Measuring Health

Michael Wolfson, uOttawa

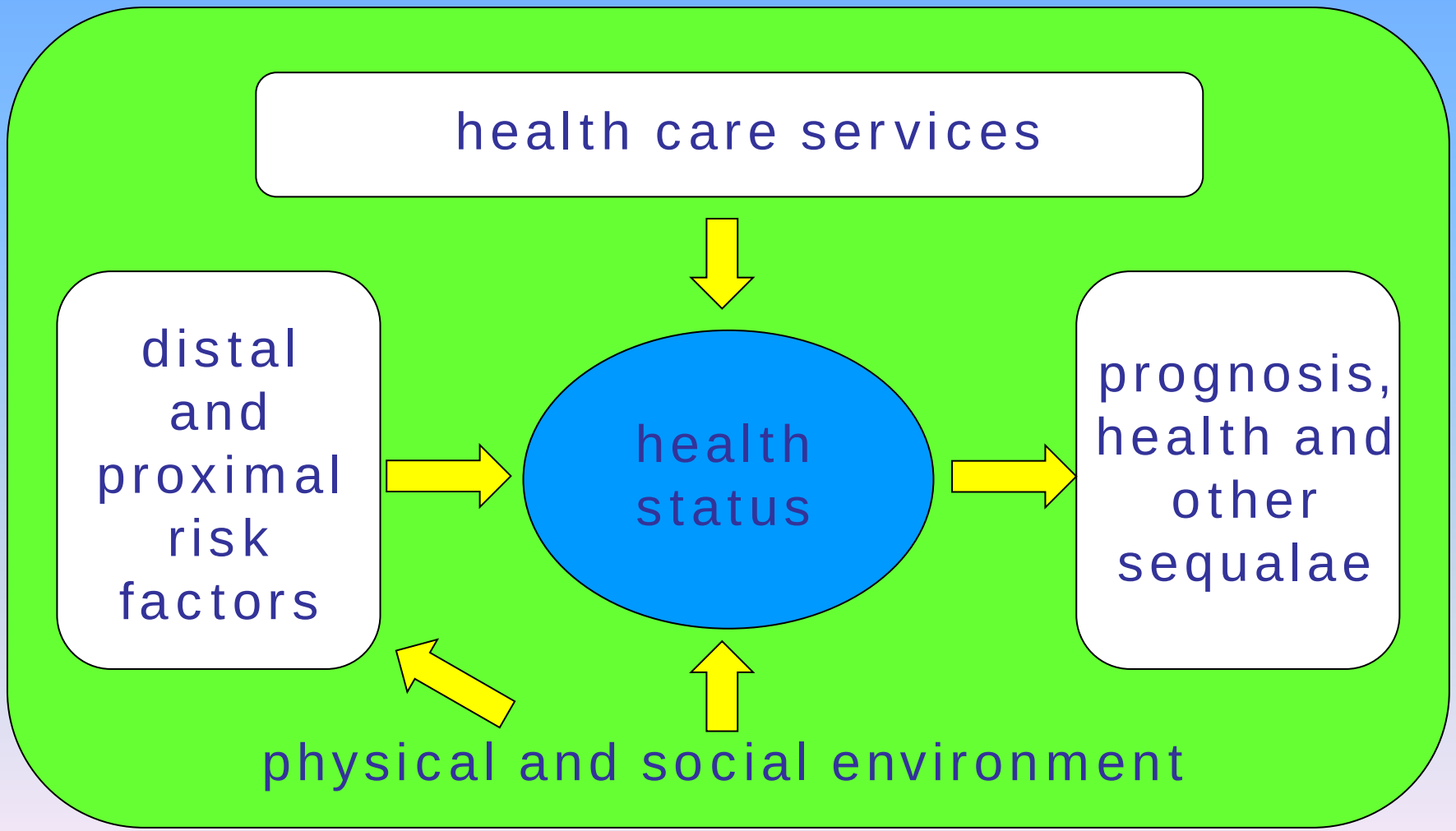
on the Occasion of the 50th Anniversary of the National Center for Health Statistics, August 2010

- why measure health
- concepts of health
- indicatoritis
- ideas for progress

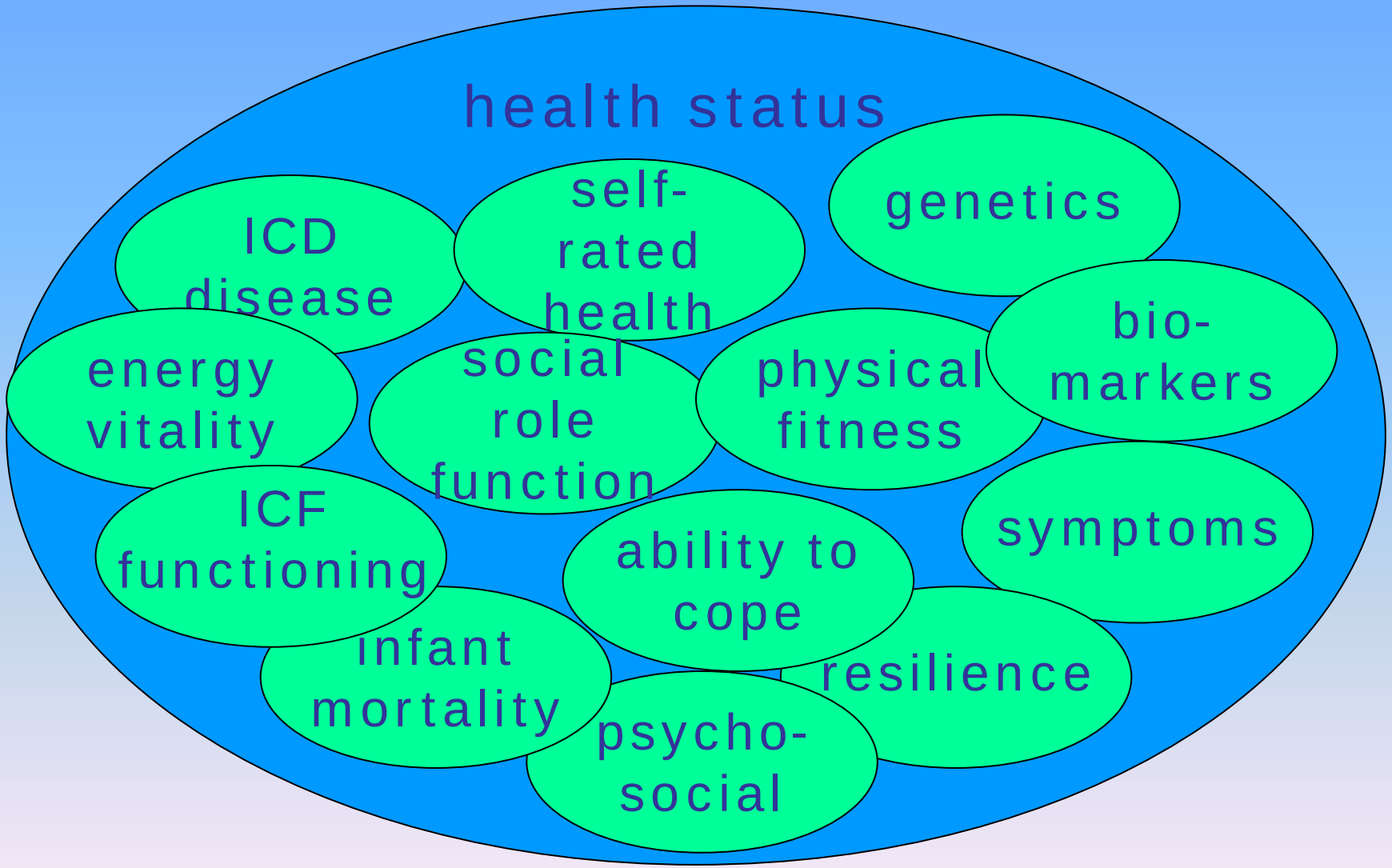
Why Measure Health (or Illth)?

- health is a major pre-occupation for almost everyone – we all want to be as healthy as possible
- our societies spend huge amounts on health care – to what avail?
- myriad activities of individuals and organizations affect health – both intentionally (e.g. hospitals) and inadvertently (e.g. zoning, transportation)
- having impressive numbers often helps win debates / “you get what you measure” / “you can’t manage what you don’t measure”
- health status is the “bottom line”

