

Diseases or Morbidity Burden?

Barbara Starfield, MD, MPH

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The purpose of this presentation is to explore the concepts of “disease” and “chronic disease” and to show why a more appropriate focus is on a continuum of care (“primary care”) for all people and populations rather than on care for targeted diseases.

- Most diseases are not discrete biological entities.
- Specific diseases do not exist in isolation from other health problems.
- The course of most chronic diseases is not predictable.
- Many health problems are “chronic” but are usually not considered so.
- Focusing care on selected chronic conditions is not likely to improve the health of populations and may not improve the health of individuals.
- A more appropriate way to organize care is through person (not disease) focused health services that take into account different degrees of “morbidity burden” in people and populations.

The IOM report, *Crossing the Quality Chasm*, urges selecting priority conditions for attention to the quality of care. The list from which they should be chosen includes cancer, diabetes, emphysema, high cholesterol, HIV/AIDS, hypertension, ischemic heart disease, stroke, and perhaps also arthritis, asthma, gall bladder disease, stomach ulcers, back problems, Alzheimers, depression, anxiety disorders.

Why aren't undernutrition, occupational diseases, osteoporosis, low birth weight and prematurity, or virtually any childhood disorder (except asthma) considered high priority? Who should decide what a priority disease is? The disease experts?

Diseases

- are professional constructs
- can be and are artificially created to suit special interests; the sum of deaths attributed to diseases exceeds the number of deaths
- do not exist in isolation from other diseases and are, therefore, not an independent representation of illness
- are but one manifestation of ill health

Sources: Chin. The AIDS Pandemic: the Collision of Epidemiology with Political Correctness. Radcliffe Publishing, 2007. De Maeseneer et al. Primary Health Care as a Strategy for Achieving Equitable Care: a Literature Review Commissioned by the Health Systems Knowledge Network. WHO Health Systems Knowledge Network, 2007. Available at: <http://www.wits.ac.za/chp/kn/De%20Maeseneer%202007%20PHC%20as%20strategy.pdf>. Mangin et al, BMJ 2007; 335:285-7. Murray et al, BMJ 2004; 329:1096-1100. Tinetti & Fried, Am J Med 2004; 116:179-85. Walker et al, Lancet 2007; 369:956-63.

Are diseases really discrete
categorizations of pathology?

Everyone knows that cardiovascular disease is the leading cause of death, but what is it?

It is “hypertensive DISEASES, ischemic heart DISEASES, rheumatic fever, pulmonary heart disease and DISEASES of the pulmonary circulation, OTHER FORMS of heart disease, cerebrovascular DISEASES or stroke, DISEASES of veins, lymphatic vessels, and lymph nodes, OTHER AND UNSPECIFIED DISORDERS OF THE CIRCULATORY SYSTEM, AND congenital MALFORMATIONS, or birth defects of the circulatory system.”

What and for whom is there benefit from calling it a disease?

There appear to be many disorders included under the rubric of diabetes: insulin secretion; insulin transport; zinc-binding to insulin; and pancreatic islet beta cell development.

IS DIABETES A DISEASE? DOES IT MAKE SENSE TO ASSUME THAT GUIDELINES FOR THE IDENTIFICATION AND MANAGEMENT OF DIABETES APPLY TO ALL “DIABETICS”?

If the association between obesity and diabetes is absent in people with low concentrations of persistent organic pollutants, and the association becomes stronger as the concentration of these pollutants rises, is obesity a risk factor for diabetes? Is diabetes a single disease?

There is broad variation in breast cancer risk among carriers of BRCA1 and BRCA2 mutations.

Question: Is BRCA1 and BRCA2-related breast cancer a disease?

If a 90-year-old woman dies two months following hip fracture, did she die from an acute disease or a chronic disease?

What is the “cause of death” likely to be coded as?

COPD is a chronic systemic inflammatory syndrome with complex chronic co-morbidities. Patients with COPD mainly die of non-respiratory disorders such as cardiovascular disease or cancer.

COPD is a heterogeneous disease process.

Although exacerbations of COPD, especially those defined as being infectious, are quite frequent, the number of randomized placebo-controlled trials of antibiotics is surprisingly small.

