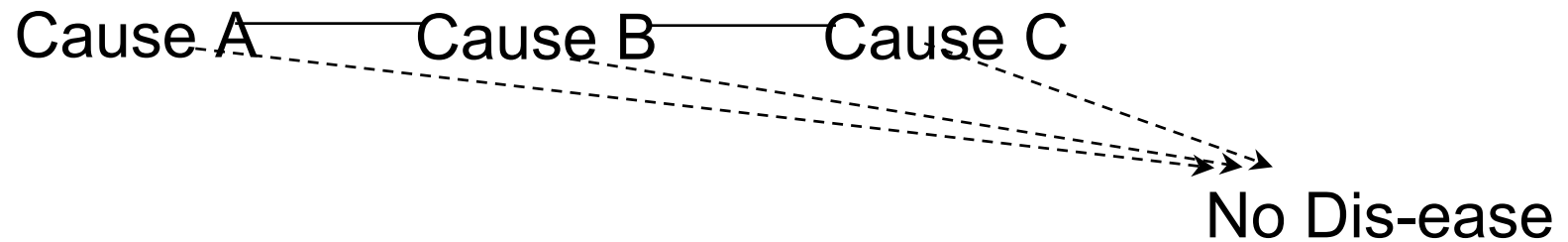
Visits to Generalist Physicians
(per Patient per Year)



Visits to Specialist Physicians
(per Patient per Year)