Health Status – What it is, and is Not



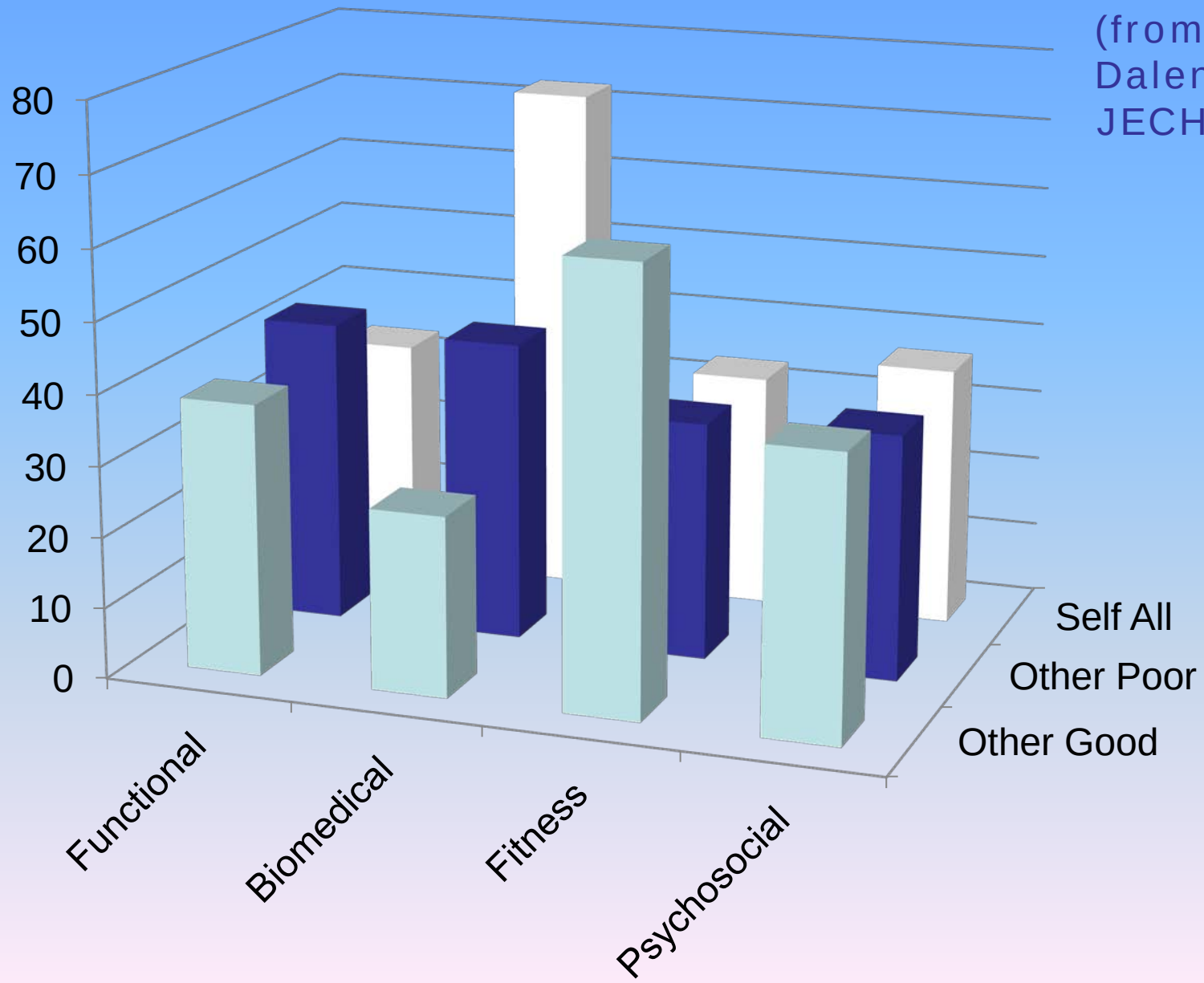
Health Status – Myriad Concepts



Canadian Health Measures Survey (CHMS) – Mobile Examination Clinic

THANKS to NHANES and NCHS!!!

Health Status – Lay Concepts



(from van Dalen et al, JECH 1994)

Health Status – Positive Health

- WHO Constitution: "Health is a state of complete physical, mental and social well-being and *not merely the absence of disease* or infirmity"
- is positive health simply the opposite of disease?

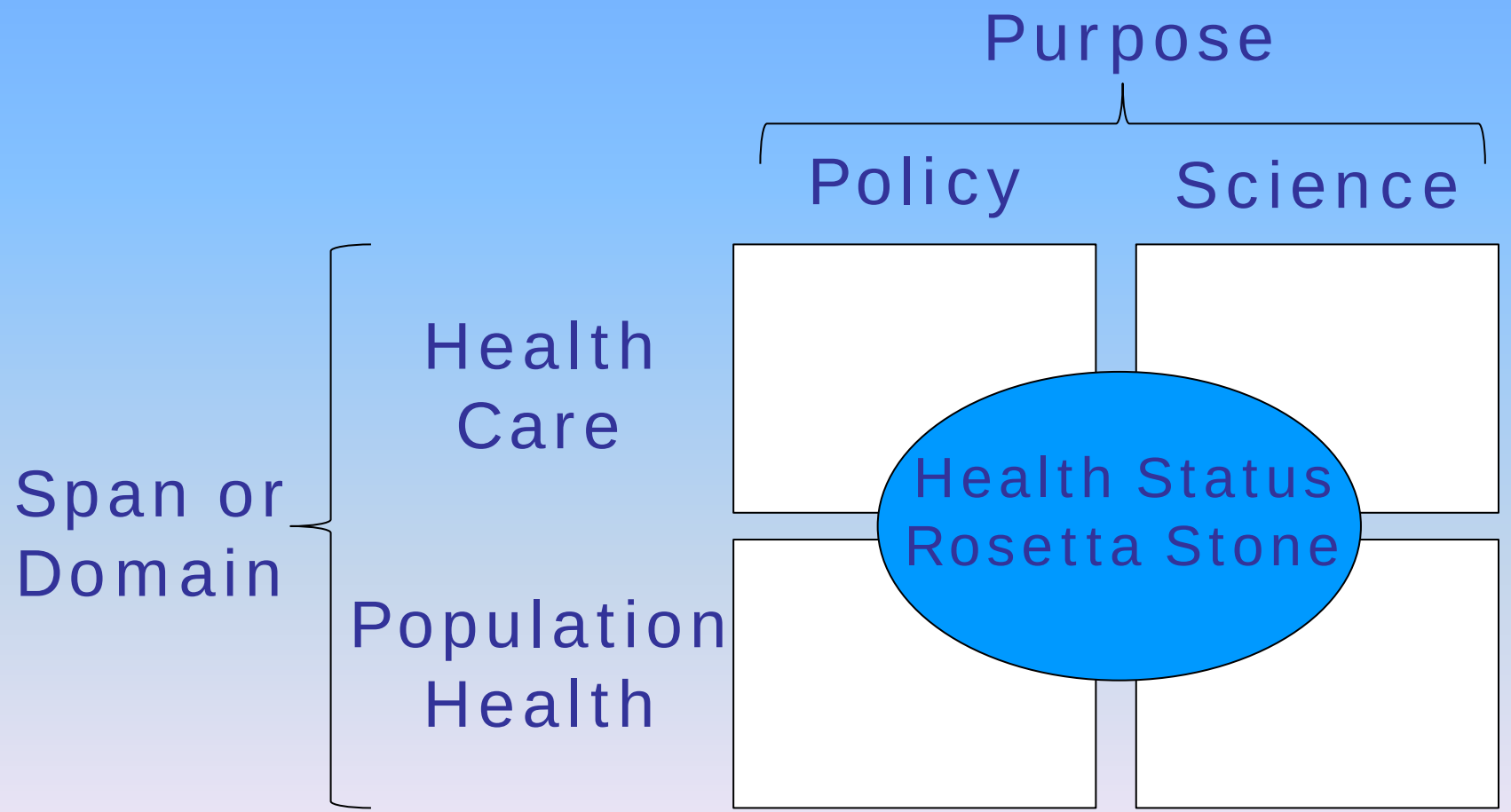
"Yucky" ← "OK" → "Great!"

- or is it something completely different?

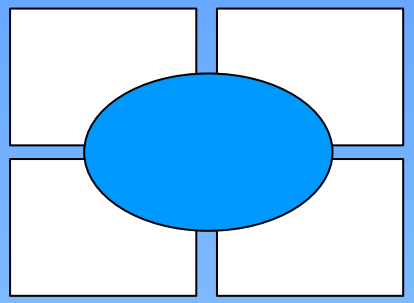
Health Status – Positive Health

- positive health is about resilience ⇒ intrinsically dynamic ⇒ can only be determined via repeated observation ⇒ longitudinal data required
- idea: “what are the risk factors for chronic good health?” (Wilk TF, 1991)
- e.g. M. Kaplan et al. on the “factors associated with thriving” where thriving ≡ repeatedly being in “good” health (J Geront 2008)

Health Status – Why Measure, and the “Rosetta Stone”



Health Status – Why Measure



- health care / science
  - RCTs for Rx, health technology assessments (HTA), “what works”
- health care / policy
  - improve quality and cost-effectiveness
- population health / science
  - understand determinants, evaluate interventions
- population health / policy
  - overall trends, compression of morbidity, aging, health impact assessment (HIA) for a broader range of (often non-health) policies