When occurring in the same individual, BMI greater than 30, systolic blood pressure greater than 140, and blood cholesterol greater than 250 mg/dL are associated with a six-fold increased odds of Alzheimers disease.

What type of disease is Alzheimers?
What is the disease?

What Is a Chronic Disease?

Generally defined as persistence or recurrence, usually beyond one year

Chronic Disease: Expanded Definition

- Incurable
- Complex “causation”
- Multiple risk factors
- Long latency
- Prolonged course
- Associated with functional impairment or disability

How “chronic” are
chronic diseases?

Persistence of Diagnoses*

	Overall prevalence time 2	Prevalence among those having diagnosis in time 1	
Obesity	69	539	(x 7.8)
Asthma	70	628	(x 9.0)
Autoimmune disorder	18	641	(x 35.6)
Seizures	10	670	(x 67.0)

*per 1000, not adjusted for age

Persistence of Diagnoses*

	Overall prevalence time 2	Prevalence among those having diagnosis in time 1	
UTI	87	350	(x 4.0)
Hypertension	213	879	(x 4.1)
Headache	102	455	(x 4.5)
Lipoid disorders	144	720	(x 5.0)

*per 1000, not adjusted for age

Persistence of Diagnoses*

	Overall prevalence time 2	Prevalence among those having diagnosis in time 1	
URI	357	585	(x 1.6)
Pneumonia, non-bacterial	186	378	(x 2.0)
Sinusitis	231	525	(x 2.3)
Musculoskeletal s/s	190	461	(x 2.4)
Dermatitis, eczema	109	302	(x 2.8)
Abdominal pain	116	326	(x 2.8)
Otitis media	136	452	(x 3.3)

*per 1000, not adjusted for age

Not all chronic diseases are manifested year to year.

Acute diseases sometimes behave as if they were chronic, recurring year to year.

Only a minority of common chronic diseases or conditions are currently candidates for the vast majority of chronic disease management programs.

Acute and chronic conditions share a characteristic: inflammation.

People and populations differ in their overall vulnerability and resistance to threats to health. Some have more than their share of illness, and some have less. Morbidity mix (sometimes called case-mix) describes this clustering of ill health in patients and populations.

There is more variability in disease manifestations and persistence within diseases than across diseases because:

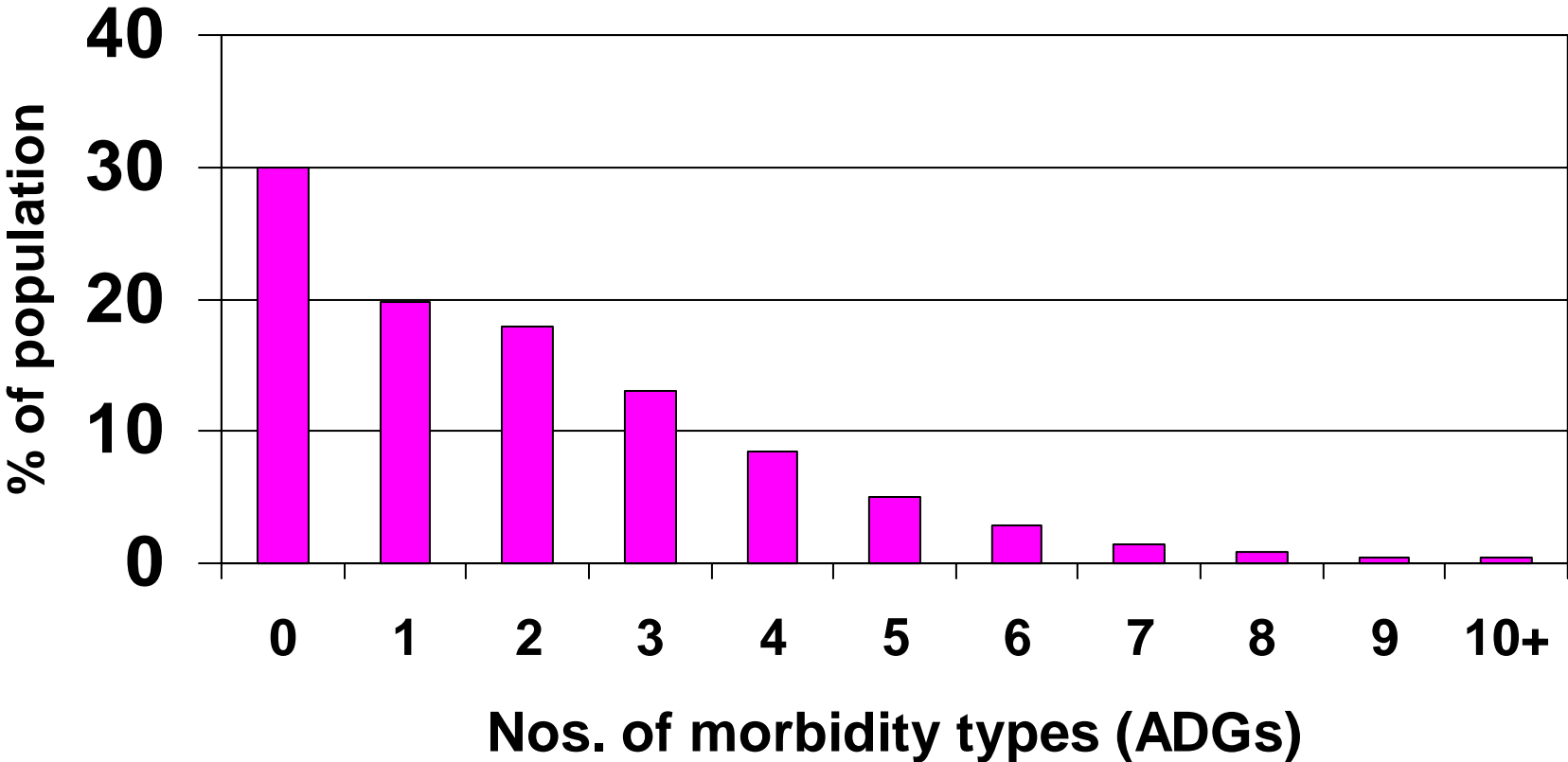
- diseases are not necessarily unique pathophysiological entities
- variability in diagnostic styles and practices
- presence of co-morbidity

Co- and Multi-morbidity (Morbidity Burden)

Co-morbidity is the concurrent existence of one or more unrelated conditions in an individual with any given condition. Multi-morbidity is the co-occurrence of biologically unrelated illnesses.