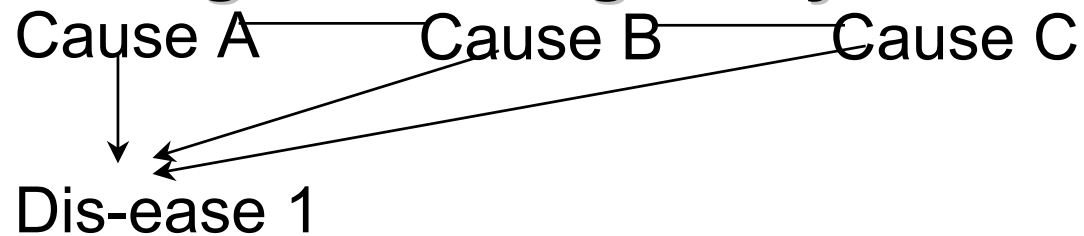
Penetrance



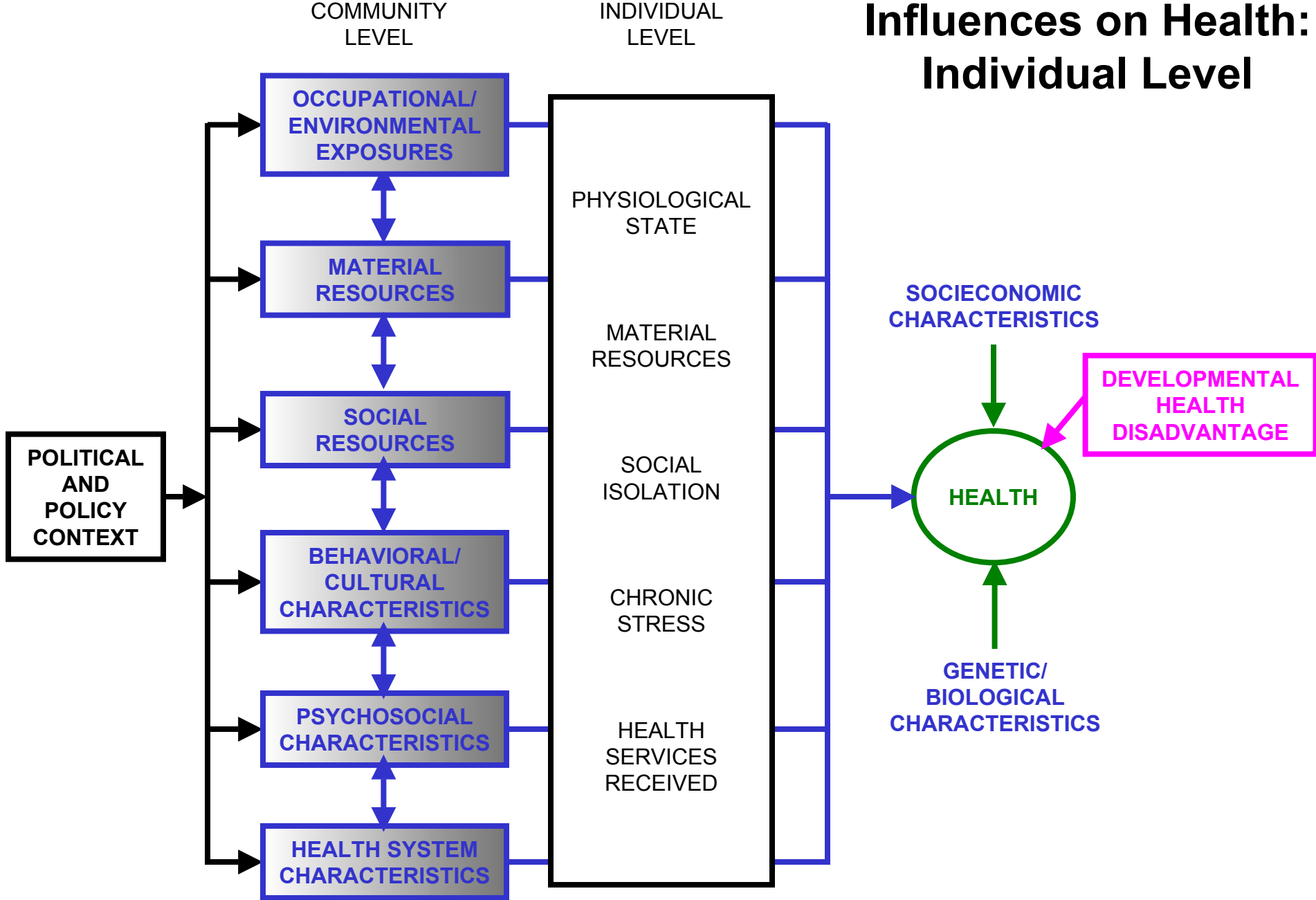
Pleiotropism



Etiologic Heterogeneity



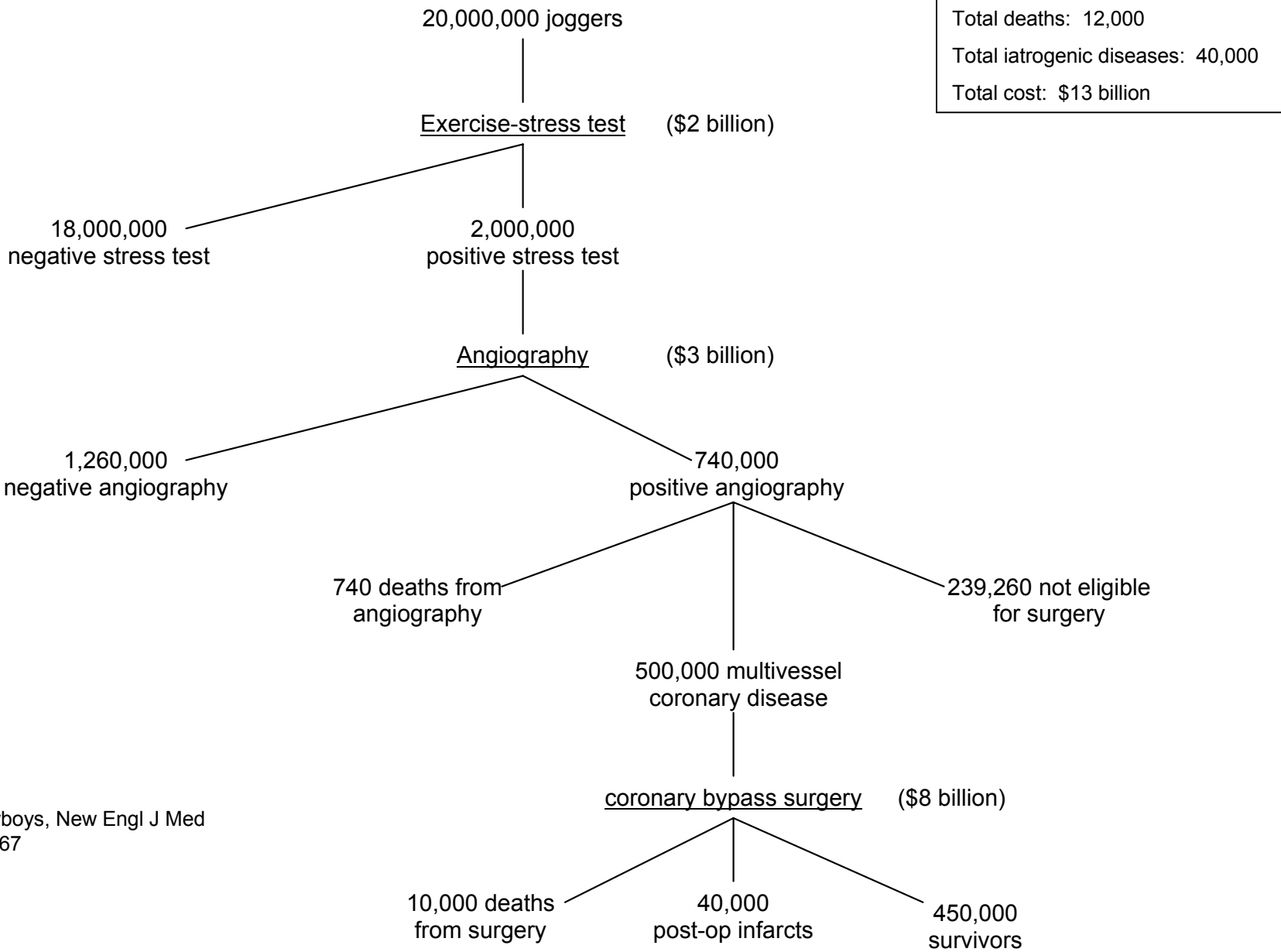
Influences on Health: Individual Level



Shading represents degree to which characteristics are measured at the ecological level (lighter color) or at the individual level aggregated to community.