Why Measure – US Health Care Costs

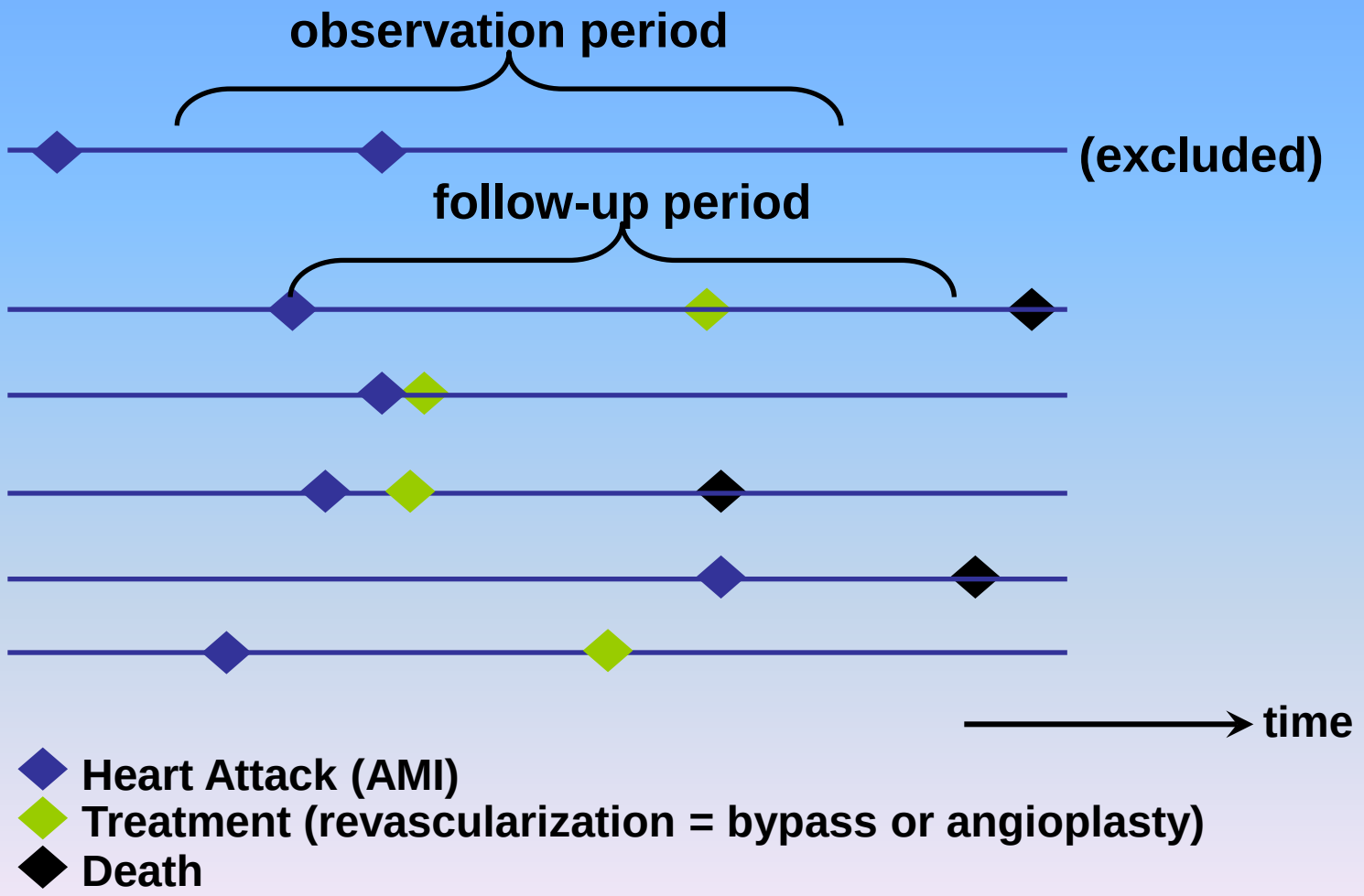
- "It has been estimated that 20-30 percent of expenditures dedicated to health care employ either **over-, under-, or misutilization** of medical treatments and technologies, relative to the evidence of their effectiveness (Skinner et al., 2005). Despite 60 percent more frequent physician visits, testing, procedures, and use of specialists and hospitals in high-spending areas in the United States, **no differences in quality** result (Fisher et al., 2003). Perhaps up to two-thirds of spending increases in recent years have been due to the emergence of new medical technologies that may yield **marginal enhancement of outcome** or may benefit only a small number of patients (Cutler, 1995; Newhouse, 1992; Smith et al., 2000)." (IoM, "Value in Health Care: Accounting for Cost, Quality, Safety, Outcomes, and Innovation", 2010)

- http://www.iom.edu/Reports/2009/Value-in-Health-Care-Accounting-for-Cost-Quality-Safety-Outcomes-and-Innovation.aspx

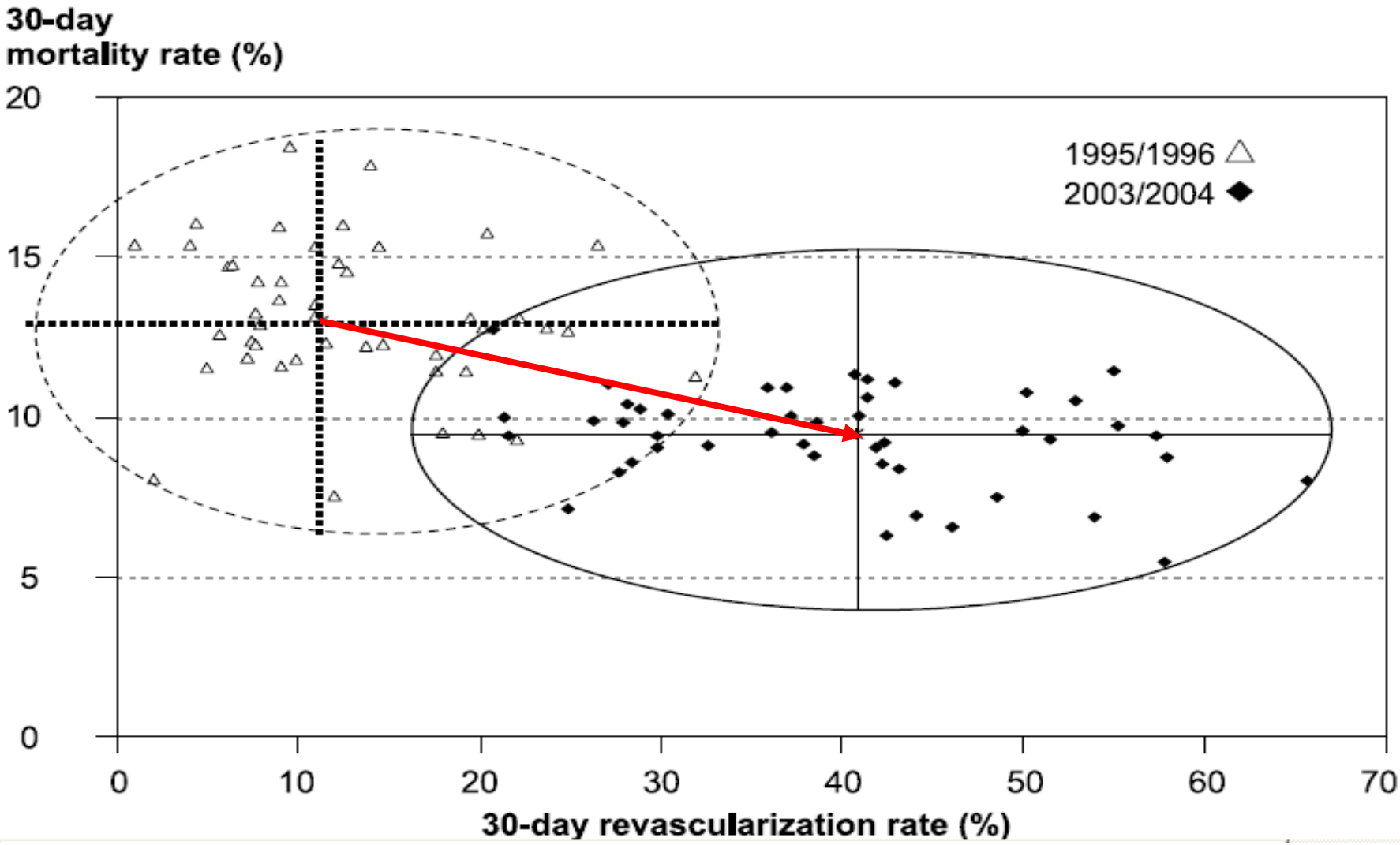
Why Measure – Canadian AMI and Revascularization Example

- builds on longstanding small area variations literature
- moves beyond procedure rate variations to connect
  - cardiac events – AMI
  - health care procedures – revascularization
  - (crude) measure of health status / outcome – 30-day mortality

Underlying Patient Trajectory Information for Heart Attack / Revascularization Analysis



Heart Attack Survival in Relation to Treatment by Health Region, Seven Provinces



Johansen et al., 2009

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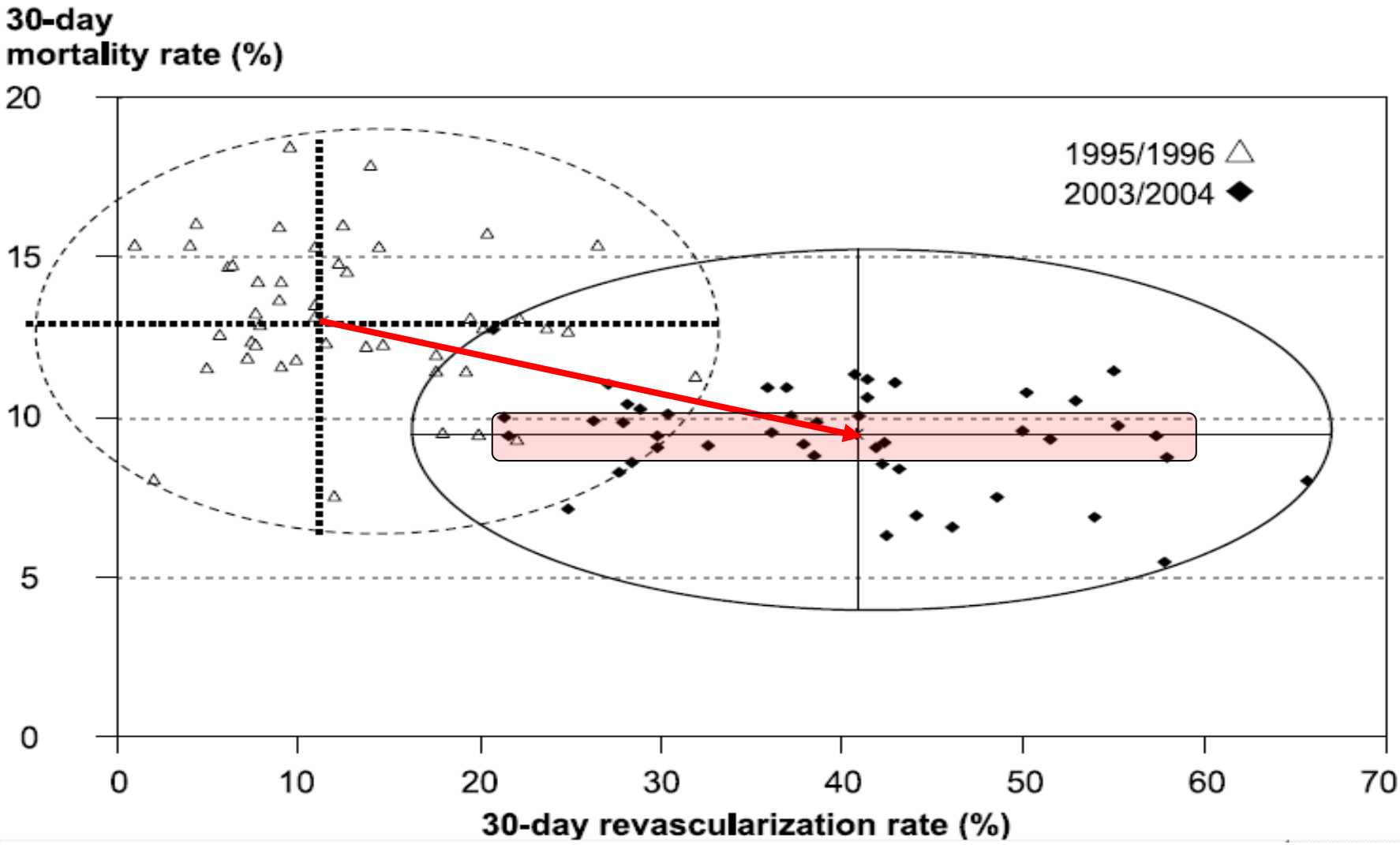