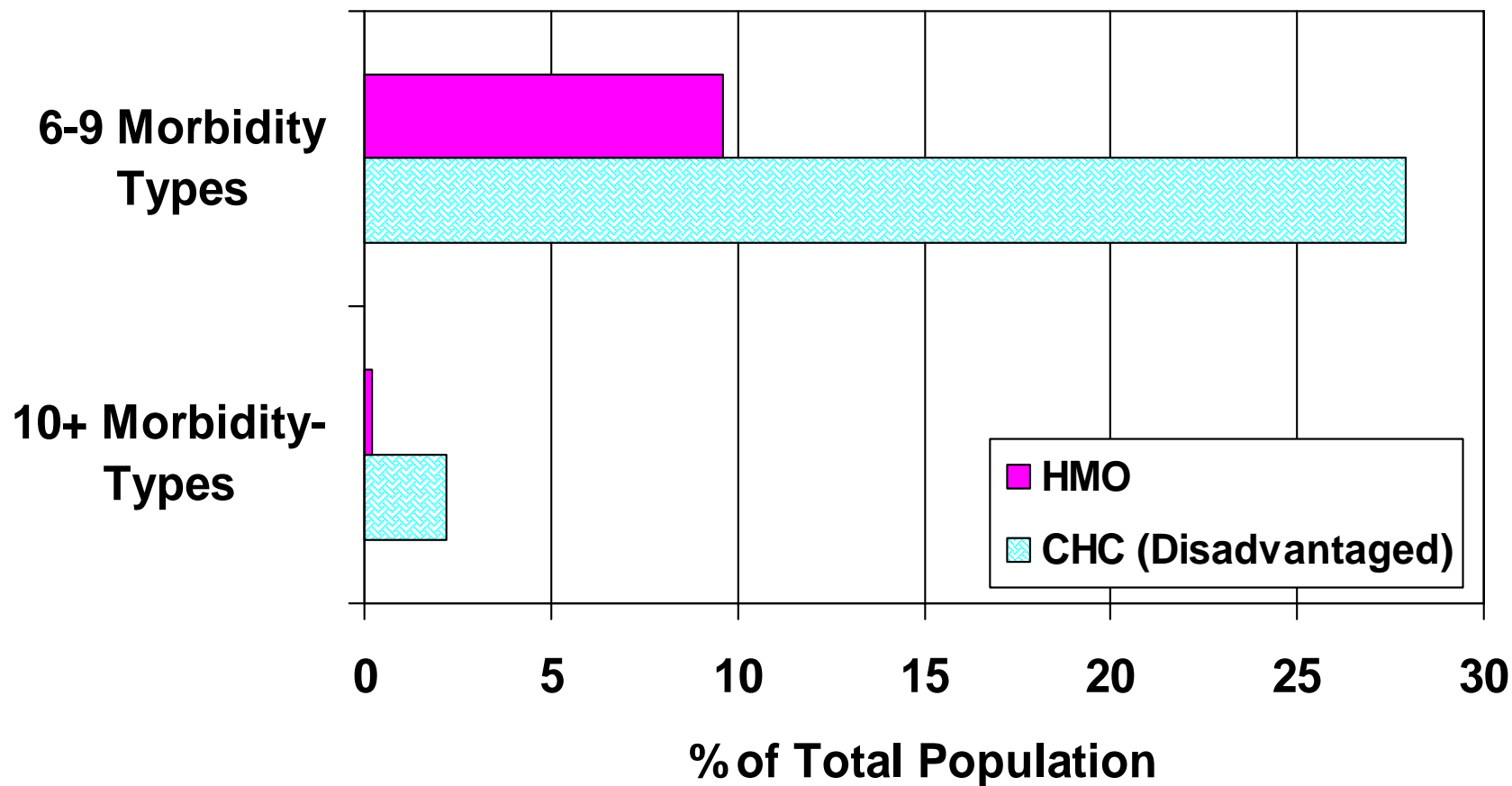
For convenience and by common terminology, we use co-morbidity to represent both co- and multi-morbidity.

Distribution of Morbidity in a Non-Elderly Insured Population: 1 Year Experience (US)



Source: HMO health plan with 500K members.

