

Comparing Canada & the U.S.: What Can We Say About Inequalities in Health?

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The 'Big Idea'

- editorial in *BMJ* 20 April 1996: Income distribution and health => called a 'big idea'
- editorial in *BMJ*, Jan. 5th 2002 dismisses it as unsupported by evidence (Mackenbach)
- BUT: editorial in *BMJ* 19 Dec. 1992, also calls Rose's population health approach to preventive medicine a 'big idea'
- the intellectual stimulus body of work:
 - study of antecedents of health & disease in whole populations
 - analysis of antecedents of health & disease common to whole populations

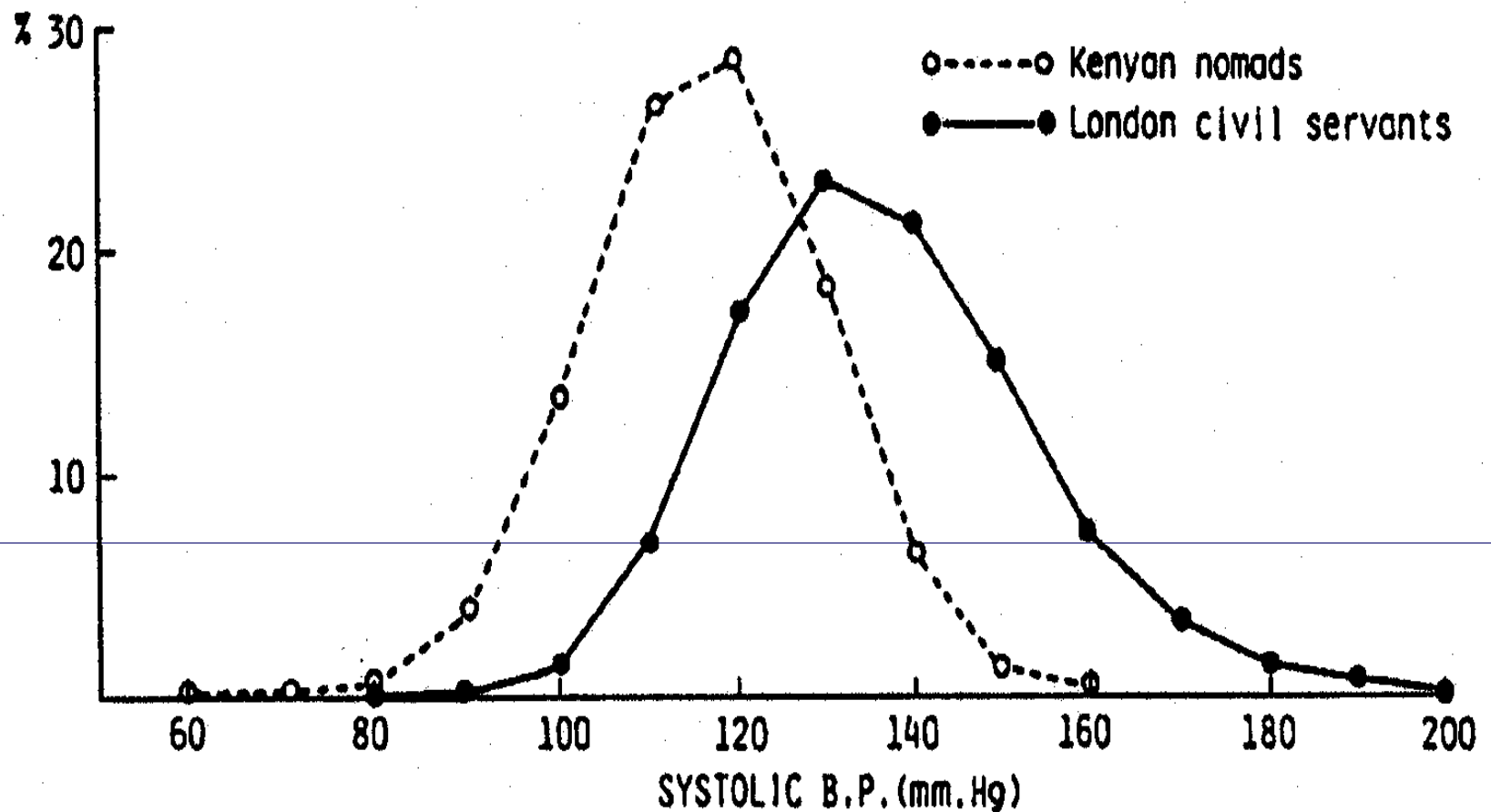


Figure 2 Distributions of systolic blood pressure in middle-aged men in two populations^{2,3}

“medicine and politics cannot
and should not be kept apart”

Geoffrey Rose, 1992

The Social Gradient in Health

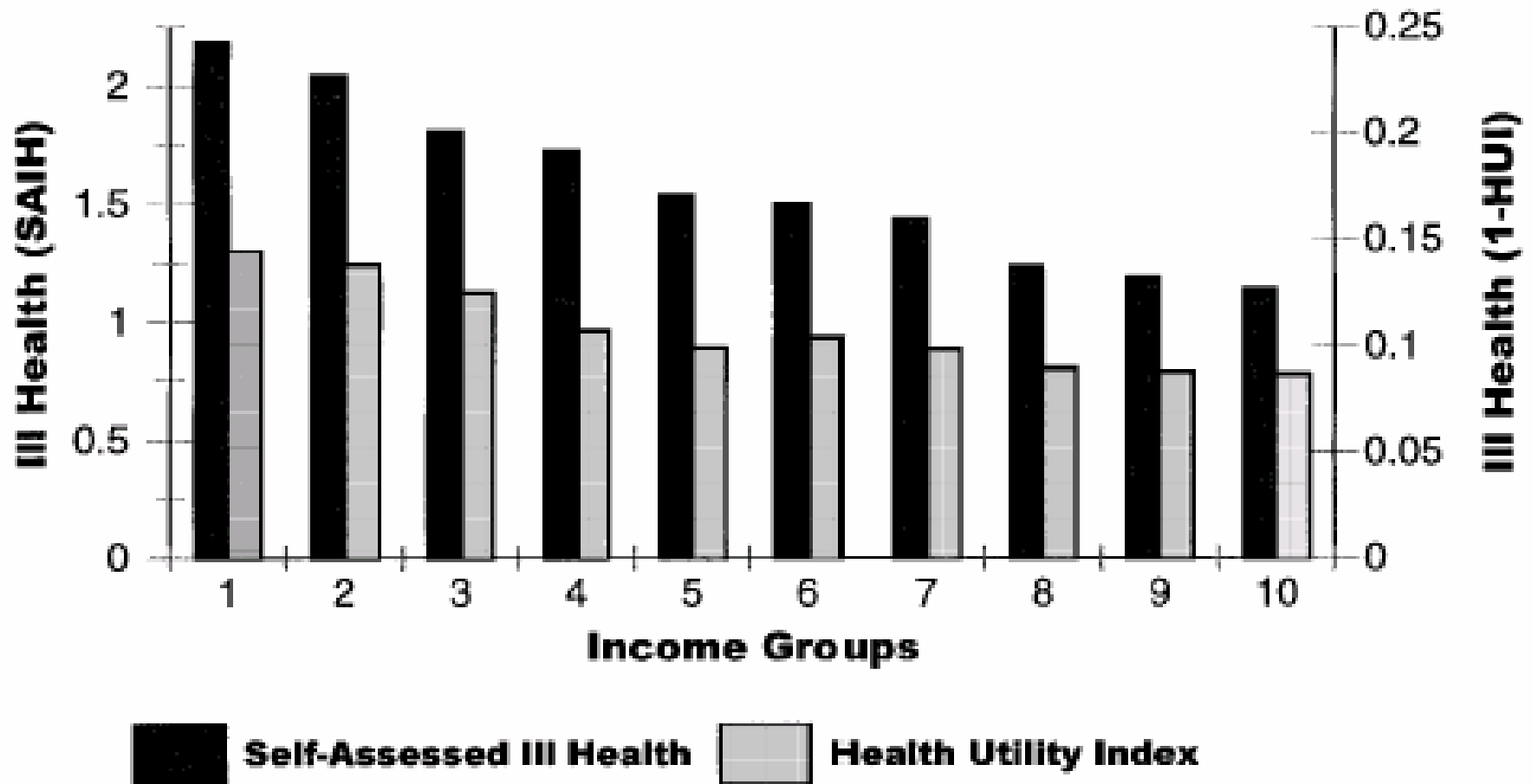
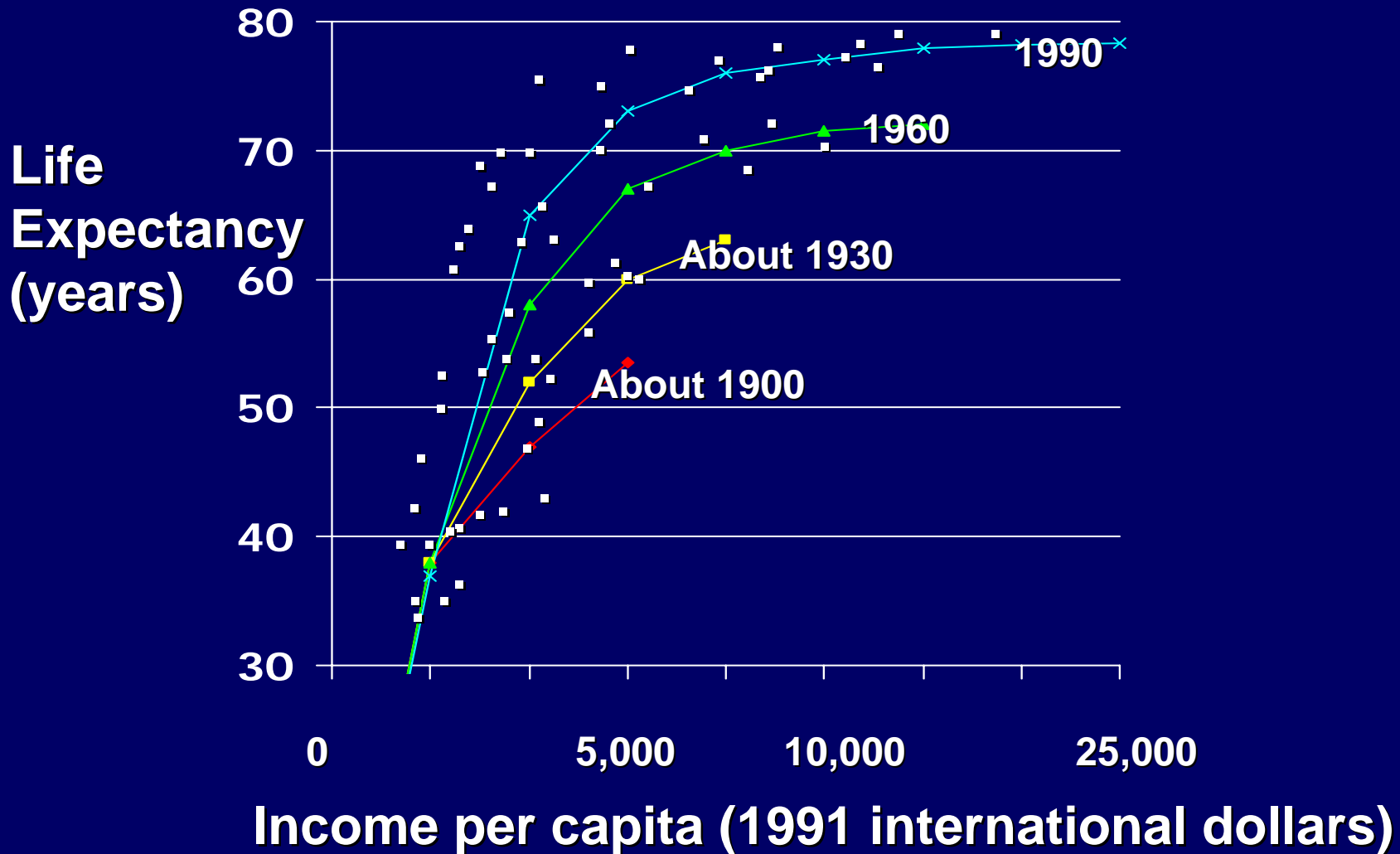