II. The Increasing Danger of Medical Interventions

Consequences of Exercise-Stress Testing in Joggers Over 35 Years Old



Source: Grayboys, New Engl J Med 1979; 301: 1067

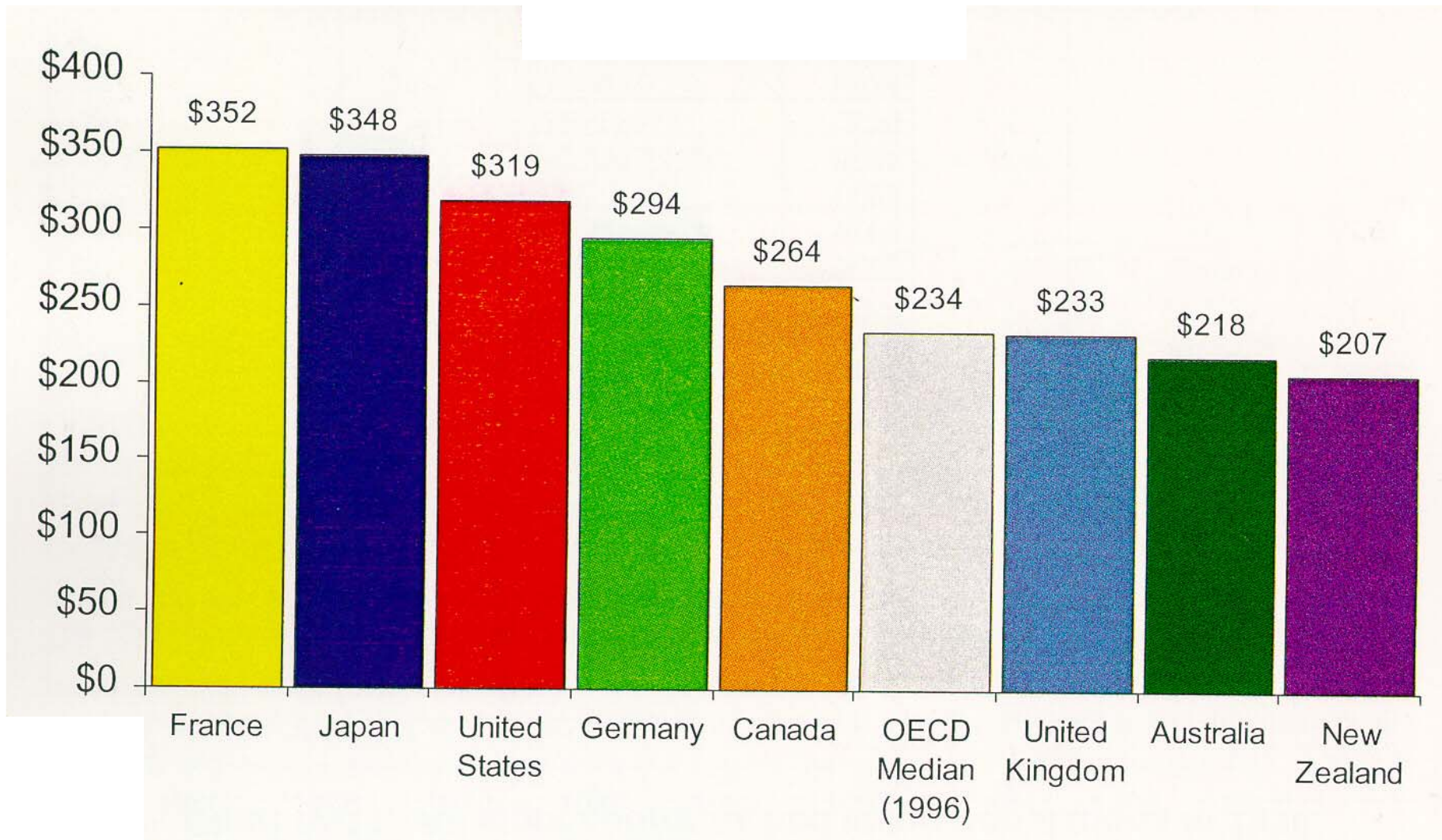
Starfield

MRI and CT Scanners per Million Population, 1996

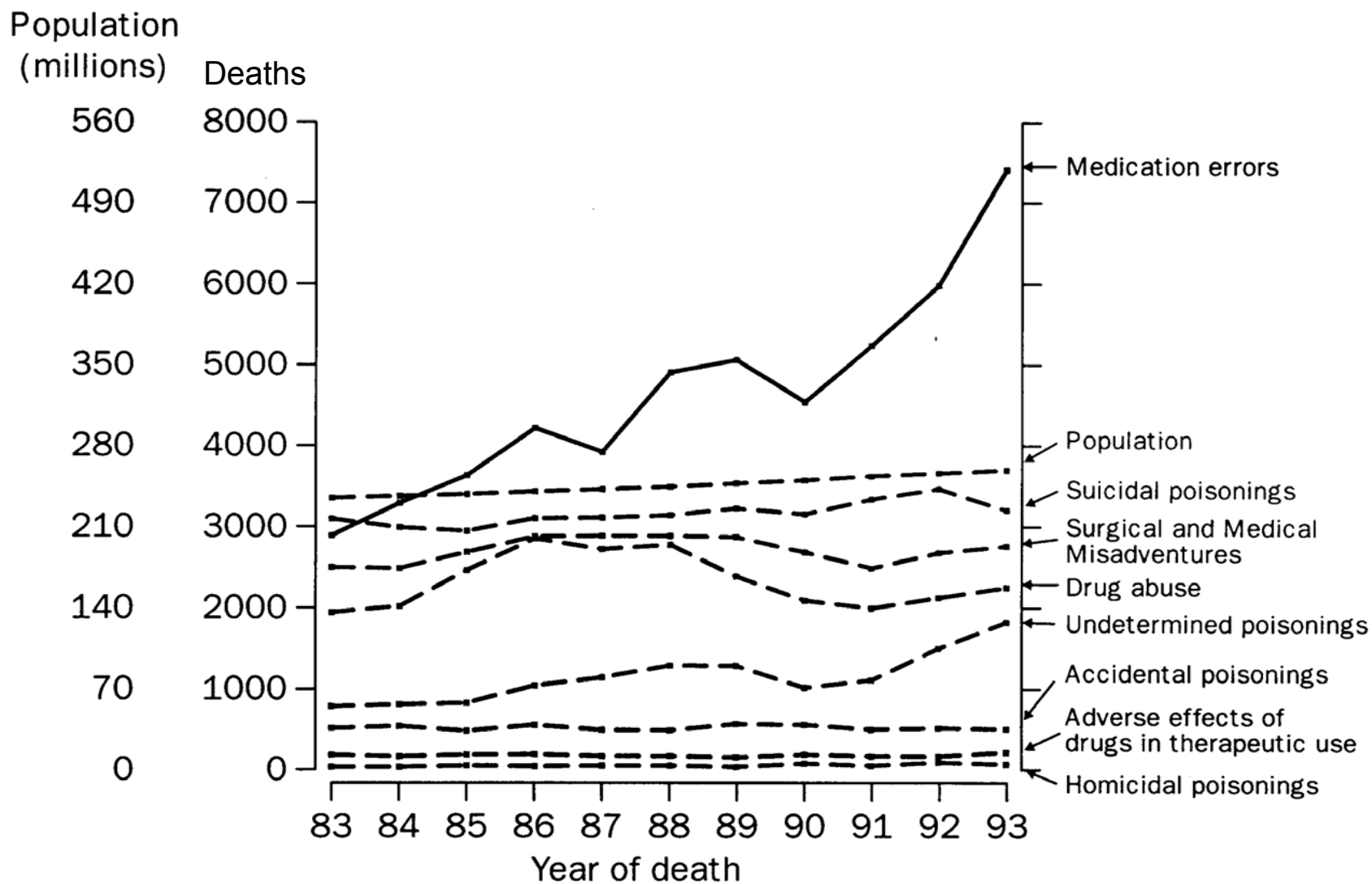
	MRI units per million population	CT scanners per million population
Australia	2.9 ^b	18.4 ^c
Belgium	3.3 ^b	16.7 ^c
Canada	1.3 ^b	7.9 ^b
Denmark	2.5 ^e	5.8 ^e
Finland	2.4 ^e	9.0 ^e
France	2.3	9.4
Germany	5.7	16.4
Japan	18.8	69.7
Netherlands	3.9 ^b	9.0 ^g
New Zealand	2.7	7.7
Spain	3.2	9.0
Sweden	6.8 ^b	13.7 ^g
United Kingdom	3.4 ^b	6.3 ^g
United States	16.0 ^b	26.9 ^g

^b1995, ^c1994, ^e1990, ^g1993

Per Capita Expenditures on Pharmaceuticals, Adjusted for Cost-of-Living Differences, 1997



Trends in US Deaths from Medication Errors and from Related Causes, 1983-1993



Iatrogenesis as a Major Cause of Mortality

	Estimated number of deaths per year
Harm from unnecessary surgery (1/200)	12,000
Medication errors in hospital	7,000
Other errors in hospital	20,000
Nosocomial infections in hospital	80,000
Non-error adverse effects of drugs	106,000
Total	225,000 deaths, or, in other words, the third leading cause of death in the US

Adverse Effects in Outpatient Care

4-18% of consecutive patients suffer adverse effects.

Costs of adverse effects (US): \$77 billion
(equal to aggregate costs of patients with diabetes)