Johansen et al., 2009

Important Caveats for the AMI → Revascularization → Mortality Results

- other clinical aspects of treatment not taken into account, e.g. thrombolysis, post discharge Rx
- no risk factors considered – e.g. obesity, physical fitness, smoking, hypertension, lipids
- no socio-economic factors considered
- n.b. in related analysis, co-morbidity (Charlson Index) was included, with one-year (versus 30 day) mortality follow-up – results essentially unchanged
- revascularization is also intended to relieve symptoms, but ***no health-related quality of life data*** available

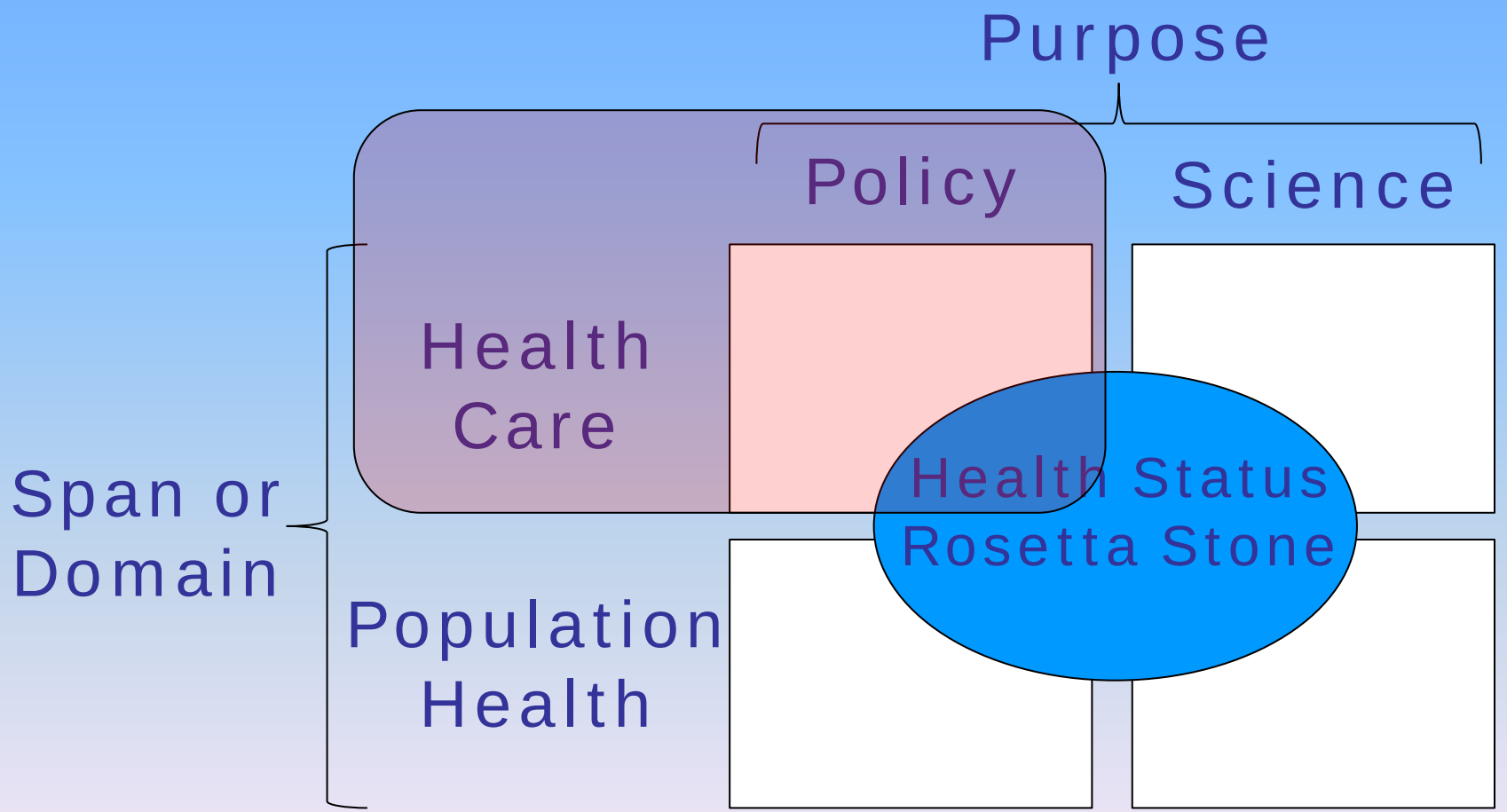
Codman's End Results

- "merely the common-sense notion that every hospital should follow every patient it treats, long enough to determine whether or not the treatment has been successful, and then to inquire 'if not, why not?' with a view to preventing a similar failure in the future."
- based on an "end result card" on which were to be entered "in the briefest possible terms," the symptoms, the diagnosis that governed the treatment, the treatment plan, the complications that occurred in the hospital, the diagnosis at discharge, and "the result each year afterward, until a definitive determination of the results could be made. (quoted in Donabedian, Millbank, 1989)

Berwick on Codman (1989)

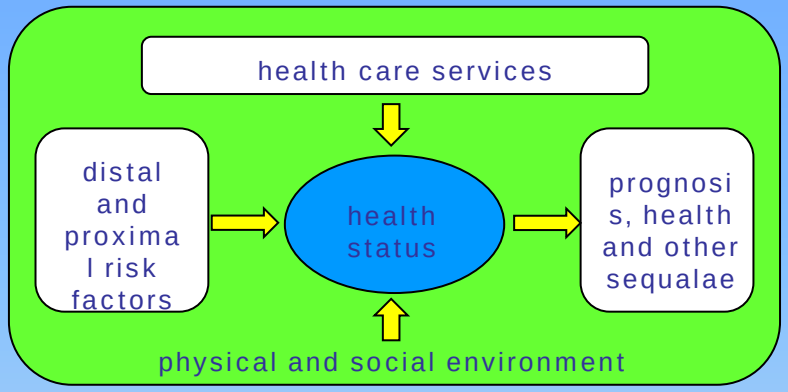
- "…the average health care provider of today goes on as if Codman never lived. Ask a doctor about outcome measures; search a hospital for its end results recording system; study a nursing home for its continual improvement of process based on systematically acquired data from patients. Nearly a century after Codman began, none will be found.
- "Why not? Codman met in his time the resistance of arrogance, the molasses of complacency, the anger of the comfortable disturbed." (Millbank, 1989)

Health Status – Why Measure, and the “Rosetta Stone”