Fig. 2. Ill-health by income.

Life expectancy and income per capita for selected countries, 20th century



Source: World Development Report, 1993

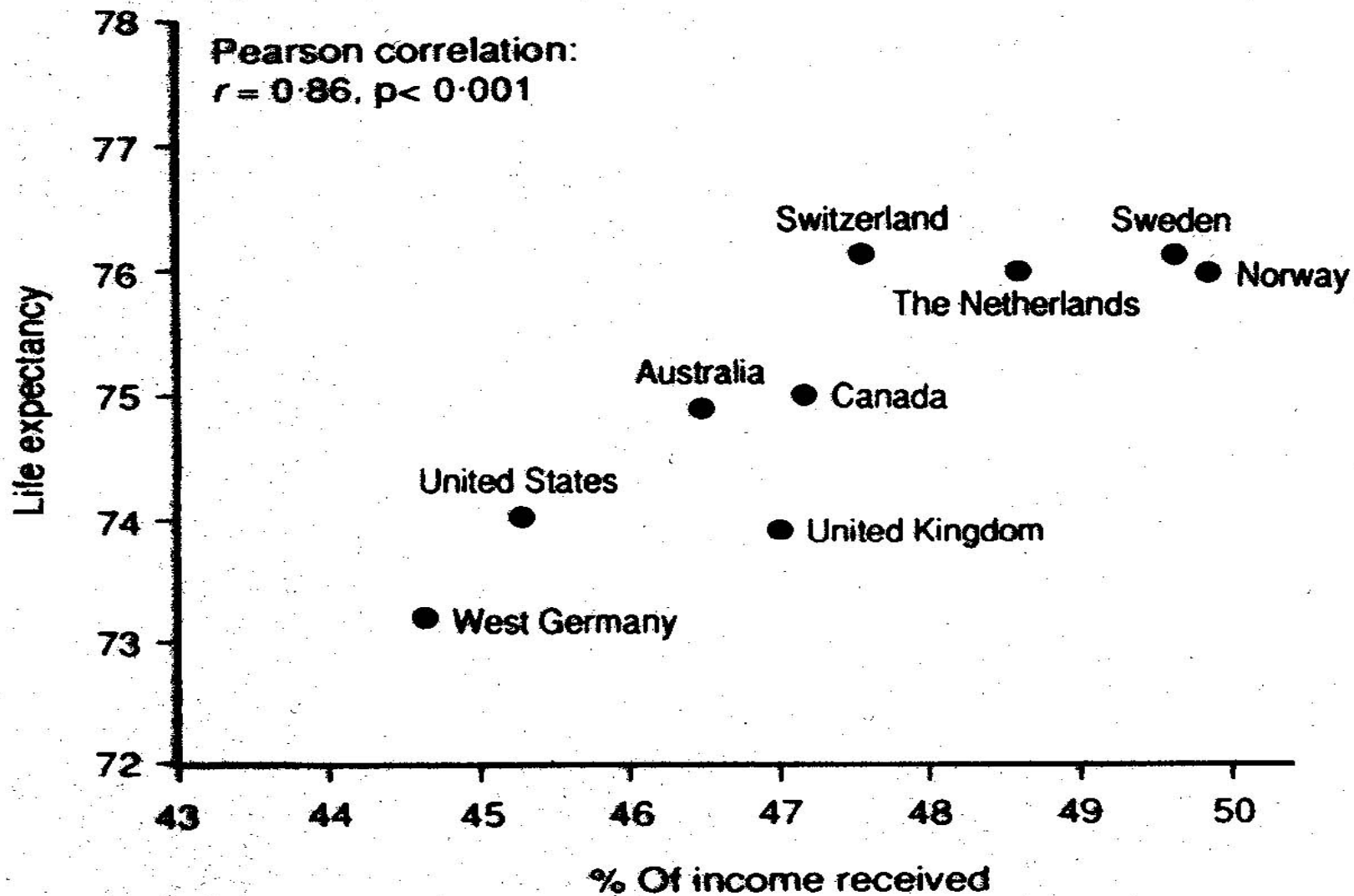


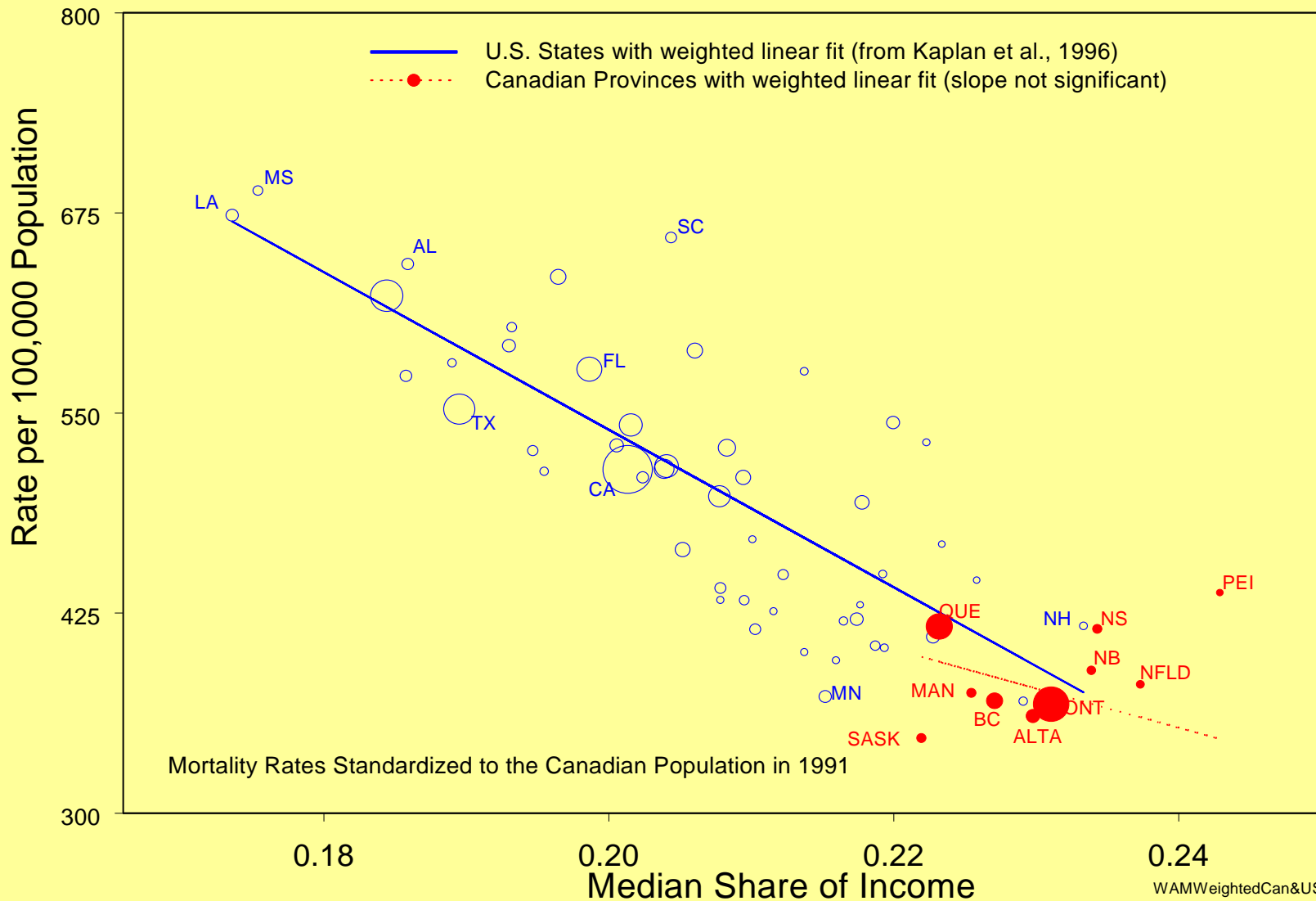
FIG. 31. Percentage of income received by the lowest 70 percent vs. life expectancy.