116 million extra doctor visits

77 million extra prescriptions

17 million emergency department visits

8 million hospital admissions

3 million long-term care admissions

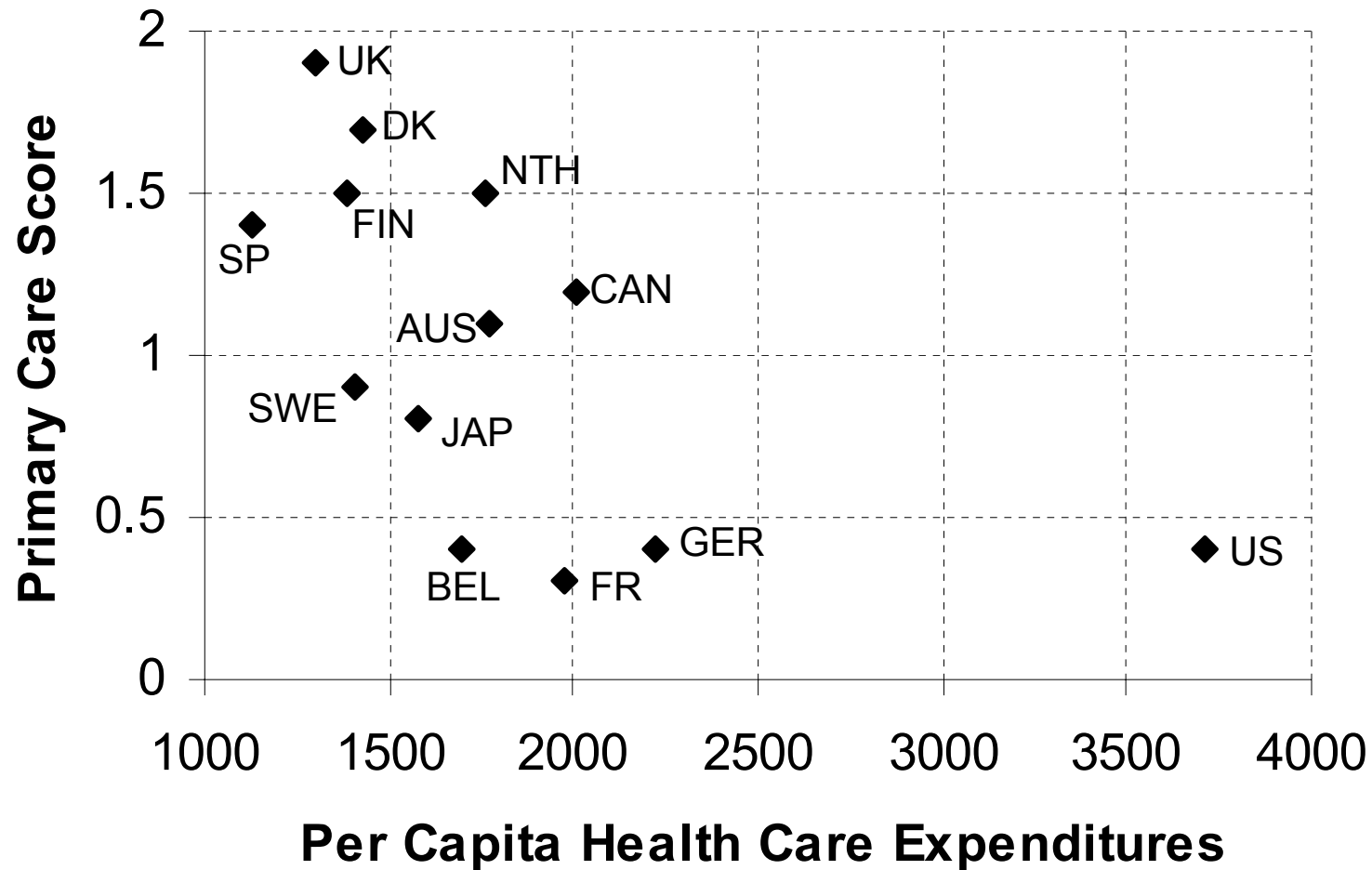
199,000 additional deaths

III. The Powerful Effect on Health of Health System Organization and Delivery

Primary Care Scores, 1980s and 1990s

	1980s	1990s
Belgium	0.8	0.4
France	-	0.3
Germany	0.5	0.4
United States	0.2	0.4
Australia	1.1	1.1
Canada	1.2	1.2
Japan	-	0.8
Sweden	1.2	0.9
Denmark	1.5	1.7
Finland	1.5	1.5
Netherlands	1.5	1.5
Spain	-	1.4
United Kingdom	1.7	1.9

Primary Care Score vs. Health Care Expenditures, 1997



Average Rankings* for Health Indicators in Infancy, for Countries Grouped by Primary Care Orientation

	Low Birth Weight (1993)	Neonatal Mortality (1993)	Postneonatal Mortality (1993)	Infant Mortality (1996)
Lowest (Belgium, France, Germany, US)	9.5	7.8	11.5	8.8
Middle (Australia, Canada, Japan, Sweden)	7.3	5.3	5.5	6.0
	} 5.9	} 6.7	} 5.0	} 6.2
Highest (Denmark, Finland, Netherlands, Spain, UK**)	4.8	7.8	4.6	6.4

*Best level of health indicator is ranked 1; worst is ranked 13, thus, lower average ranks indicate better performance.

**England and Wales only

Average Rankings* for Life Expectancy at Ages 40, 65, and 80, for Countries Grouped by Primary Care Orientation

	Age 40		Age 65		Age 80					
	Female	Male	Female	Male	Female	Male				
Lowest (Belgium, France, Germany, US)	7.8	9.5	8.0	8.0	7.4	6.9				
Middle (Australia, Canada, Japan, Sweden)	4.0	2.5	3.8	3.5	3.6	4.3				
	} 6.7		} 5.9		} 6.6		} 6.8		} 7.1	
Highest (Denmark, Finland, Netherlands, Spain, UK**)	8.8	8.6	8.8	9.0	9.5	9.3				

*Best level of health indicator is ranked 1; worst is ranked 13, thus, lower average ranks indicate better performance.

**England and Wales only

Average Rankings for Health Indicators, YPLL (Total and Suicide) in Countries Grouped by Primary Care Orientation

	All Except Suicide		Suicide		All Except External	
	Female	Male	Female	Male	Female	Male
Lowest (Belgium, France, Germany, US)	9.5	10.8	7.3	8.3	8.8	10.8
Middle (Australia, Canada, Japan, Sweden)	3.8	2.8	7.0	7.3	3.8	3.5
Highest (Denmark, Finland, Netherlands, Spain, UK)	7.6	7.4	6.8	5.8	8.2	7.0

Average Rankings for Health Indicators for Countries Grouped by Primary Care Orientation: World Health Report, 2000

	DALEs	Child Survival Equity	Overall Health	
Lowest (Belgium, France, Germany, US)	16.3	22.5	36.3	
Middle* (Australia, Canada, Sweden, Japan)	4.8	16.5	26.0	
	} 11.0	} 15.8	} 29.1	
Highest* (Denmark, Finland, Netherlands, Spain, UK)	16.0	15.2	31.6	