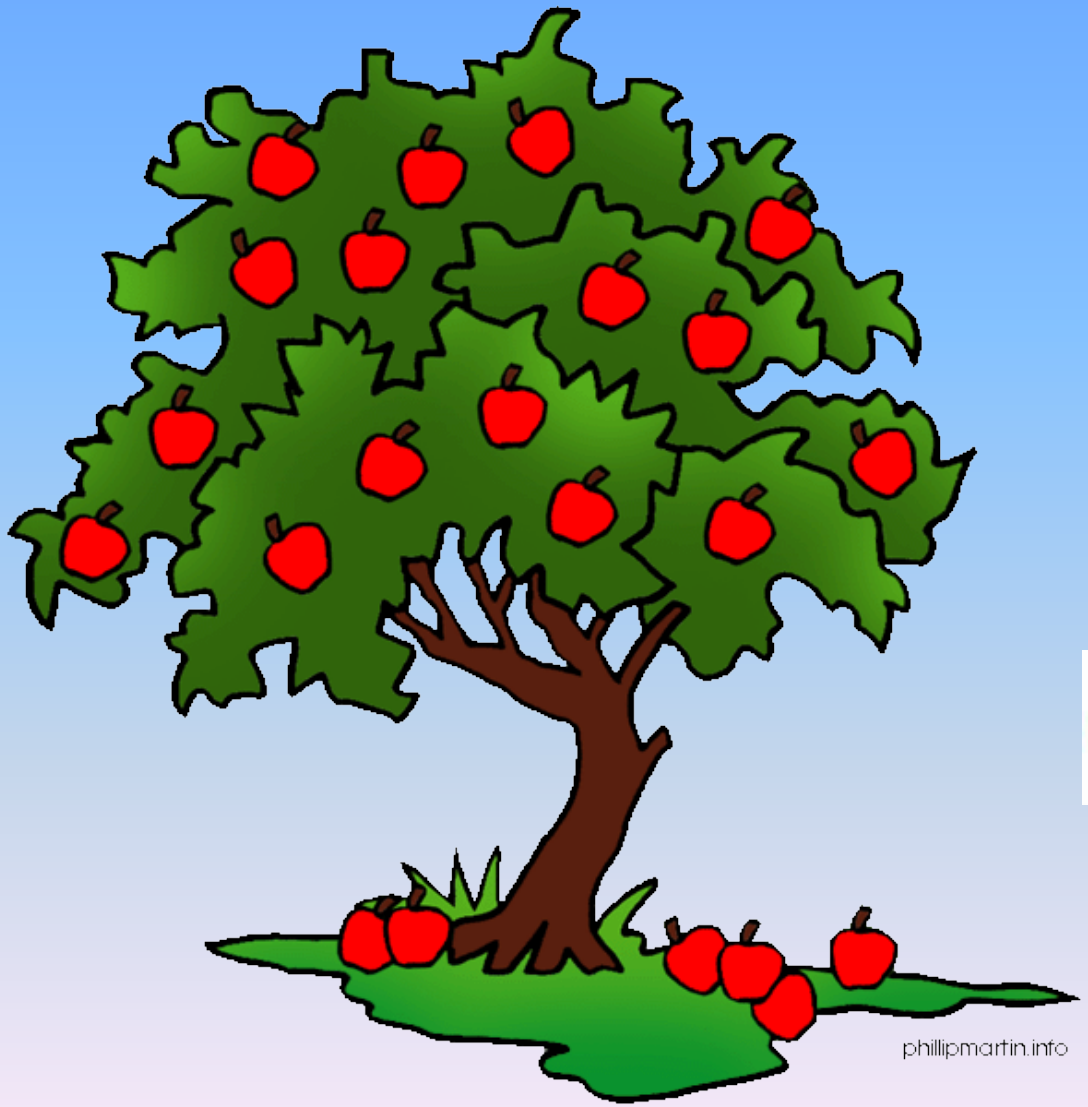
Measuring Health, and Health Indicators

- recall



- not all (or even most) health indicators are about health status
- not all measures of health status are indicators
- everyone seems to want an indicator → “indicatoritis”

Naïve Indicatoritis



 = indicator

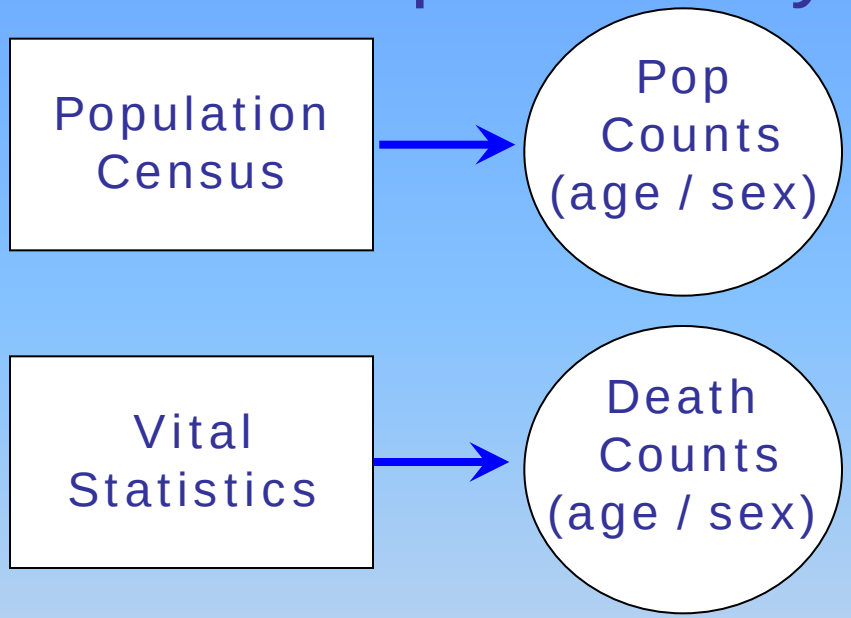
Appropriate Indicatoritis – Life Expectancy