(*British Medical Journal*, 1992, 304:166.)

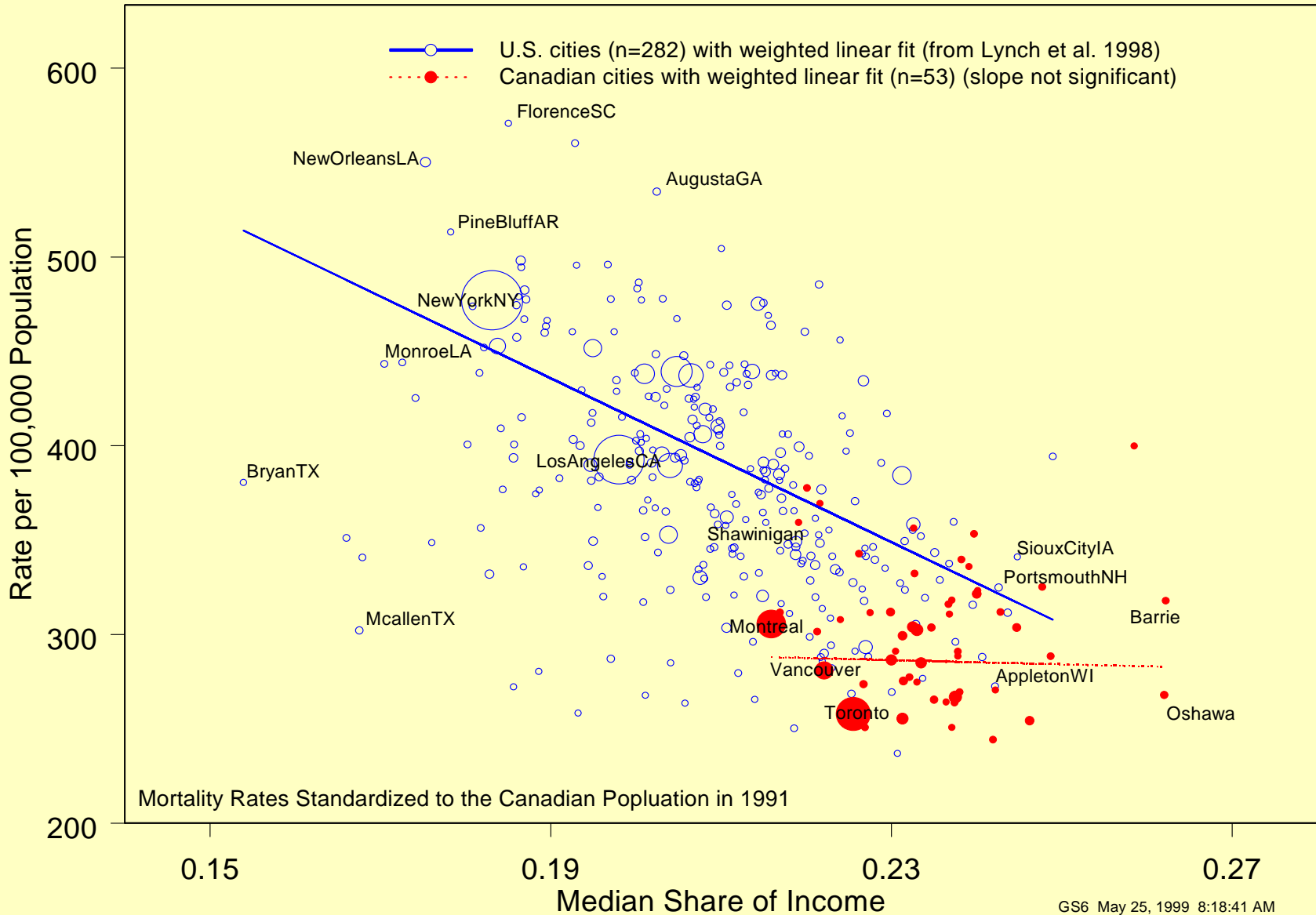
Canada–U.S. Comparative Study

- we examined the relationship between income inequality and population health in:
 - U.S. states and Canadian provinces
 - U.S. and Canadian metropolitan areas
- income inequality measure: ‘median share’
- health measure: age-adjusted mortality rate for the ‘working-age’ (25-64) population

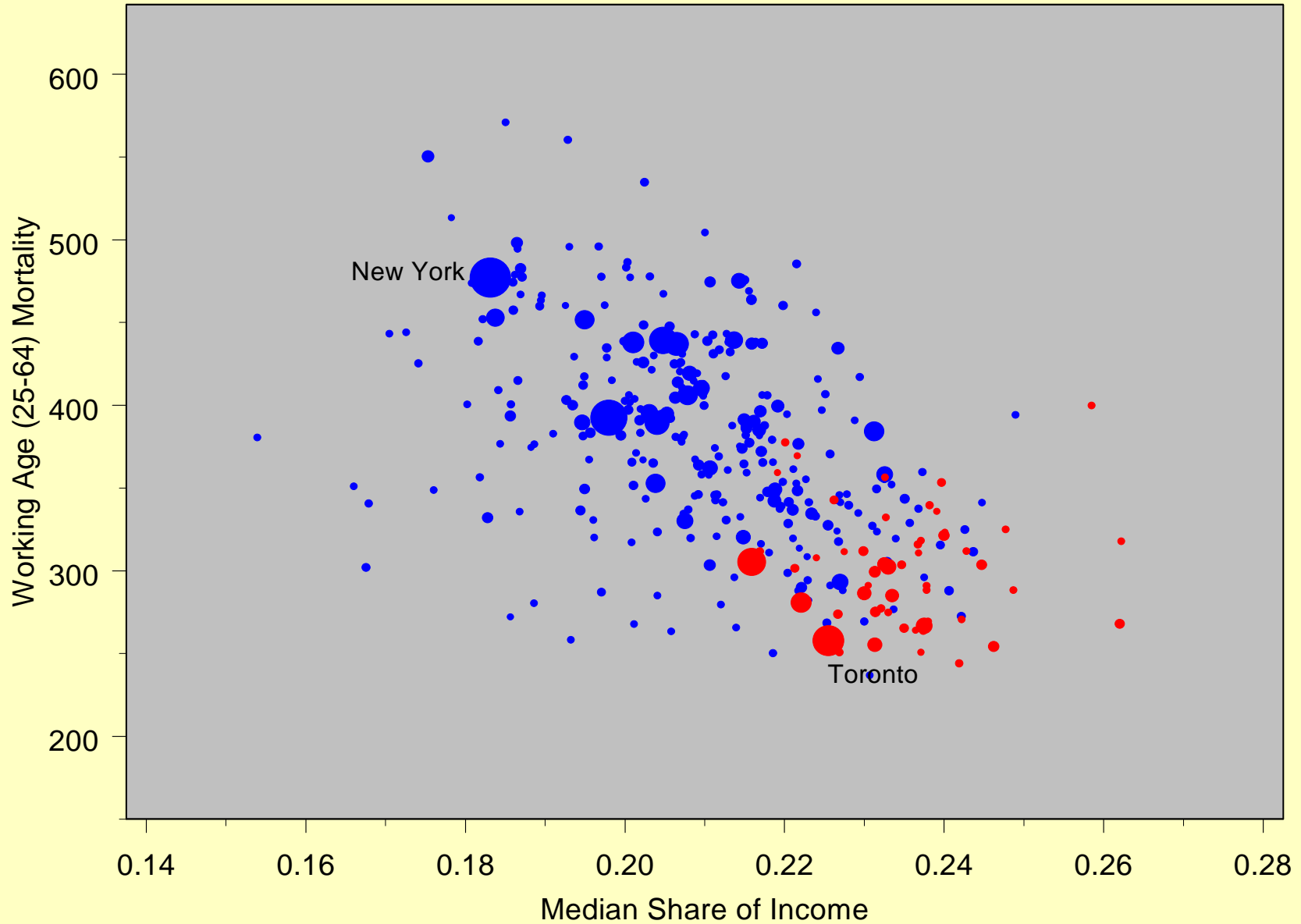
Working-Aged Male (25-64) Mortality by Median Share U.S. States and Canadian Provinces