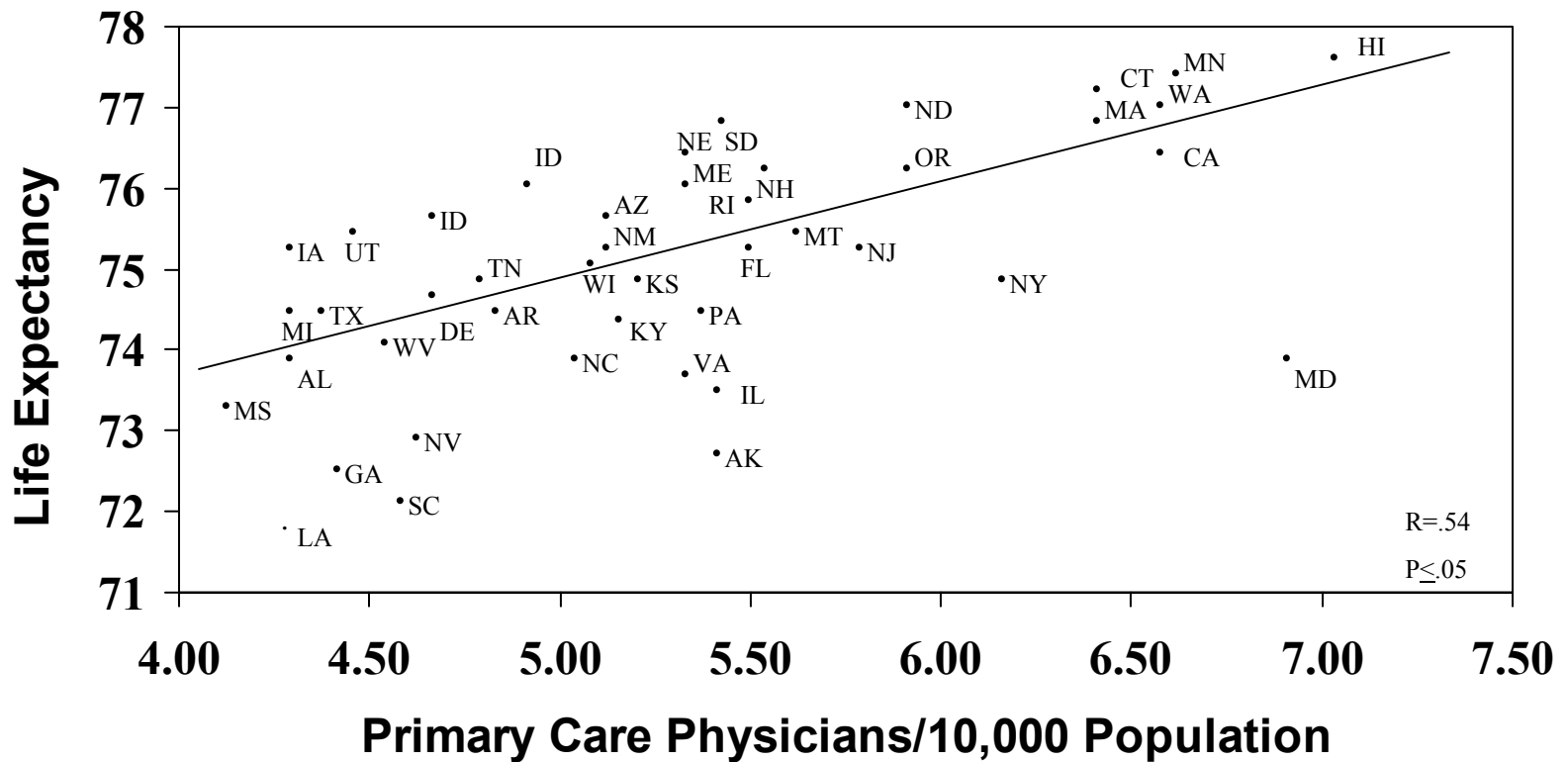
DALE: Disability adjusted life expectancy (life lived in good health)
 Child survival: survival to age 5, with a disparities component
 Overall health: $\frac{\text{DALE minus DALE in absence of a health system}}{\text{Maximum DALE for health expenditures minus same in absence of a health system}}$

Source: Calculated from
 WHO, World Health Report
 (Health Systems: Improving
 Performance) 2000