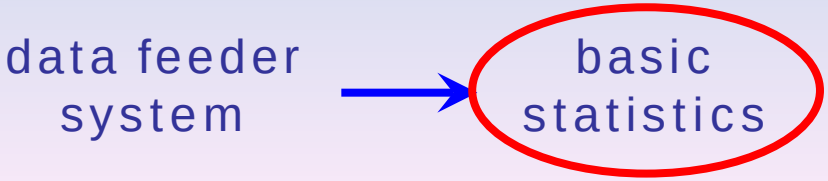
Population Census

Vital Statistics

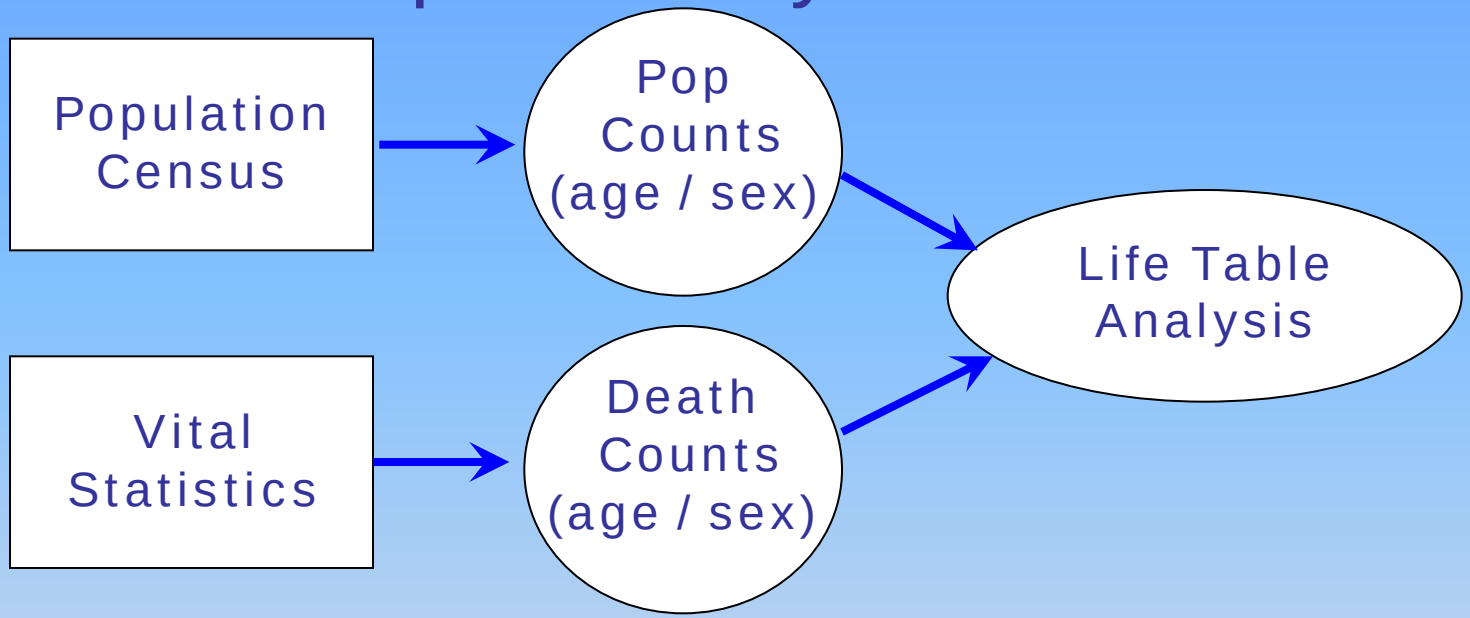
data feeder system

Appropriate Indicatoritis – Life Expectancy



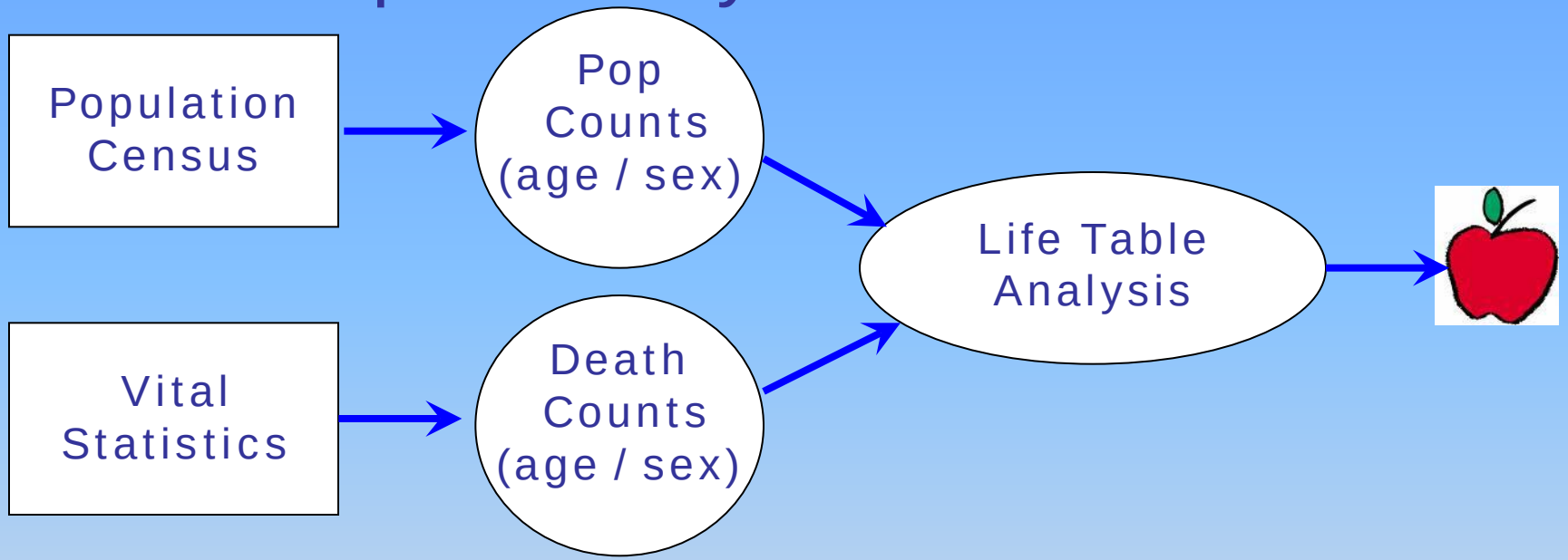


Appropriate Indicatoritis – Life Expectancy



data feeder system → basic statistics → analysis

Appropriate Indicatoritis – Life Expectancy



data feeder system → basic statistics → analysis → indicator

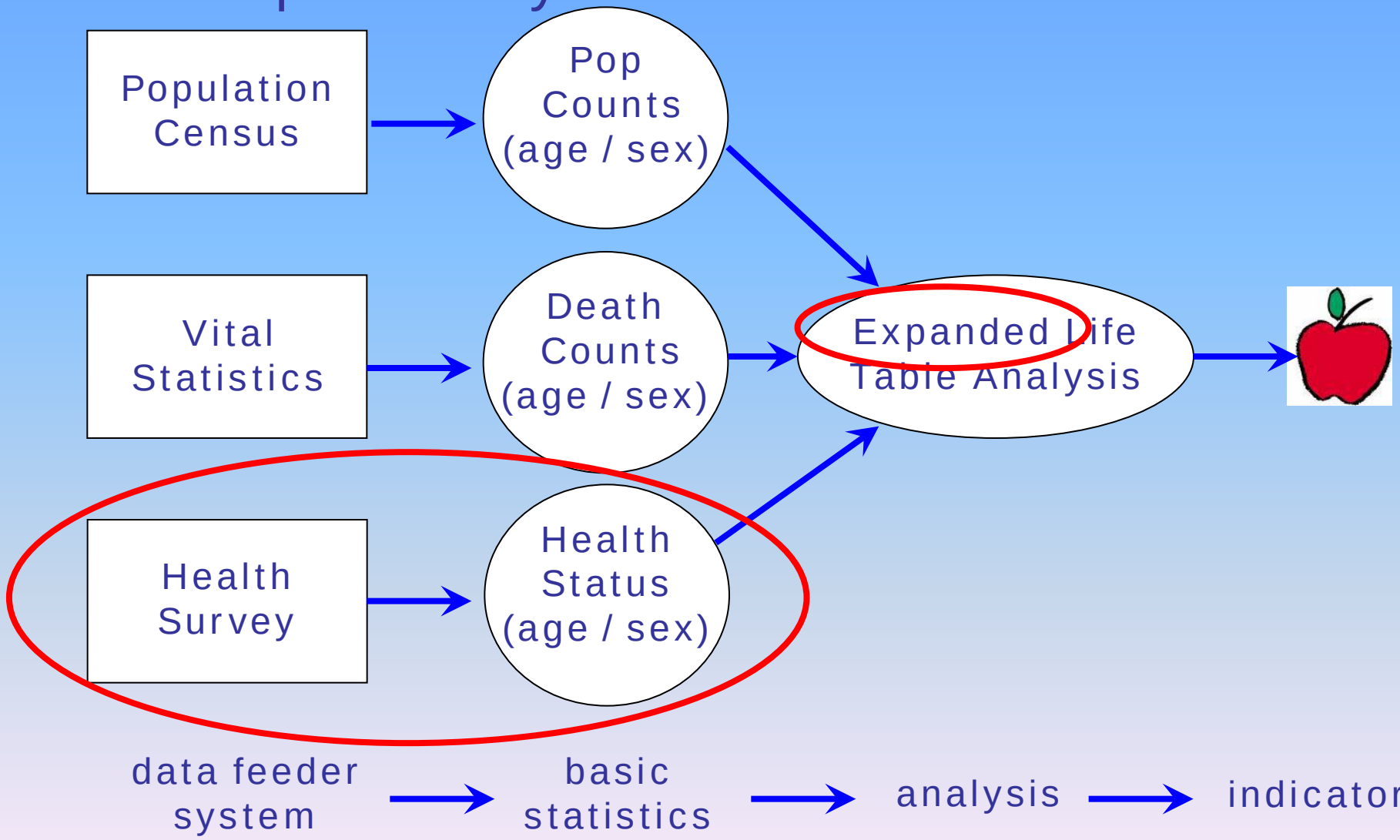
A Single Index of Mortality and Morbidity

DANIEL F. SULLIVAN

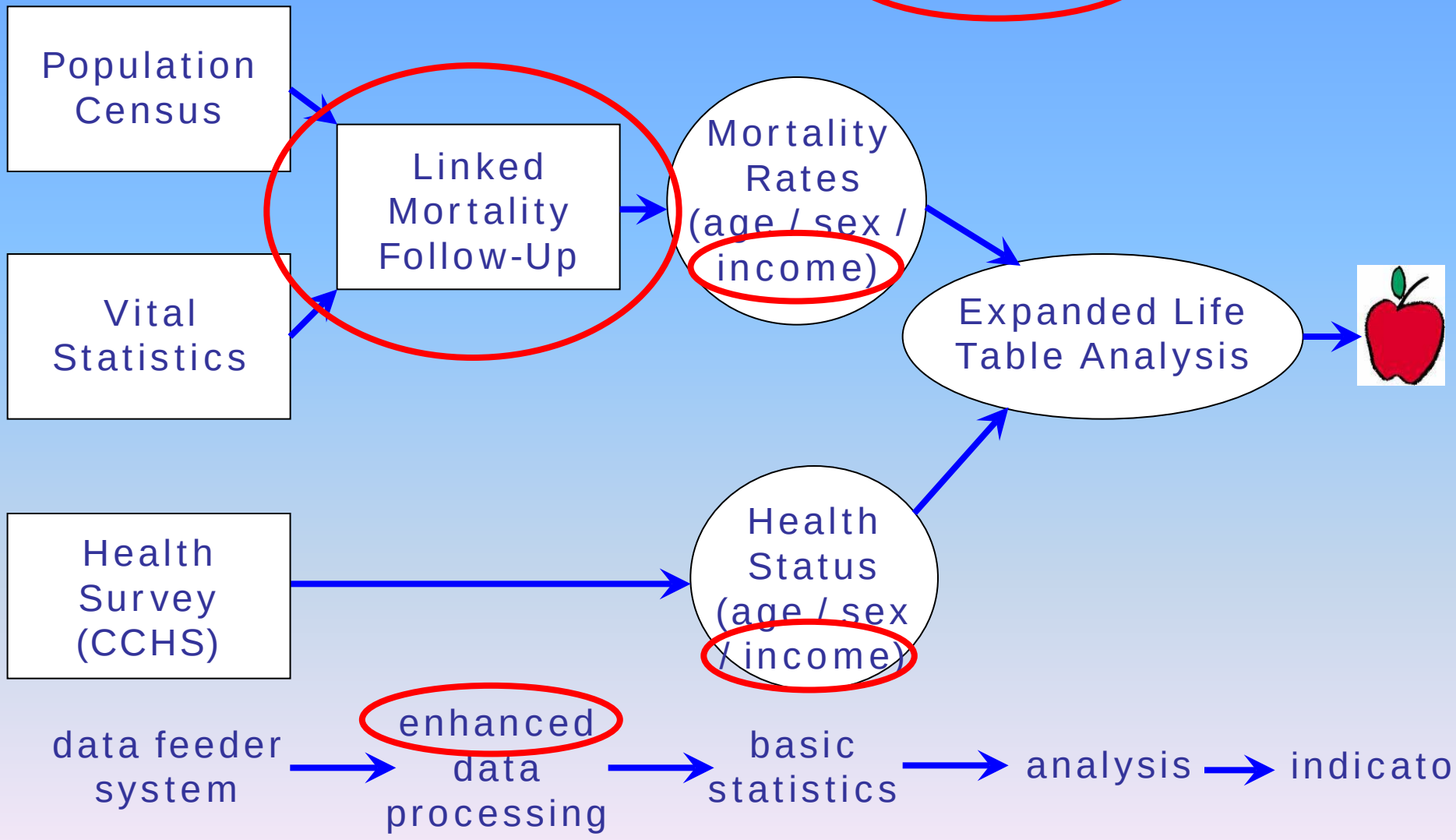
A CONTINUING interest of the National Center for Health Statistics is the development and evaluation of new health indices suited to diverse specific purposes. No one index can reflect all aspects of health, but there is considerable agreement that an index which measures some aspects of nonfatal illness as well as mortality would be desirable. A rationale for using both mortality and disability rates as the components of such an index has already been pub-

Mr. Sullivan is a statistician with the Office of Health Statistics Analysis, National Center for Health Statistics, Health Services and Mental Health Administration. Tearsheet requests to Mr. Daniel F. Sullivan, National Center for Health Statistics, Parklawn Bldg., 5600 Fishers Lane, Rockville, Md. 20852.