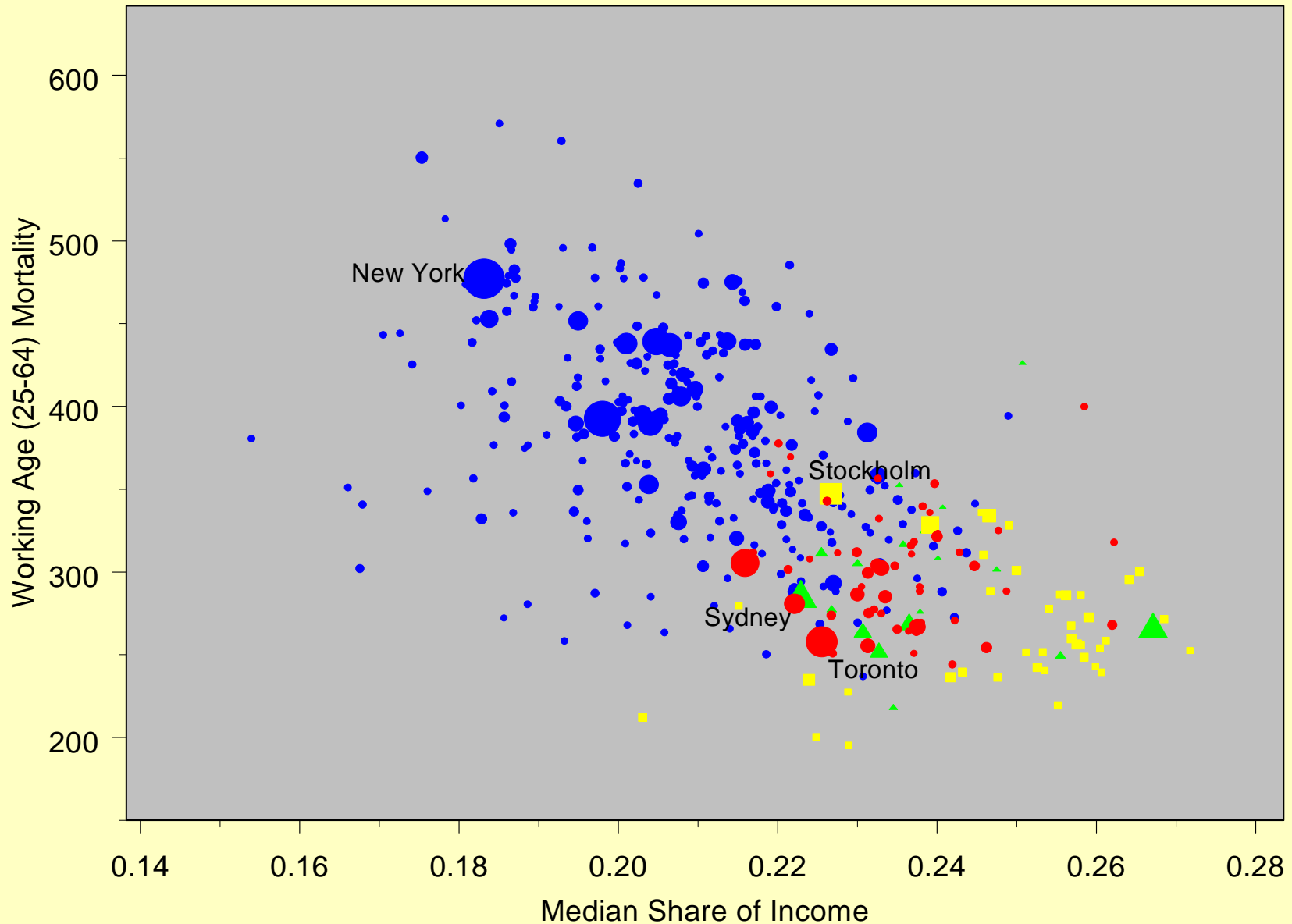
Working Age (25-64) Mortality by Median Share U.S. and Canadian Metropolitan Areas



Income Inequality and Working-Age Mortality North American Metropolitan Areas, 1990/91

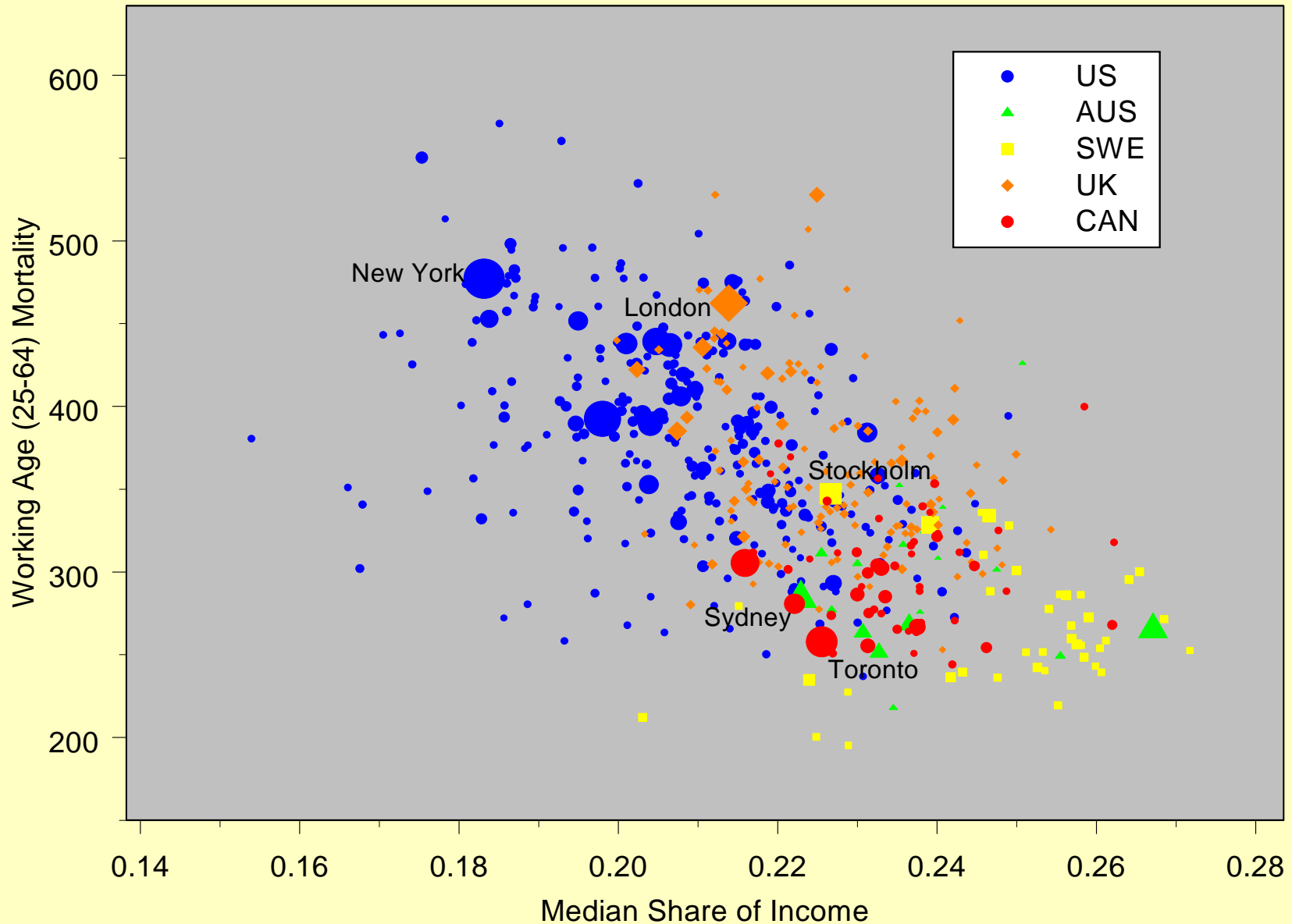


Income Inequality and Working-Age Mortality Metropolitan Areas in Four Countries, 1990/91



Income Inequality and Working-Age Mortality

528 Metropolitan Areas in Five Countries, 1990/91

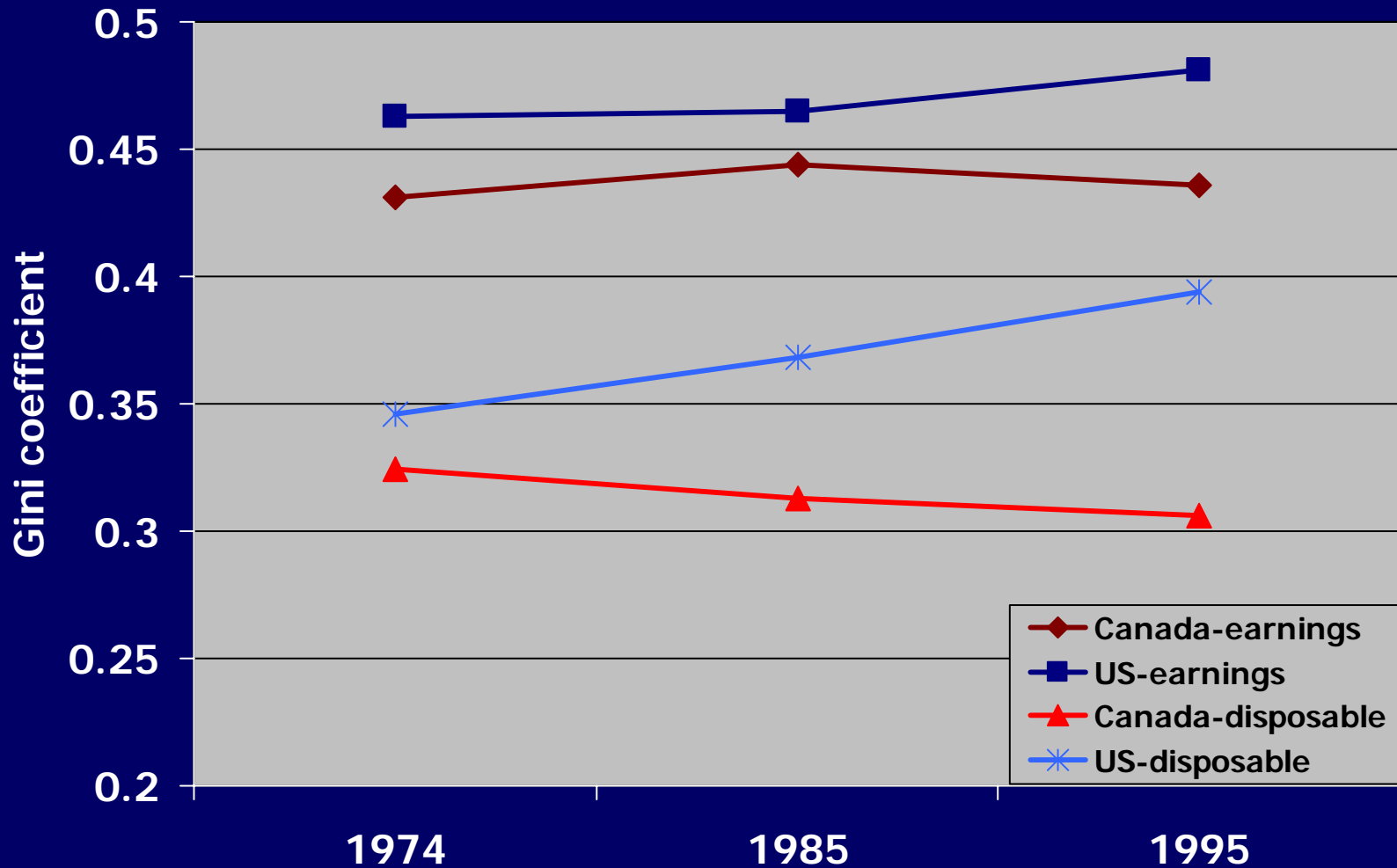


Urban Income Inequalities & Health: Why the Canada - U.S. Differences?