Morbidity Burdens of Socially Disadvantaged and Socially Advantaged People



The high frequency of

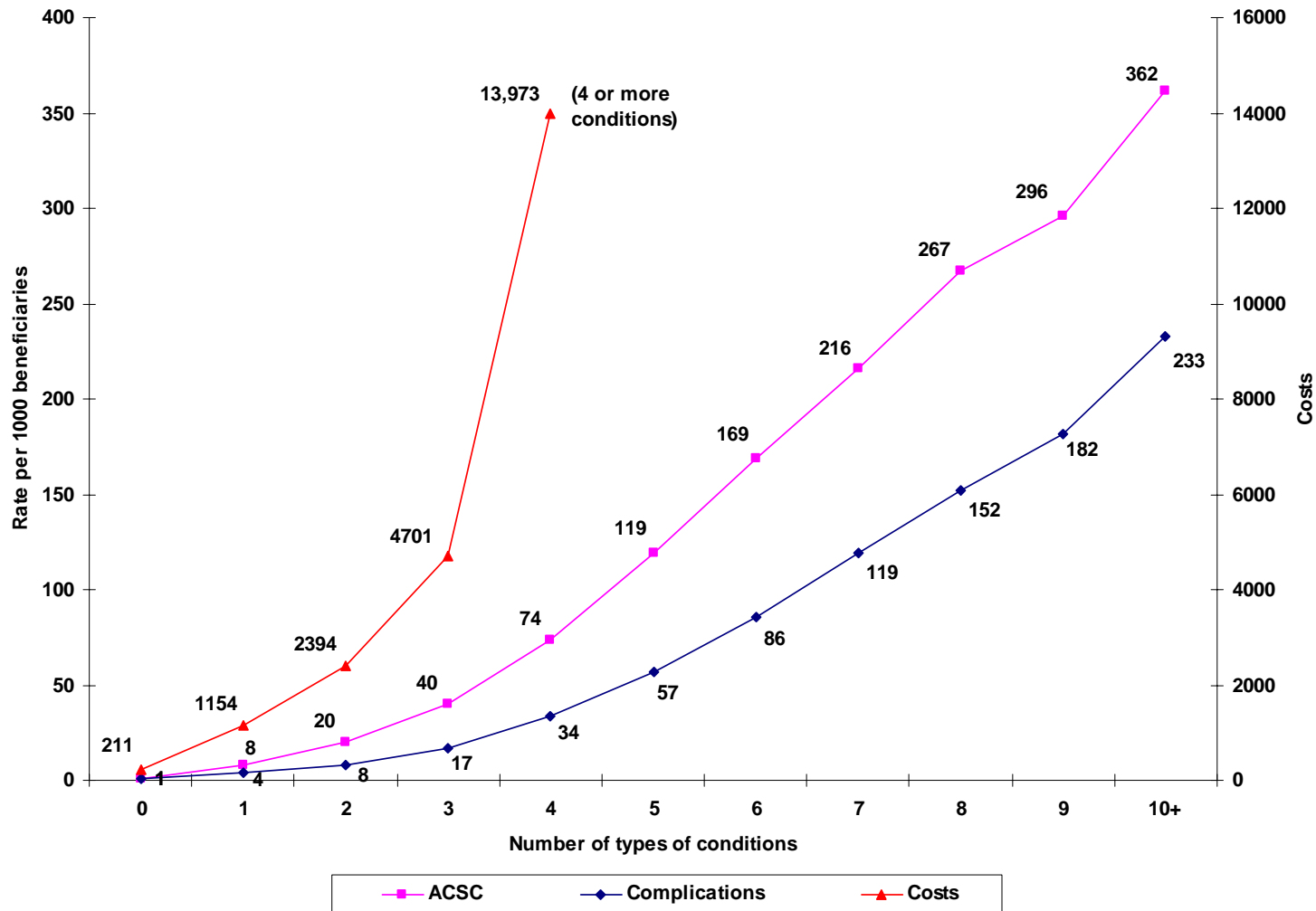
Co-morbidity

Multi-morbidity

Morbidity burden

makes it inappropriate to focus
on single diseases

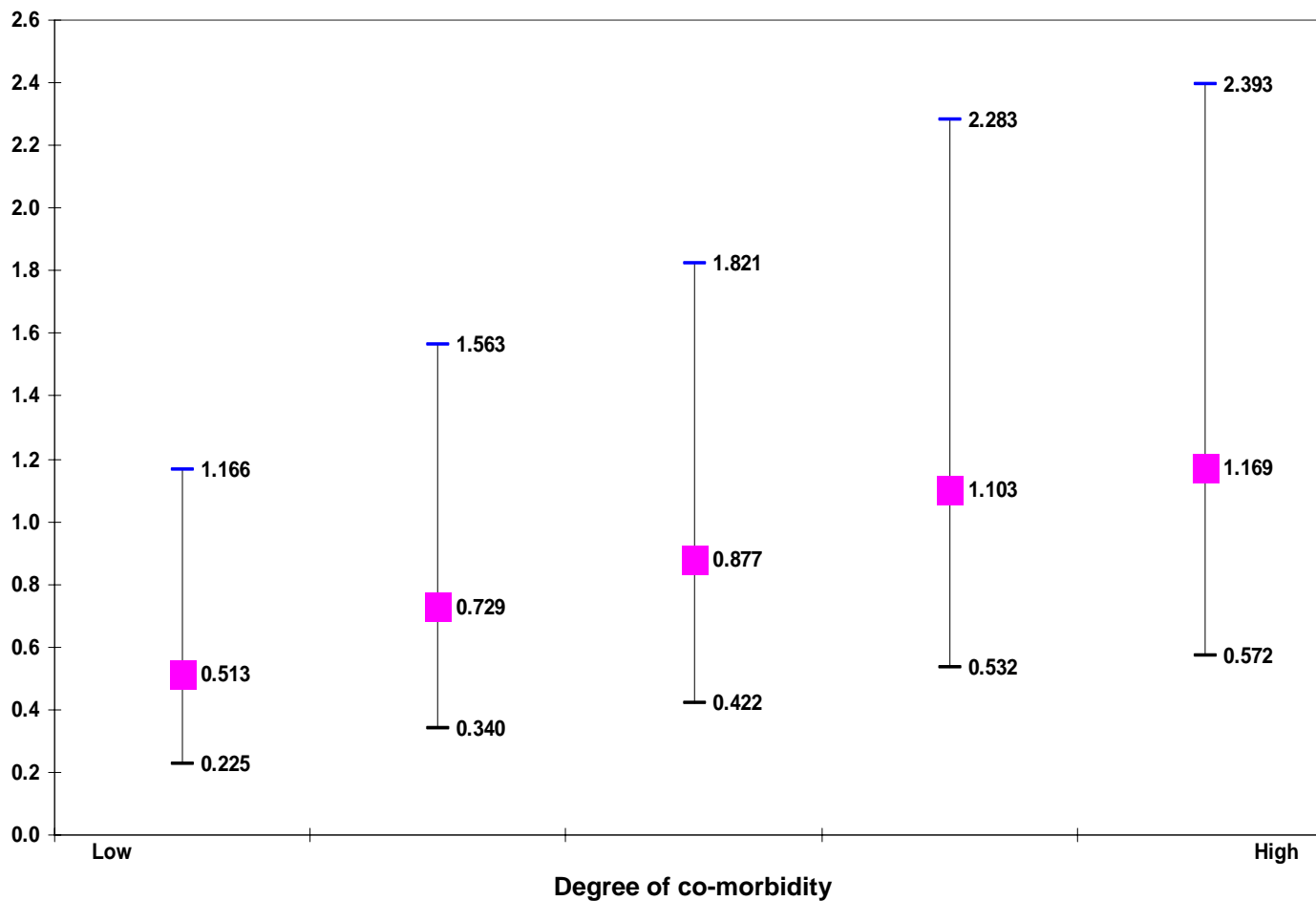
Co-morbidity, Inpatient Hospitalization, Avoidable Events, and Costs*



The greater the morbidity burden,
the greater the persistence of any
given diagnosis.

That is, with high co-morbidity,
even acute diseases are more
likely to persist.

Odds Ratios and Confidence Intervals for Persistence* by Degree of Co-morbidity: Urinary Tract Infection



*controlled for age and sex

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Expected Resource Use (Relative to Adult Population Average) by Level of Co-Morbidity, British Columbia, 1997-98

	None	Low	Medium	High	Very High
Acute conditions only	0.1	0.4	1.2	3.3	9.5
Chronic condition	0.2	0.5	1.3	3.5	9.8
High impact chronic condition	0.2	0.5	1.3	3.6	9.9

Thus, it is co-morbidity, rather than presence or impact of chronic conditions, that generates resource use.

Increase in Treated Prevalence: Selected Conditions, US, People with Private Insurance, 1987-2002

	<u>Treated Prevalence Percentage Change, 1987-2002</u>
Hyperlipidemia	437
(Heart disease	9)
Bone disorders	227
Upper GI problems	169
Cerebrovascular disease	161
Mental problems	136
Diabetes	64
Endocrine disorders	24
Hypertension	17
Bronchitis	13

As thresholds for diagnosing disease are lowered over time, the variability within “diseases” will increase even further, as will the prevalence of multiple simultaneous or sequential diseases.