Appropriate Indicators – Health-Adjusted Life Expectancy



Appropriate Indicators – Health-Adjusted Life Expectancy by SES



Overarching Goals
Healthy People 2010

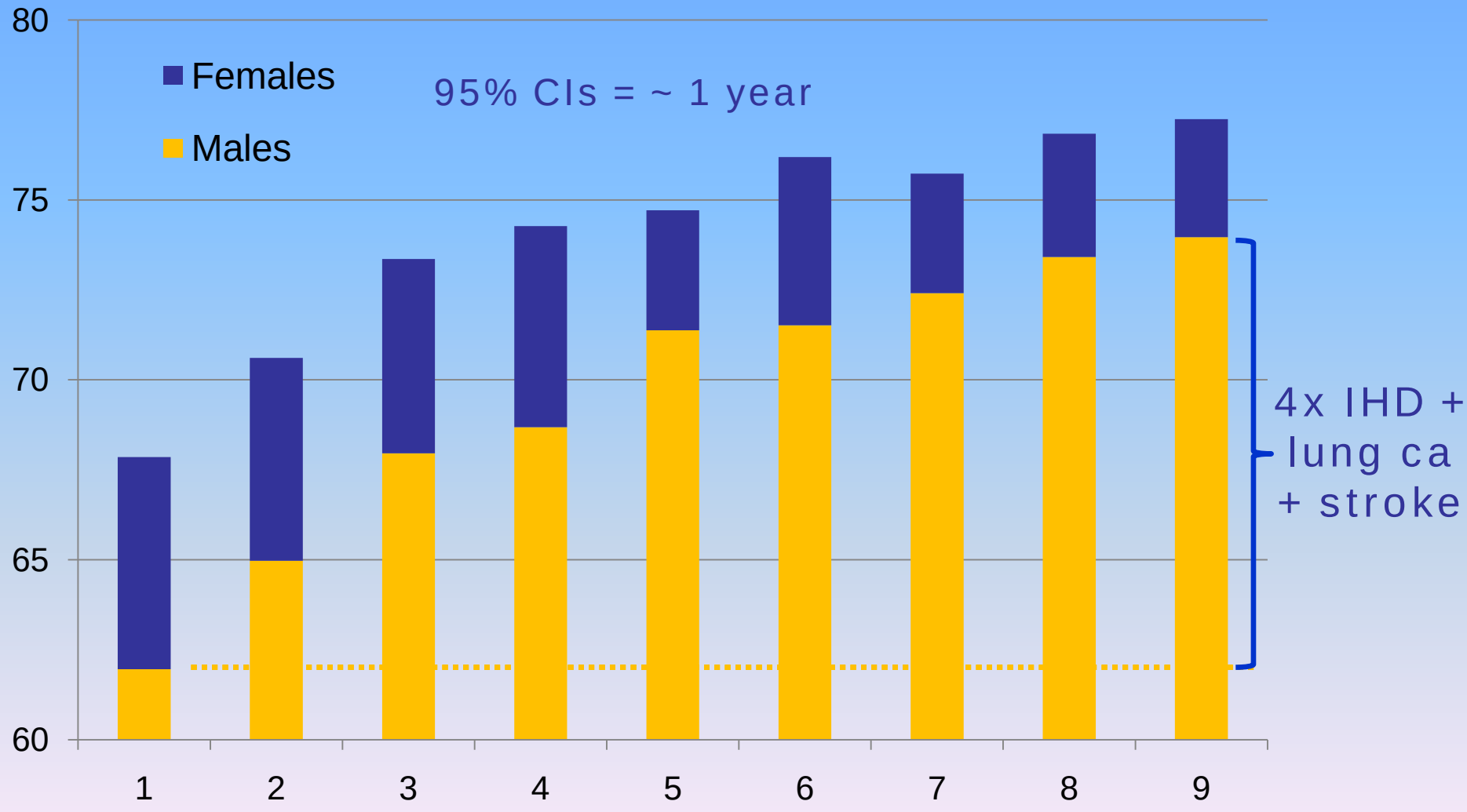
1. Increase Quality and Years of Healthy Life
2. Eliminate Health Disparities

Healthy People 2020

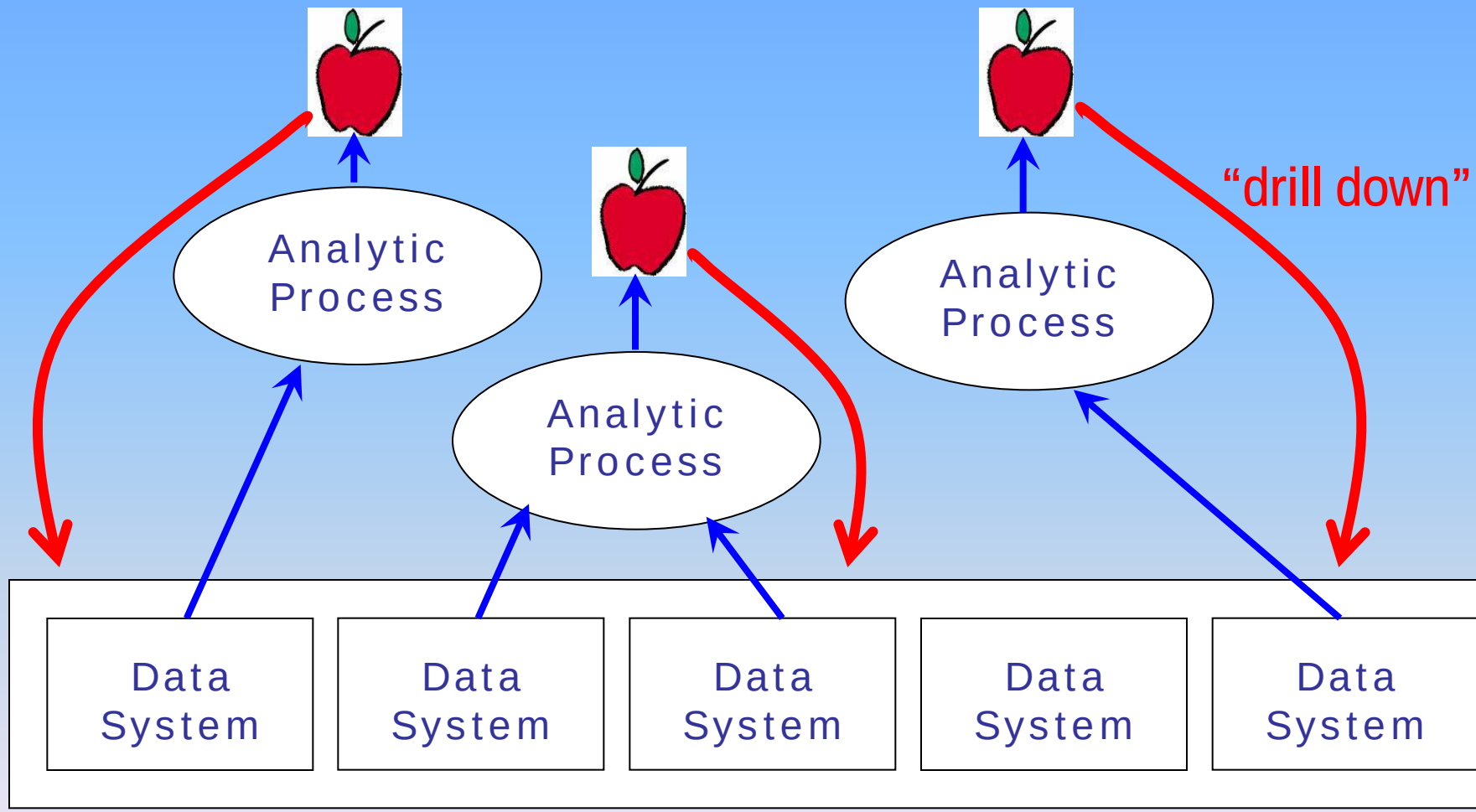
1. Eliminate preventable disease, disability, injury, and **premature death**
2. Achieve health equity, **eliminate disparities**, and **improve the health** of all groups
3. Create social and physical environments that promote good health for all.
4. Promote healthy development and healthy behaviors across every stage of life.