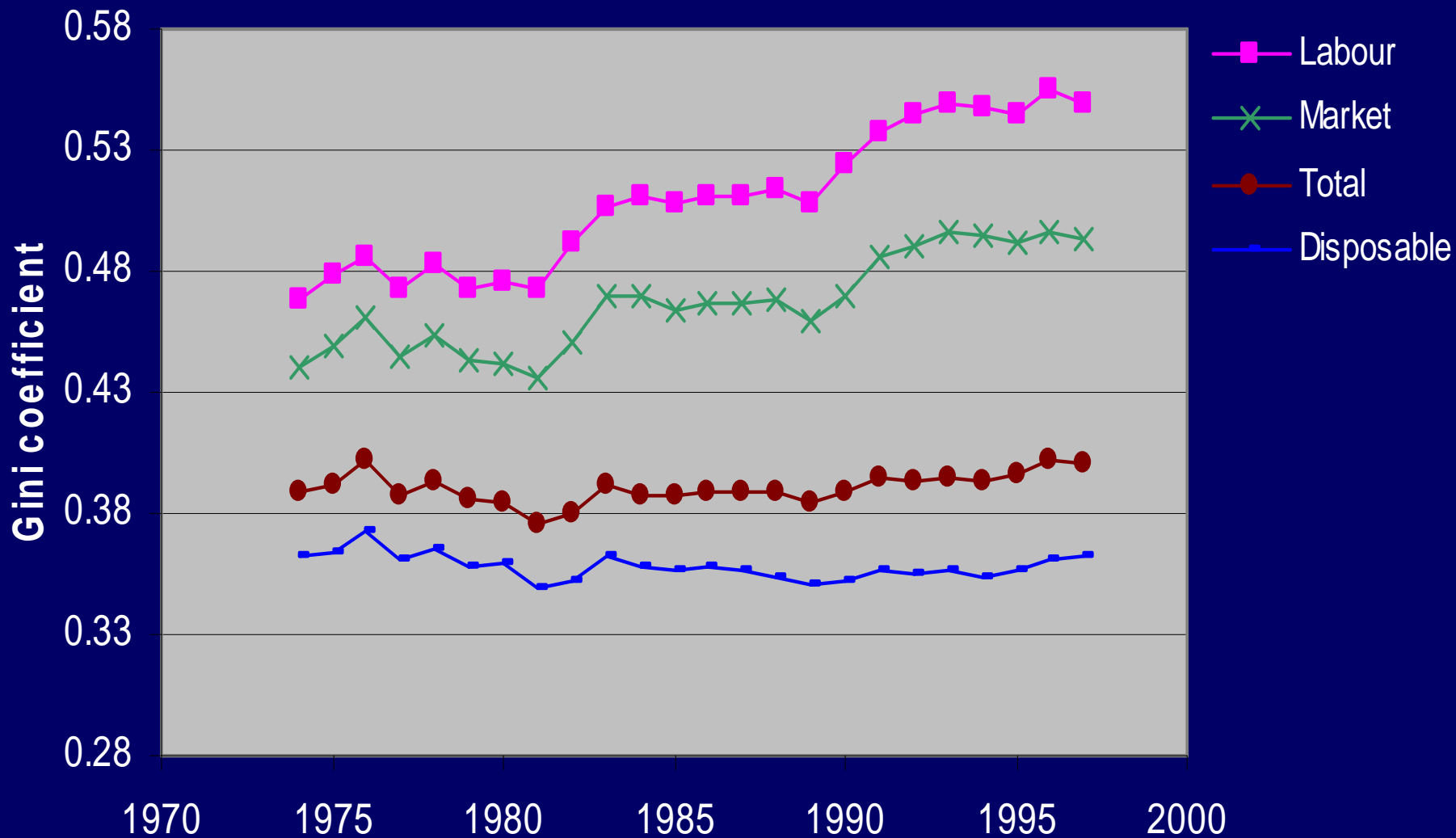
Urban Income Inequalities & Health: Why the Canada - U.S. Differences?

- Canadian public policy redistributes income effectively

Trends in Income Inequality, Canada and the U.S. 1974-1995

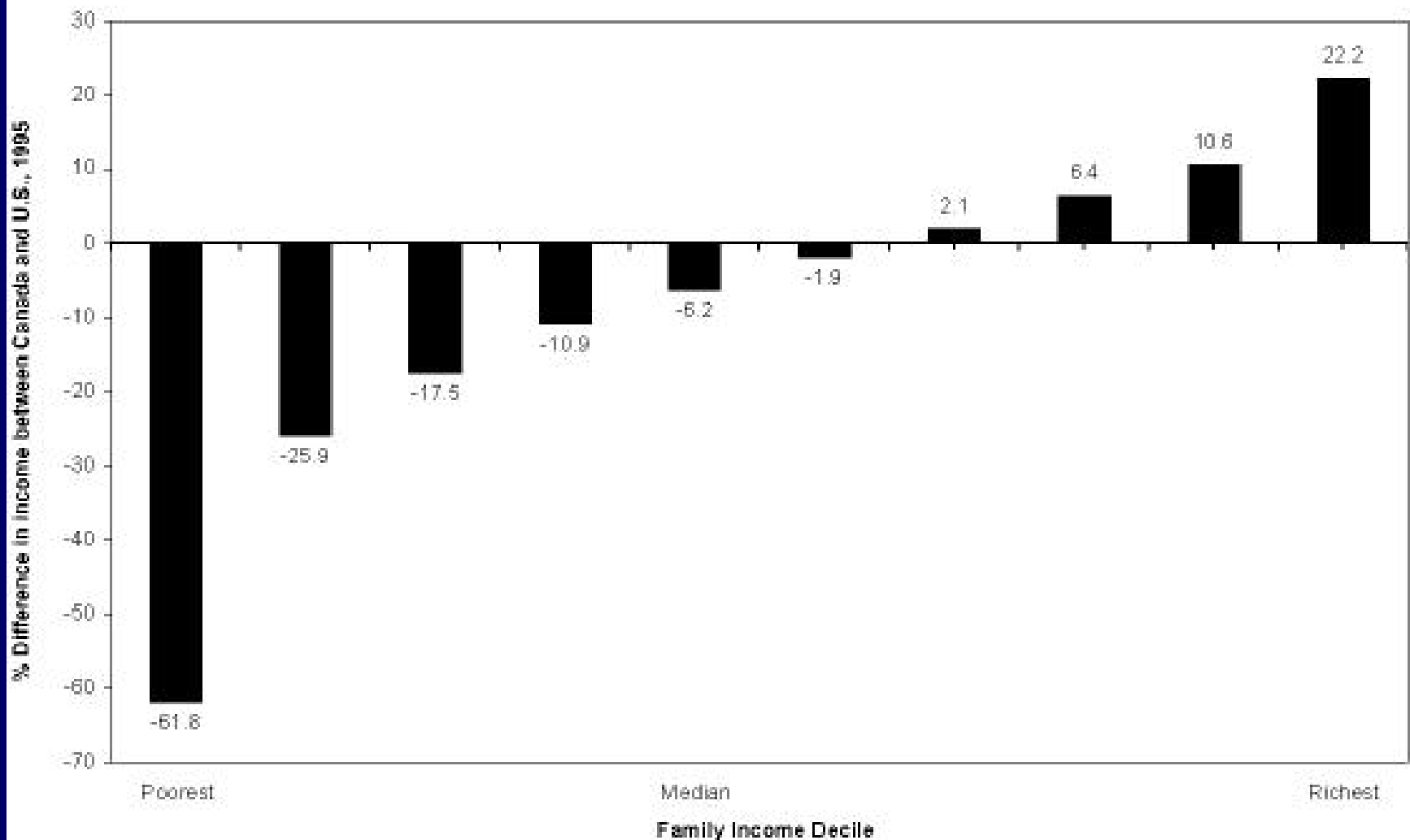


Trends in Income Inequality: Canada, 1971-1997



Canada-U.S. Disposable Income Adjusted for PPP 1995

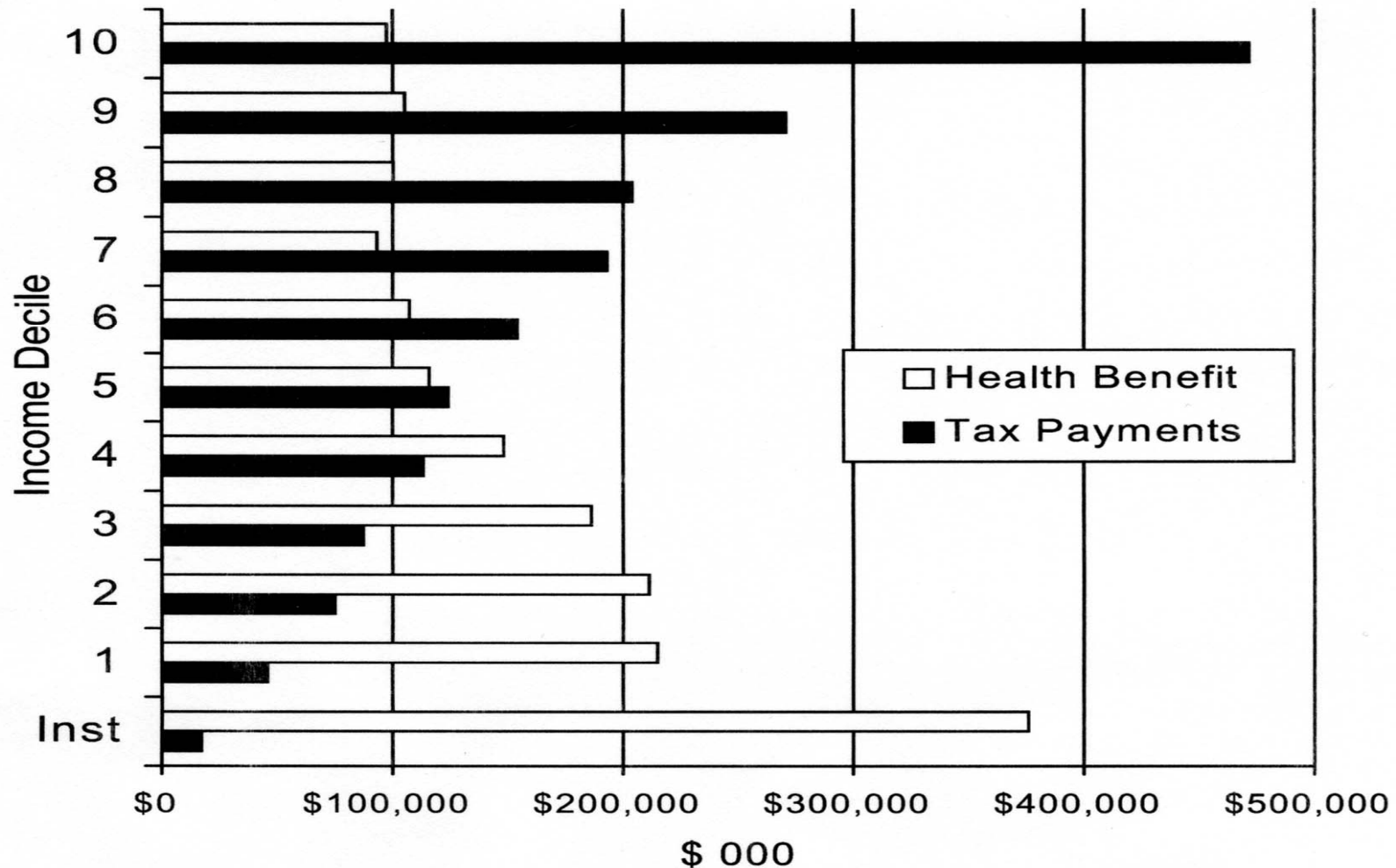
Most Americans Have Less Disposable Income than Canadians