Within-Country Studies

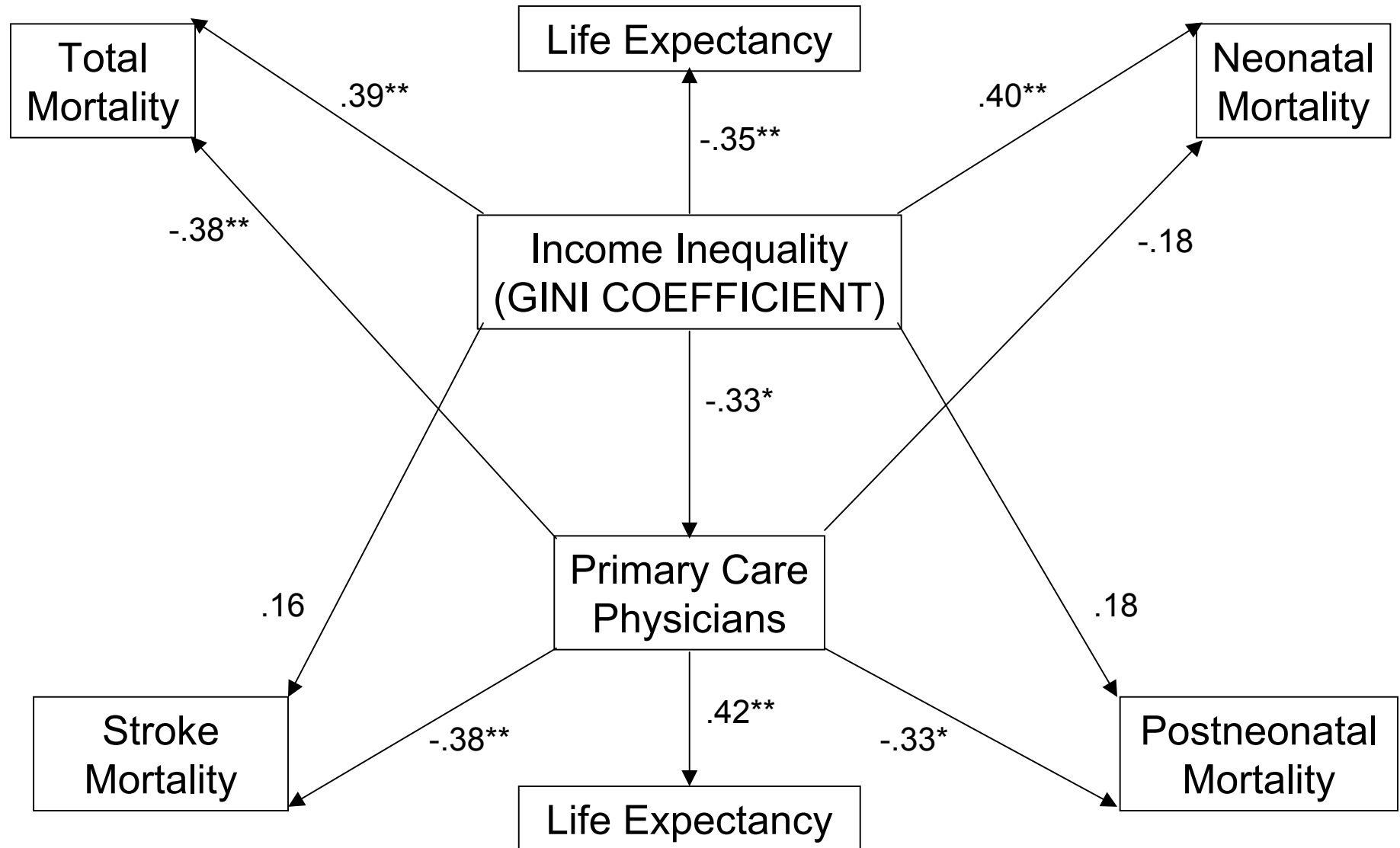
- Ecological analyses: Effect of primary care doctor to population ratios (US, UK)
- Case control studies (US)
- Hospitalizations for avoidable conditions or complications (US, Spain)
- Survey data on impact of affiliation with a primary care doctor (US, Spain)
- Path analyses at state and local levels (US)

State Level Analysis: Primary Care and Life Expectancy



PC physicians/population positively associated with longer life expectancy.

Path Coefficients for the Effects of Income Inequality and Primary Care on Health Outcome: 50 US States, 1990



* $p < .05$; ** $p < .01$.

Source: Shi, Starfield, Kennedy, Kawachi, JFP 1999

Primary Care Practice Characteristics: Evidence-Based

- Countries with strong primary care
 - have lower overall costs
 - generally have healthier populations
- Within countries
 - areas with higher primary care physician availability (but NOT specialist availability) have healthier populations
 - more primary care physician availability reduces the adverse effects of social inequality

IV. The Imperative for Equity

In 7 African countries

- The highest 20% of the population receives well over twice as much financial benefit from overall government health spending (30% vs 12%).
- For primary care, the poor-rich benefit ratio is notably lower (23% vs 15%).

“From an equity perspective, primary care represents a clear step in the right direction.”

Reductions in Inequality in Health by Primary Care: Self-Reported Health, 60 US Communities, 1996

Percent reporting fair or poor health

- **Areas with low income inequality**
 - No effect of primary care resources*
- **Areas with moderate income inequality**
 - 16% increase in areas with low primary care resources*
- **Areas with high income inequality**
 - 33% increase in areas with low primary care resources*

*compared with median # of primary care physicians to population ratios

Reductions* in Inequality in Health by Primary Care: Stroke Mortality, 50 US States, 1990

Areas with low income inequality

High primary care resources	1.3% decrease in mortality
Low primary care resources	2.3% increase in mortality

Areas with high income inequality

High primary care resources	2.3% decrease in mortality
Low primary care resources	1.1% increase in mortality

*compared with population mean

Reductions* in Inequality in Health by Primary Care: Postneonatal Mortality, 50 US States, 1990

Areas with low income inequality

High primary care resources	0.8% decrease in mortality
Low primary care resources	1.9% increase in mortality

Areas with high income inequality

High primary care resources	17.1% decrease in mortality
Low primary care resources	6.9% increase in mortality

*compared with population mean

Primary Care and Equity: Summary

In areas with low social inequity, the additional effect of primary care is small.