http://www.healthypeople.gov/hp2020/advisory/PhaseI/summary.htm#_Toc211942897

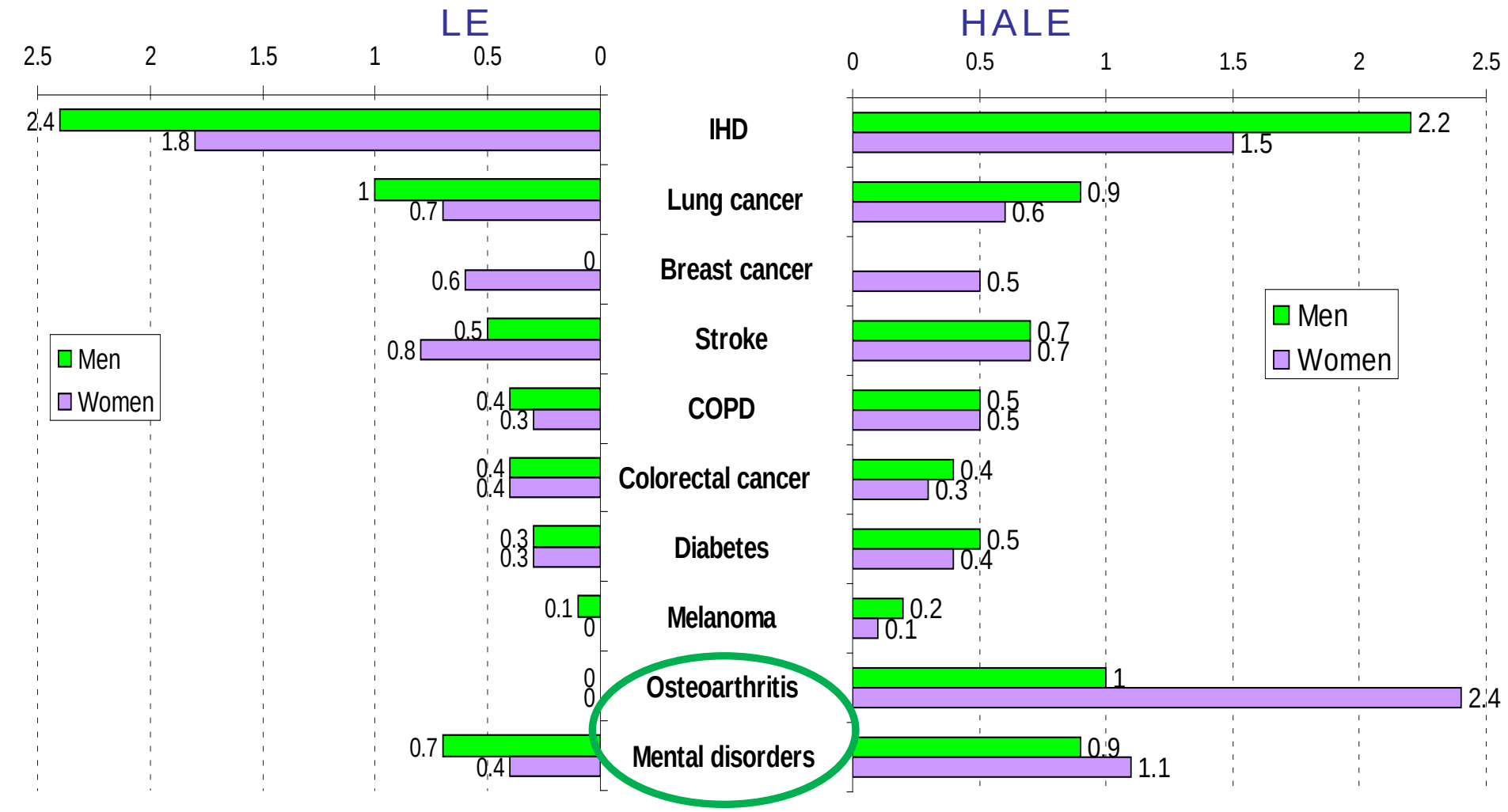
HALE in Canada by Income Decile (given survival to age 25, 1990s)



Aggregation and Disaggregation



Changes in Life Expectancy (LE) and Health-Adjusted Life Expectancy (HALE) by Cause, Canada

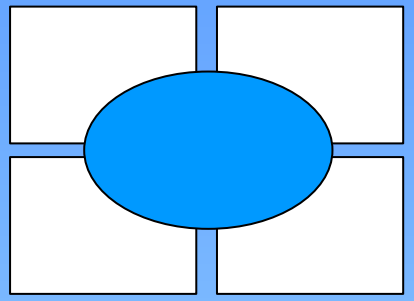


(Manuel et al, 2003)

Prerequisites for HALE

- health status profile
  - small set of questions on individual's functioning (e.g. sensory, mobility, pain, cognition, affect, fatigue)
- person level index: one person's multi-dimensional categorical profile → [α (<0) , 1]
  - suggested approach – one-day focus groups with quota samples (i.e. include some disabled)
  - health state cards, visual analogue scale to familiarize, then standard gamble or time trade-off
  - cost <$300k for 12 focus groups across Canada
- population level index → HALE
  - basic approach – Sullivan Method (very easy)
  - ideally – POHEM style microsimulation

Health Status Rosetta Stone



- health functioning profile
  - the first step in constructing measures of HALE
- provides the ideal Rosetta Stone for health status measurement
- in all the domains, from RCTs to Codman-style health outcomes measurement

Budapest Initiative – Criteria for Selecting Health Domains

- Relevance – important in measuring population health ≡ face validity, breadth, builds on ICF basic concepts (n.b. not details)
- Feasibility – can be turned into one or a few valid questions on an interview survey ≡ parsimony, cross cultural comparability, heterogeneity
- Measurement – technical requirements ≡ statistical and structural independence, enough levels, "within the skin", **suitable for preference measurement**

Budapest Initiative (BI) + Washington Group (WG)

- WG established to achieve consensus on a very short set of “disability” questions suitable for inclusion in the 2010 round of population censuses
  - general desire also for an “extended set” of disability questions suitable for household surveys
  - similar concerns as in BI re cross-cultural comparability
  - considerable overlap in domains with BI
- under the leadership of NCHS, BI and WG processes have become joined
- by design – excellent foundation for a new internationally comparable measure of health status

NIH-PROMIS / CDC-BRFSS / CMMS-HEDIS / NCHS-NHIS+NHANES / RCTs

- meanwhile, many other health status measure flowers blooming (and wilting)
- good news – among all these efforts, considerable common content, and convergence (e.g. HEDIS and BRFSS)
- concern – insufficient attention to cross-cultural comparability, a lesson clearly demonstrated in the BI & WG cognitive testing (! an NCHS success)
- concern – none are designed to support HALE, i.e. erecting a valuation function or scale on the profile
- concern -- all still give too much weight to SRHS
- potential – PROMIS has major benefit of CAT
- potential – can include BI / WG questions in PROMIS item bank

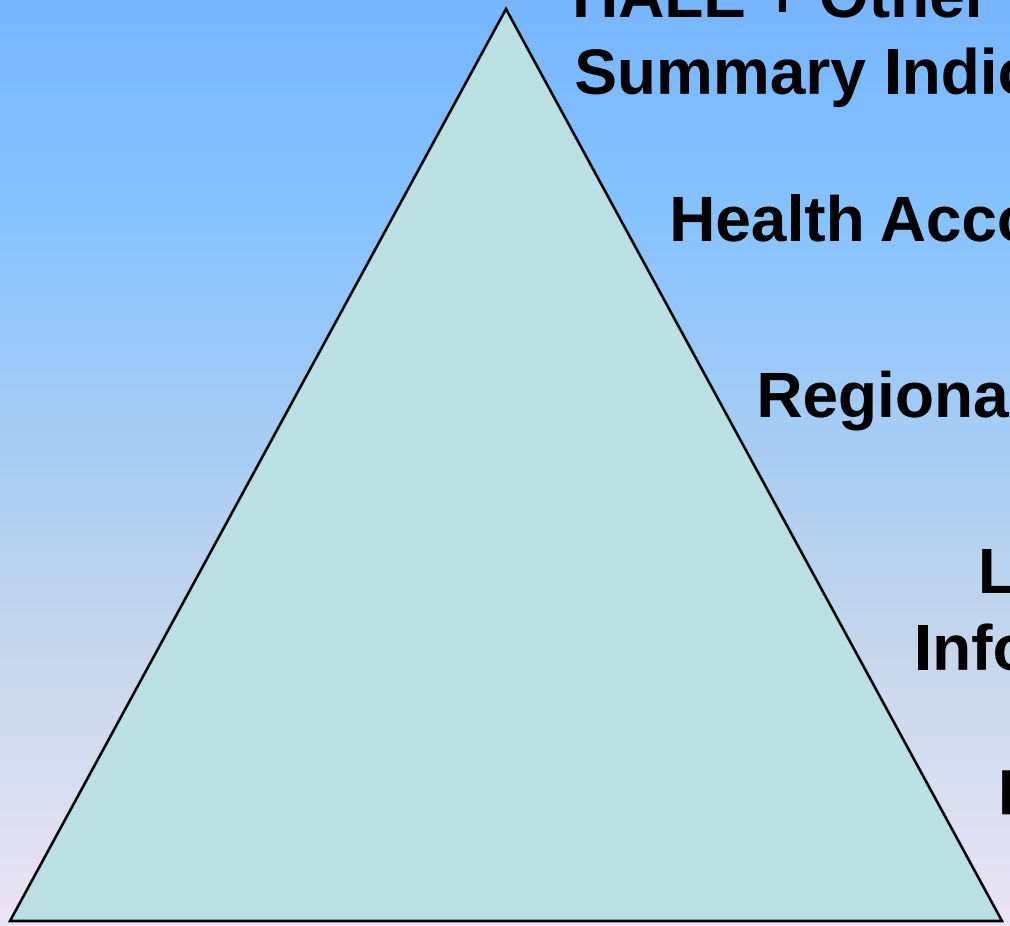
Concluding Comments (1)

- measurement costs money
- we should therefore target measurement where it gives the greatest benefit
- population health status is the “bottom line” for health policy, of which health *care* policy is a part
- caveat: note recent policy foci – wait times in Canada, insurance coverage in the US
  - remember, though, “you get what you measure”
  - yes, shorter wait times and improving coverage
  - but what about improved population health – does either country really know ?!

Concluding Comments (2)

- determinants of human health are extraordinarily complex
  - think genes ↔ molecules ↔ cells ↔ organs ↔ individuals ↔ communities ↔ societies
- measurement of health in isolation is thus of very limited value – “so what” if the trend in population health status is X, if we have no idea what is driving this trend
- ∴ measurement of health status should be embedded in a broader and carefully designed / coherent network of data systems

Vision – Policy-Relevant, Coherent, Integrated Health Information System



HALE + Other Broad Summary Indicators

Health Accounts / Simulation Models

Regional Indicators / Planning Info

Local Data / Facility Information / Unit Costs

Basic Encounter / Service Data / Health Surveys (including generic health status profile)