Urban Income Inequalities & Health: Why the Canada - U.S. Differences?

- Canadian public policy redistributes income effectively
- 'social wage' distributed by markets in U.S.
 - => income affects life chances more
- health care?
 - primary care
 - redistributive impact of non-cash benefit

Incidence of Taxation and Incidence of Health Care Benefits, By Economic Family Income Decile, Manitoba 1994



Source: Mustard, et al. (1998)

Table 1: Comparison of Health Care Systems in Canada and the U.S.¹⁰

| | Canada | United States |
|-----------------------------------|---------------|----------------------|
| Health Costs as Percentage of GNP | 9% | 14% |
| Health Spending Per Capita | \$2,250 | \$4,270 |
| Percent of Population Uninsured | 0% | 17% |
| Life Expectancy for Men, 1997 | 75.7 yrs. | 73.6 yrs. |

Source: Himmelstein D, *et al.* 2001. *Bleeding the Patient*. Maine: Common Courage Press.

Real Income (Effective Income)

“all receipts which increase an individual’s command over the use of a society’s scarce resources - in other words his net accretion of economic power between two points of time...Hence income is the algebraic sum of (1) the market value of rights exercised in consumption, and (2) the change in value of the store of property rights between the beginning and end of the period in question”

(Titmuss, R. 1962. *Income Distribution and Social Change*, p. 32)

Table 2: Taxes, Public Spending and Private Costs in British Columbia and Washington

| | BC | WA | The BC Advantage |
|--|---------|---------|------------------|
| Total provincial and local taxes (two income family earning \$55,000 CAN at PPP), 1998 | \$6,518 | \$4,855 | -\$1,663 |
| Public program spending per capita, 1998 | \$4,983 | \$3,865 | \$1,118 |
| Average university tuition, undergraduate, 2000 | \$2,300 | \$3,950 | \$1,650 |
| Average college tuition, undergraduate, 2000 | \$1,700 | \$1,969 | \$269 |
| Average expenditure: water, fuel, electricity, 2000 | \$1,216 | \$1,756 | \$540 |
| Average expenditure: health care, 1998 | \$1,499 | \$2,267 | \$768 |
| Average expenditure: personal insurance and pension contributions (including life insurance and social security contributions), 1998 | \$2,632 | \$4,937 | \$2,305 |

Source: Vogel, D. 2001. *“Competitiveness” and Well-Being in British Columbia and Washington State*. Vancouver: Canadian Centre for Policy Alternatives, B.C. Division.

Table 3: Inequality and Benefits in British Columbia and Washington

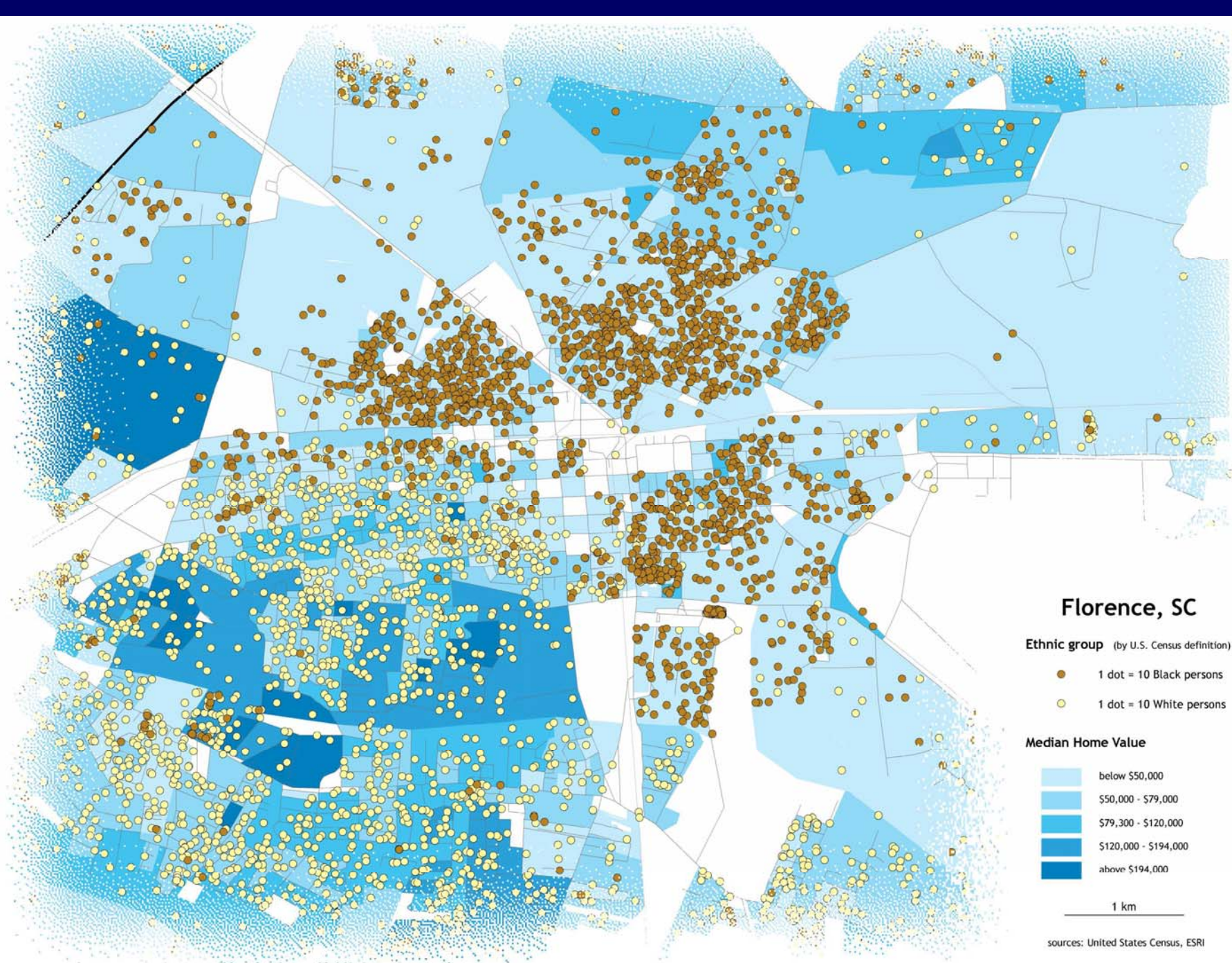
| | BC | WA |
|--|--------------|--------------------------------------|
| Annual social assistance income for single parent family with one child (WA in \$CAN at PPP), 2001 | \$13,660 | \$8,500 |
| Number of individuals without health insurance, 1999 | 0 | 910,000 (15% of total population) |
| Ratio of total family income, top 20% to bottom 20%, 1998 | 6.2 to 1 | 9.2 to 1 |
| Ratio of total family income, top 20% to bottom 20%, 1989 | 5.2 to 1 | 7.0 to 1 |
| Weeks of paid maternity leave, guaranteed by law | 52 (paid) | 12* (unpaid) |
| Infant mortality per 1,000 births, 1998 | 4.03 | 5.7 |

* this benefit is only extended to women working in workplaces with more than 50 employees. It applies to just 55% of the workforce

Source: Vogel, D. 2001. *“Competitiveness” and Well-Being in British Columbia and Washington State*. Vancouver: Canadian Centre for Policy Alternatives, B.C. Division.

Urban Income Inequalities & Health: Why the Canada - U.S. Differences?