In areas of high social inequity, the additional effect of primary care is larger.

Quality Issues for New Quality Challenges

Co-morbidity:

Full recognition of needs – person focus

Adequacy of evidence base in clinical trials

Health services delivery: standardized measures of good primary and specialty care

Avoidance of adverse effects: early warnings

Equity: elimination of disparities across different types of populations by whatever means is possible

Tools for New Challenges in Quality Assessment

Co-morbidity: case mix measures that capture morbidity burden in individuals and populations

e.g., ACGs – Adjusted Clinical Groups

Impact of health system factors

e.g., PCAT – Primary Care Assessment Tools

Errors and adverse effects

e.g., ICPC – consistent and standardized reporting of symptoms

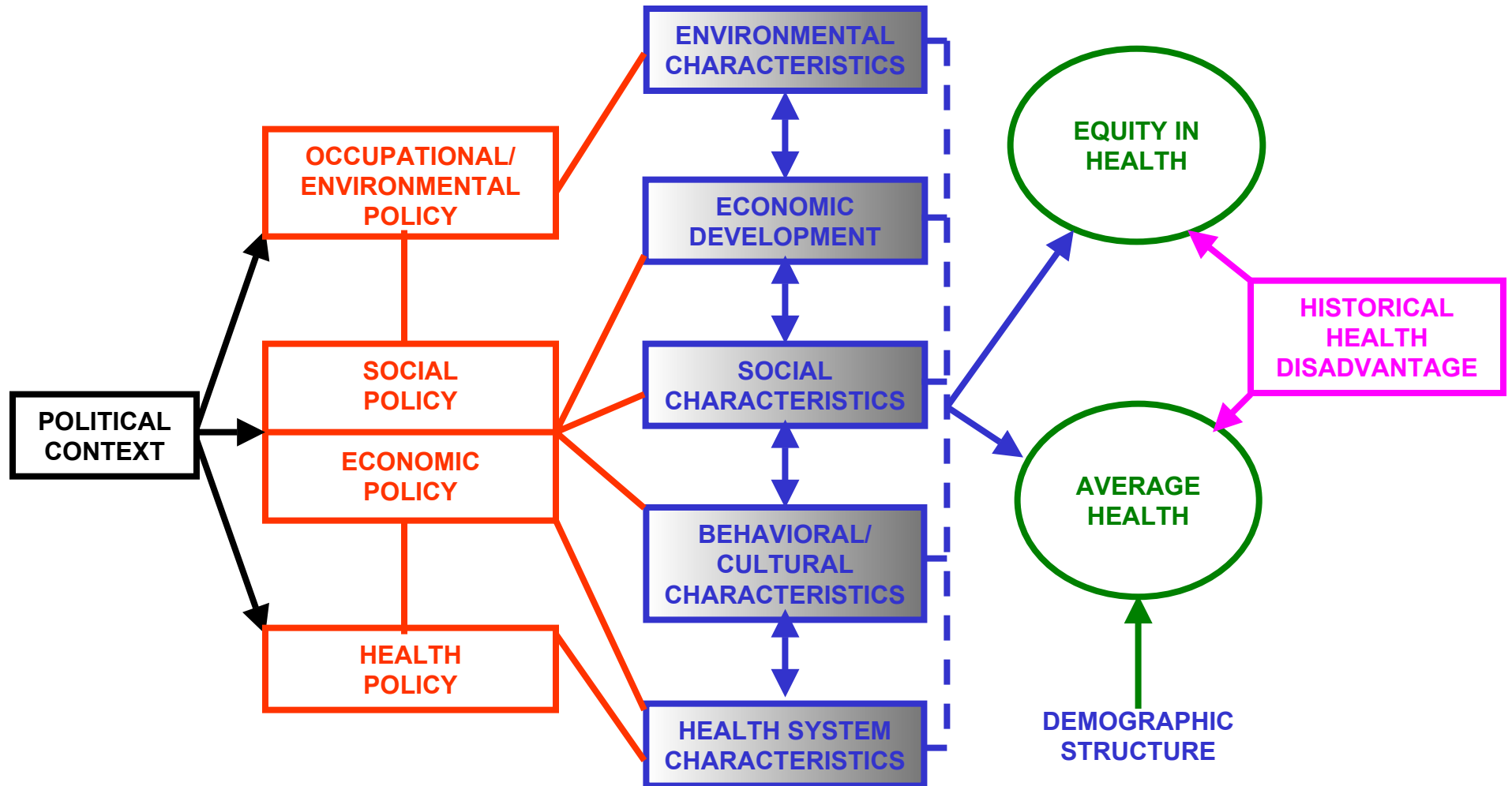
Equity in health care and health

e.g., consider the impact of primary care quality

Principles in Thinking About Health Services Quality

1. People are not diseases. Medical care is not the treatment of diseases.
2. Conventional ways of approaching quality of care must, at least, be supplemented by new ways of viewing and assessing the health of populations.
3. Randomized controlled clinical trials and all clinical studies should
 - Stratify or control for morbidity burden
 - Take into account relationship with a primary care provider
 - Document and characterize adverse effects
 - Examine differential effects in subpopulations

Influences on Health: Population Level



Dashed lines indicate the existence of pathways through individual-level characteristics that most proximally influence health.

Shading represents degree to which characteristics are measured at the ecological level (lighter color) or at the individual level aggregated to community.