- Canadian public policy redistributes income effectively
- 'social wage' distributed by markets in U.S.
=> income affects life chances more
- health care?
 - primary care
 - redistributive impact of non-cash benefit
- race?
 - tightly linked to inequality, poverty & segregation in U.S.
 - explanatory power of 'proportion black' inadequate



Florence, SC

Ethnic group (by U.S. Census definition)

- 1 dot = 10 Black persons
- 1 dot = 10 White persons

Median Home Value

- below \$50,000
- \$50,000 - \$79,000
- \$79,300 - \$120,000
- \$120,000 - \$194,000
- above \$194,000

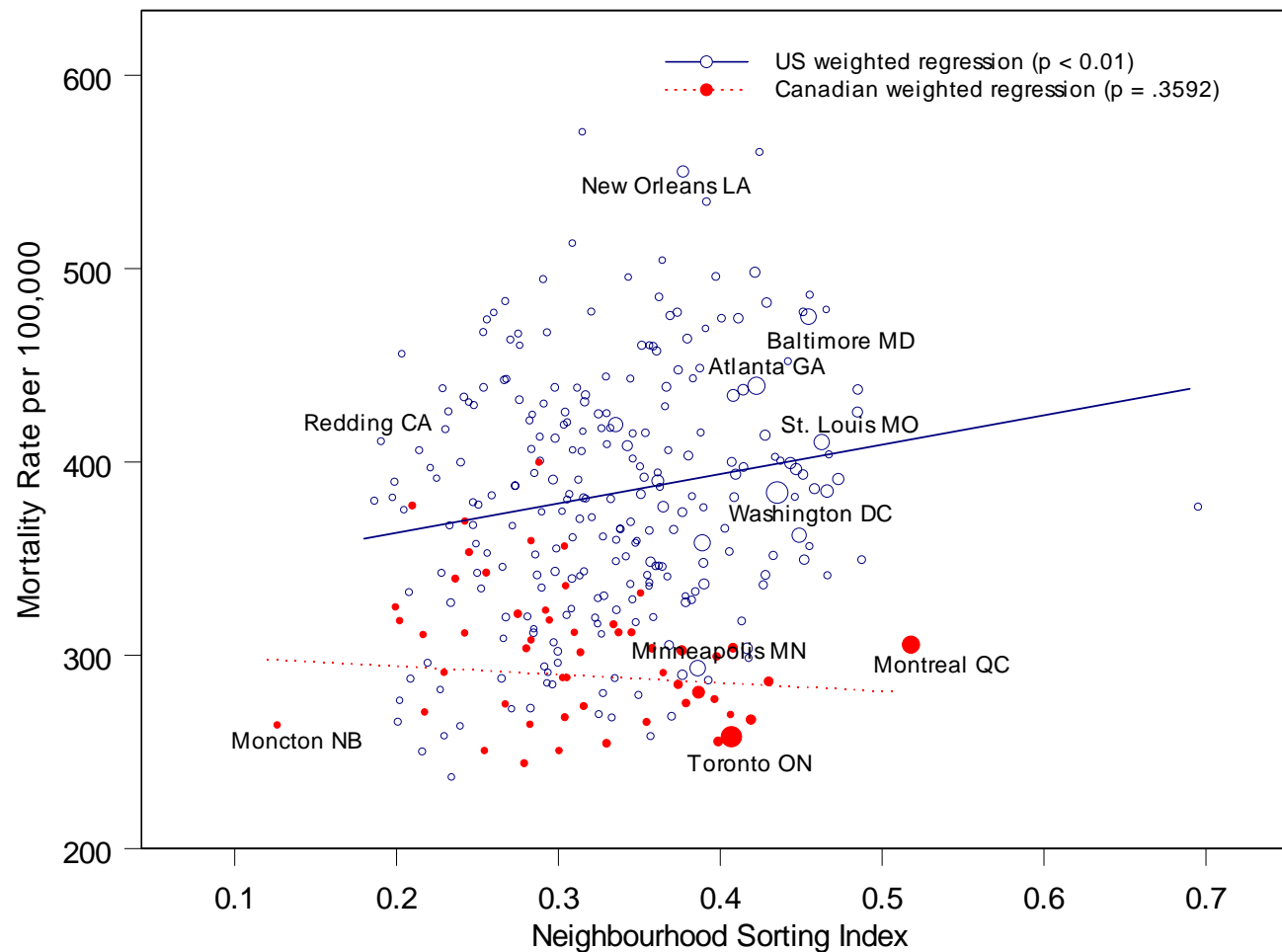
1 km

sources: United States Census, ESRI

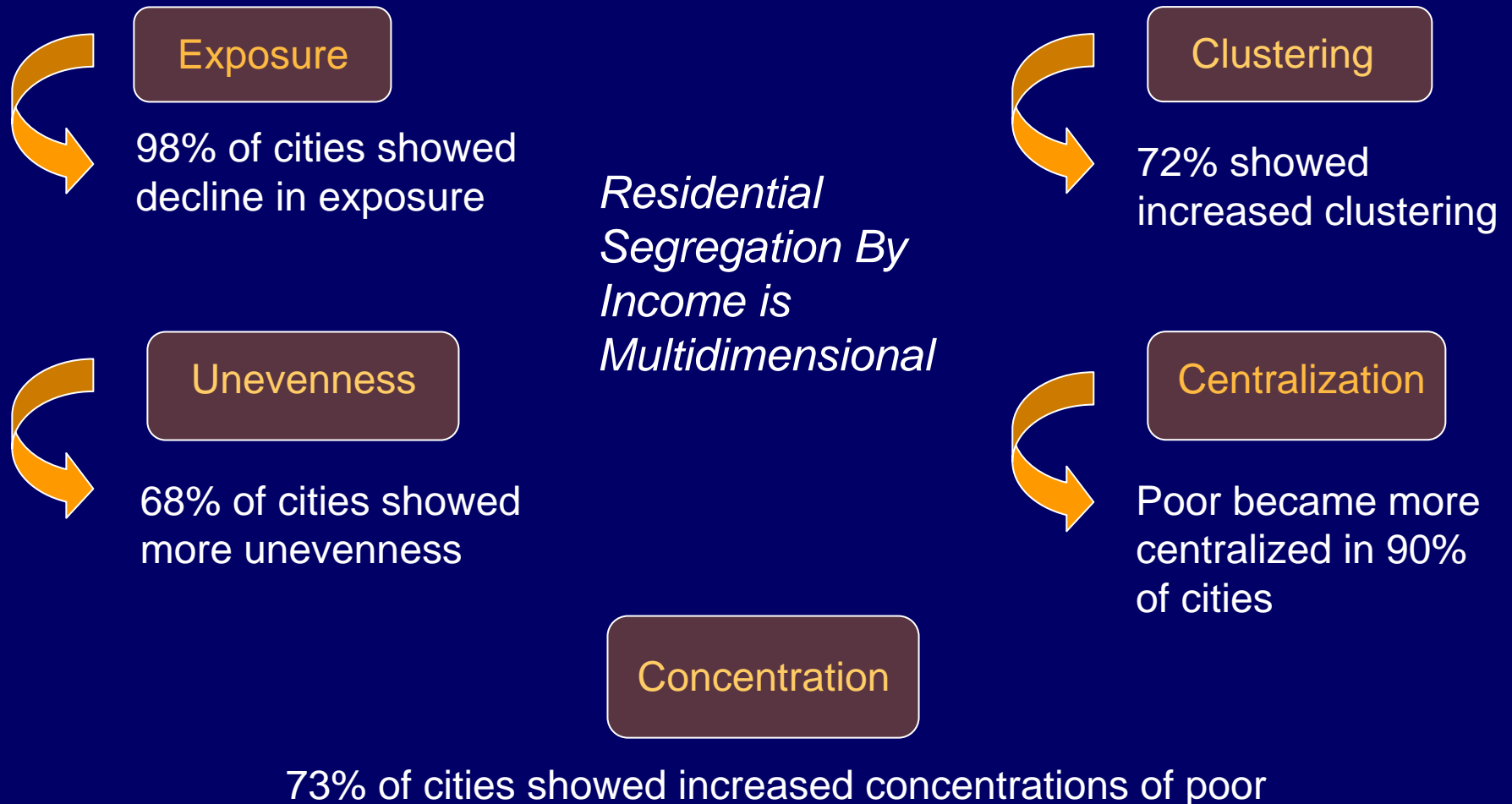
Public Goods, Segregation & Urban Population Health

- *Metropolarities* in U.S. cities: racial & economic
 - segregation => distinct social env'ts & life chances
 - e.g., spatial mismatch

Income Segregation and Mortality in North American Metropolitan Areas



Increase in all Dimensions of Segregation in Canadian Cities 1991-96



Public Goods, Segregation & Urban Population Health

- *Metropolarities* in U.S. cities: racial & economic
 - segregation => distinct social env'ts & life chances
 - e.g., spatial mismatch
 - layered on top of regressive fiscal policies
 - municipal fragmentation
 - high degree of municipal autonomy
 - high dependence on property taxes for revenue
 - severe intra-metropolitan fiscal disparities
- inequalities in capacity to provide public goods
- assisted by institutional practices & structures

Policy Implications

- preserve progressive income tax system, reduce importance of regressive sources of revenue
 - redistributive social services should be funded from progressive taxes
- reduce financial barriers to 'goods' that shape 'life chances' – health, education, housing
- social service financing and delivery options should be evaluated for social and spatial equity
 - e.g. widen the debate over municipal amalgamation, devolution, etc. to include equity as a factor
- strengthen links b/w social planning and city planning

Public Goods/Services, Income Inequality & Population Health

- one hypothesis suggested to explain income inequality & pop. health relationship:
 - places with high income inequality under-invest in human capital
 - some evidence of this in Can-U.S. comparison
 - can be quantified within the U.S.
- Our two objectives were to investigate:
 - state & local gov't expenditures ~ all-cause SMR
 - expenditures ~ income inequality ~ SMR

Key Theoretical Concepts: Real Income

- real income (or 'effective income')
 - different from cash income
 - "all receipts which increase an individual's command over the use of a society's scarce resources"
(Titmuss 1962)
 - focus on the hypothetical value of the command over resources an individual has
 - includes cash income and non-cash benefits
 - can differ from place to place depending on the bundle of public goods available

Key Theoretical Concepts: Public Goods

- there are typically positive externalities associated w/ provision of public goods
- a *public* good must satisfy two conditions:
 - joint supply or non-rivalness: once a good is provided to one person, it can be supplied to others at no additional cost; ALSO consumption of the good by one person does not affect the consumption of the good by others
 - non-excludability: having provided a good to one person, it is impossible to exclude anyone from enjoying its benefits regardless of WTP
- most public services are 'impure' public goods, but can still contribute to effective incomes

Data and Methods

- public expenditure data for 1987
 - Advisory Commission on Intergov'tal Relations
- Gini coefficient
 - Current Population Survey
- median household income
 - Current Population Survey, adjusted for state differences in cost of living
- all-cause mortality rates
 - DHHS – CDC Wonder Site

A Problem

- \$1 spent in State A may produce a different level of hypothetical public services than \$1 in State B
 - local wage rates, climate patterns (e.g. snowfall), population characteristics, etc. make a difference
- need to adjust expenditures for 'workload factors' => index of public services
- how much it would cost the governments in a state to provide the national average (representative) level of services?
- that said, index of public services ~ total expenditures: $R=0.946$

Example of Workload Factors and Wage Adjustment: Education

| Jurisdiction | Workload variables and weights | | | | 'Representative' total expenditures per capita (\$) ^{***} | Actual total expenditures per capita (\$) ^{***} | Index of variation in services provided (US=100) ^{****} |
|--------------|--|---|---|--|--|--|--|
| | (a) | (b) | (c) | (d) | (e) | (f) | (g) |
| | Elementary school age share of pop. (%) (weight .6) [*] | Secondary school age share of pop. (%) (weight 1.) [*] | Children in poverty share of pop. (%) (weight .25) [*] | Index of wage levels (%) ^{**} | [Estimates derived from factors (a)-(d)] | | [Actual expenditures (f) as a percentage of representative expenditures (e)] |
| US average | 11.99 | 5.85 | 5.67 | 100.0 | 891.64 | 891.64 | 100.0 |
| Alabama | 12.92 | 6.60 | 7.96 | 92.9 | 930.23 | 679.59 | 71.0 |
| Minnesota | 11.61 | 5.60 | 4.20 | 101.5 | 889.34 | 1086.07 | 124.7 |

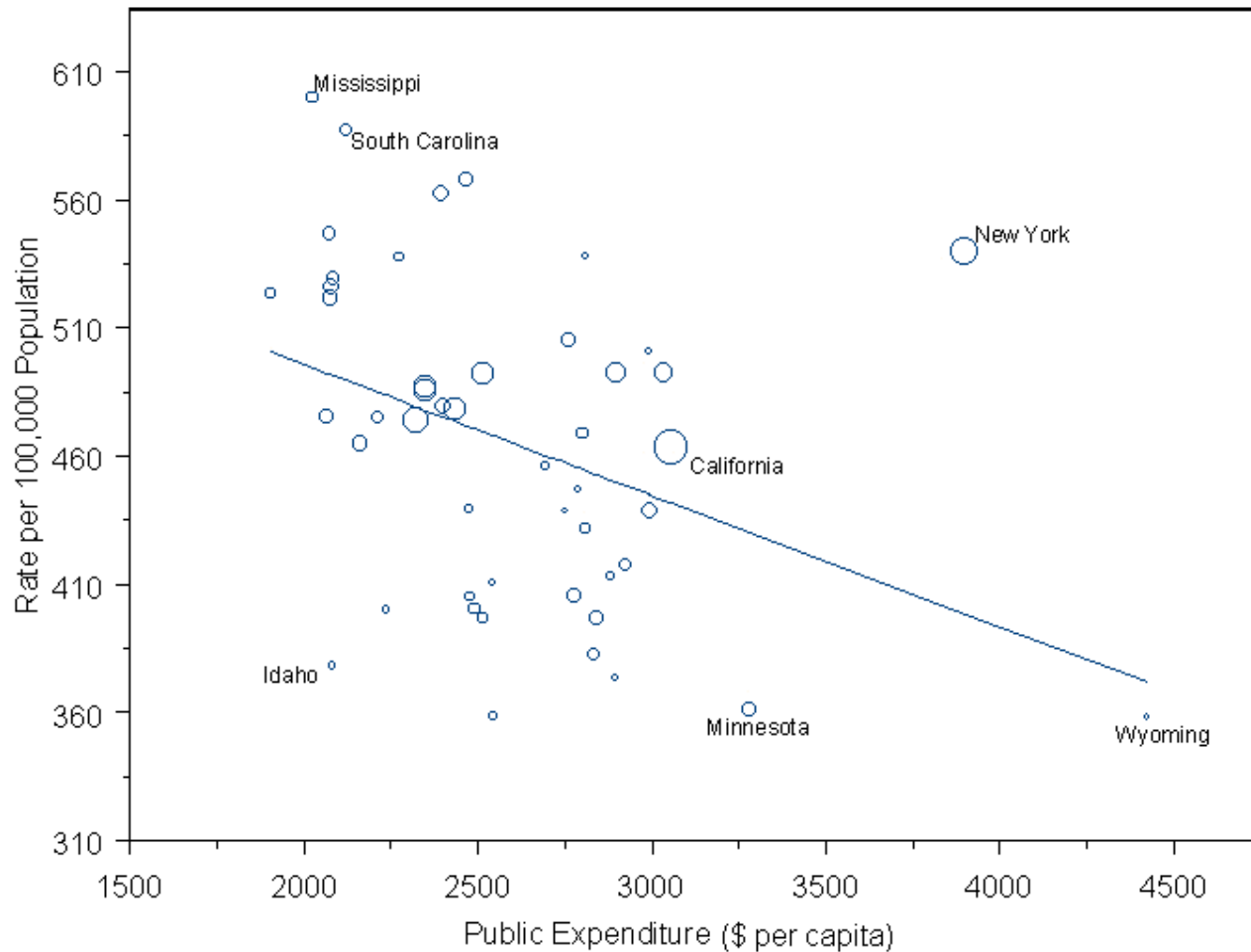
Source: ^{*} Authors' calculations using data from Rafuse 1990, 79. ^{**} Ibid., 103. ^{***} Ibid., 71, 73. ^{****} Ibid., viii.

Correlation Coefficients for Key Variables

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---------------------------------|----------|----------|----------|----------|--------|---------|---------|---|
| 1 | all-age mortality | 1 | | | | | | | |
| 2 | working-age (25-64) SMR (M) | .920*** | 1 | | | | | | |
| 3 | working-age (25-64) SMR (F) | .961*** | .933*** | 1 | | | | | |
| 4 | median state income (\$000s) | -.263 | -.393** | -.244 | 1 | | | | |
| 5 | gini of state income inequality | .505*** | .653*** | .533*** | -.501*** | 1 | | | |
| 6 | total expenditures per capita | -.378** | -.400** | -.350* | .394** | -.198 | 1 | | |
| 7 | index of public services | -.401** | -.448** | -.381** | .444** | -.337* | .946*** | 1 | |
| 8 | education expenditures p.c. | -.499*** | -.560*** | -.485*** | .420** | -.327* | .817*** | .712*** | 1 |

* p < .05; ** p < .01; *** p < .001

Expenditures on Public Services and Working-Age Mortality



Public Expenditures and Mortality, U.S. States, 1987

| | All-age (M/F) mortality | Working-age mortality (M) | Working-age mortality (F) |
|--|--|------------------------------|------------------------------|
| | Regression coefficients (Adjusted R ²) | | |
| | Actual Expenditures (\$00/capita) | | |
| Total | -4.5* (.125) | -7.9** (.142) | -3.0* (.103) |
| Primary & secondary education | -18.9** (.147) | -36.2** (.203) | -13.7** (.144) |
| Higher education | -36.8** (.184) | -65.6** (.216) | -25.4** (.179) |
| Public welfare | -8.3 (.005) | -16.2 (.016) | -6.5 (.009) |
| Health and hospitals | 9.2 (-.002) | 23.8 (.027) | 6.3 (-.004) |
| Highways | -29.9** (.186) | -55.6** (.238) | -23.7** (.222) |
| Police and corrections | 2.4 (-.021) | 12.5 (-.018) | 13.0 (.002) |
| Environment and housing | -36.5* (.086) | -60.6* (.087) | -22.1 (.052) |
| Interest on general debt | -15.2 (.009) | -30.5 (.023) | -8.9 (-.002) |
| General govt. administration | -53.2* (.089) | -96.7* (.112) | -29.7 (.043) |
| All other | -10.5 (.012) | -15.4 (.004) | -6.6 (.024) |

Regression Models: Income Inequality, Public Goods & Mortality (M)

| Age group and model | Intercept | Median Income (\$000s) | Gini | Expenditure per capita (\$ 00s)/ public services index | Adjusted R ² (significance of F-statistic) |
|---|------------|------------------------|-----------|--|---|
| Male, working-age (25-64), all-cause mortality | | | | | |
| median income | 942.054*** | -12.838** | | | .136* |
| gini coefficient of income inequality | -395.989* | | 24.415*** | | .415*** |
| median income, gini | -255.825 | -2.840 | 22.787*** | | .407*** |
| median income, gini, total public expenditures | -203.289 | .894 | 22.783*** | -5.700* | .470*** |
| median income, gini, public services index | -158.113 | .289 | 21.312*** | -1.196* | .451*** |
| median income, gini, total education expenditures | -64.954 | 1.665 | 20.455*** | -23.457** | .533*** |

Regression Models: Income Inequality, Public Goods & Mortality (F)

| Age group and model | Intercept | Median Income (\$000s) | Gini | Expenditure per capita (\$ 00s)/ public services index | Adjusted R ² (significance of F-statistic) |
|--|------------|------------------------|----------|--|---|
| Female working-age (25-64), all-cause mortality | | | | | |
| median income | 418.809*** | -3.525 | | | .039 |
| gini coefficient of income inequality | -35.229 | | 8.801*** | | .269*** |
| median income, gini | -57.415 | .450 | 9.059*** | | .254** |
| median income, gini, total public expenditures | -33.419 | 2.155 | 9.057*** | -2.603* | .318*** |
| median income, gini, public services index | -12.995 | 1.872 | 8.388** | -.554 | .297*** |
| median income, gini, total education expenditures | 25.417 | 2.405 | 8.047** | -10.179** | .371*** |

Discussion

- total public expenditures strongly related to mortality in U.S. States in 1987
- particularly strong relationship for education expenditures
 - esp. higher education for working-age males
- expenditures on health & hospitals unrelated to mortality, even after adjust
- ecological relationship between income inequality & mortality:
 - robust to control for median state income
 - attenuated only slightly by addition of public expenditures / public services index

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