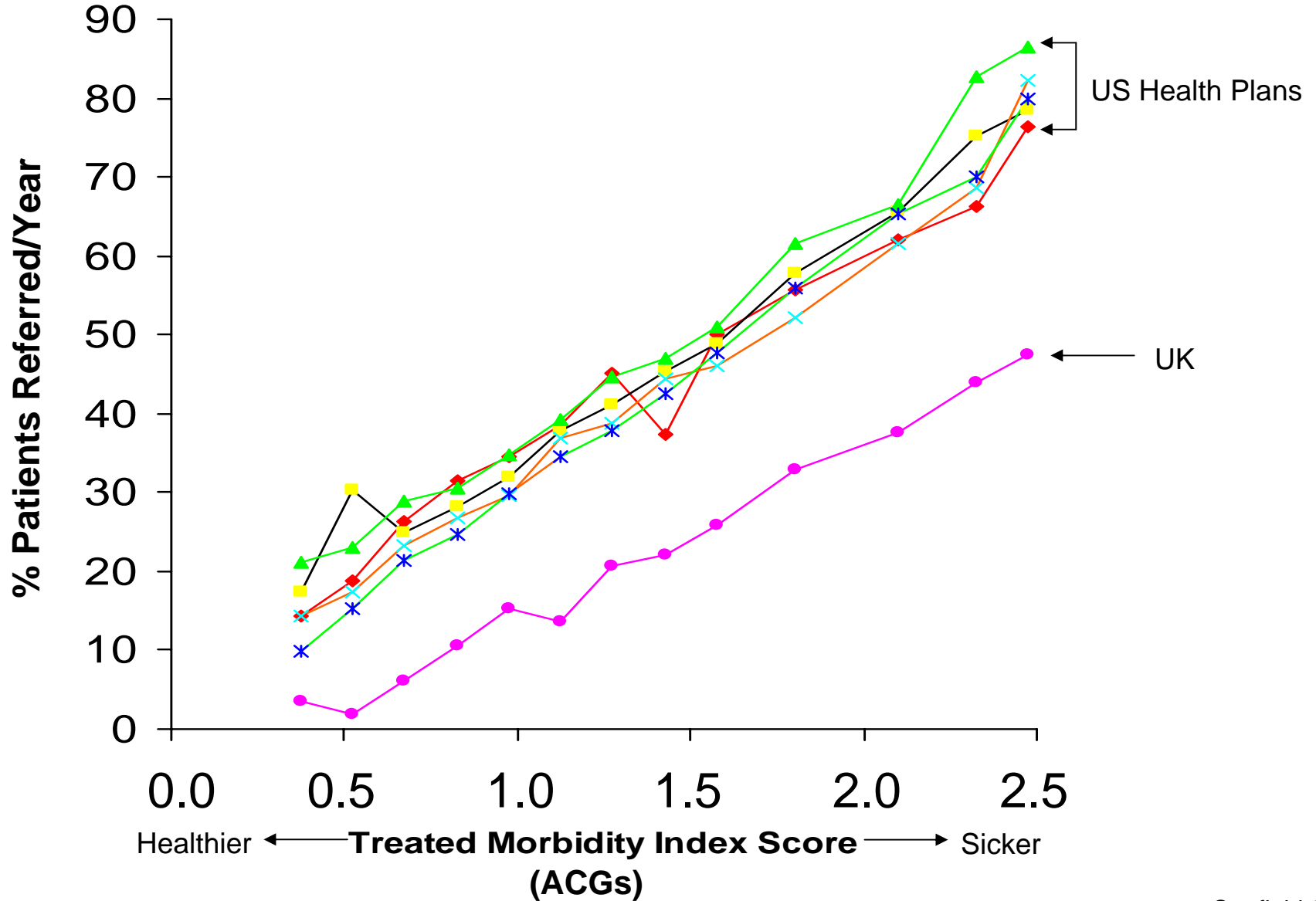
Are there approaches to characterizing peoples' health that are better than disease-by-disease approaches?

The Johns Hopkins ACG system has proven useful in understanding the impact of morbidity on variability on health services use and in better planning to meet health services needs.

ACGs for Profiling

- Salem-Schatz et al., 1994
 - Referrals from encounter data, 38000 people, staff-model practices
 - Age, sex, physician/practice characteristics
 - ADGs as control in regressions
 - Variability in referral rates reduced by control for morbidity and practice characteristics (both overall and as assessed by outliers)

Percentage of Patients Referred in a Year: US vs. UK



Sicras-Mainar et al, 2007

Referral rates and percentage of people referred

Age, gender, specialty

ACGs: observed/expected

Variability in referrals is greatly reduced by controlling for morbidity burden in a Spanish primary care facility

Aguado et al, 2008

Variability in prescription drug expenditures and quality of prescribing

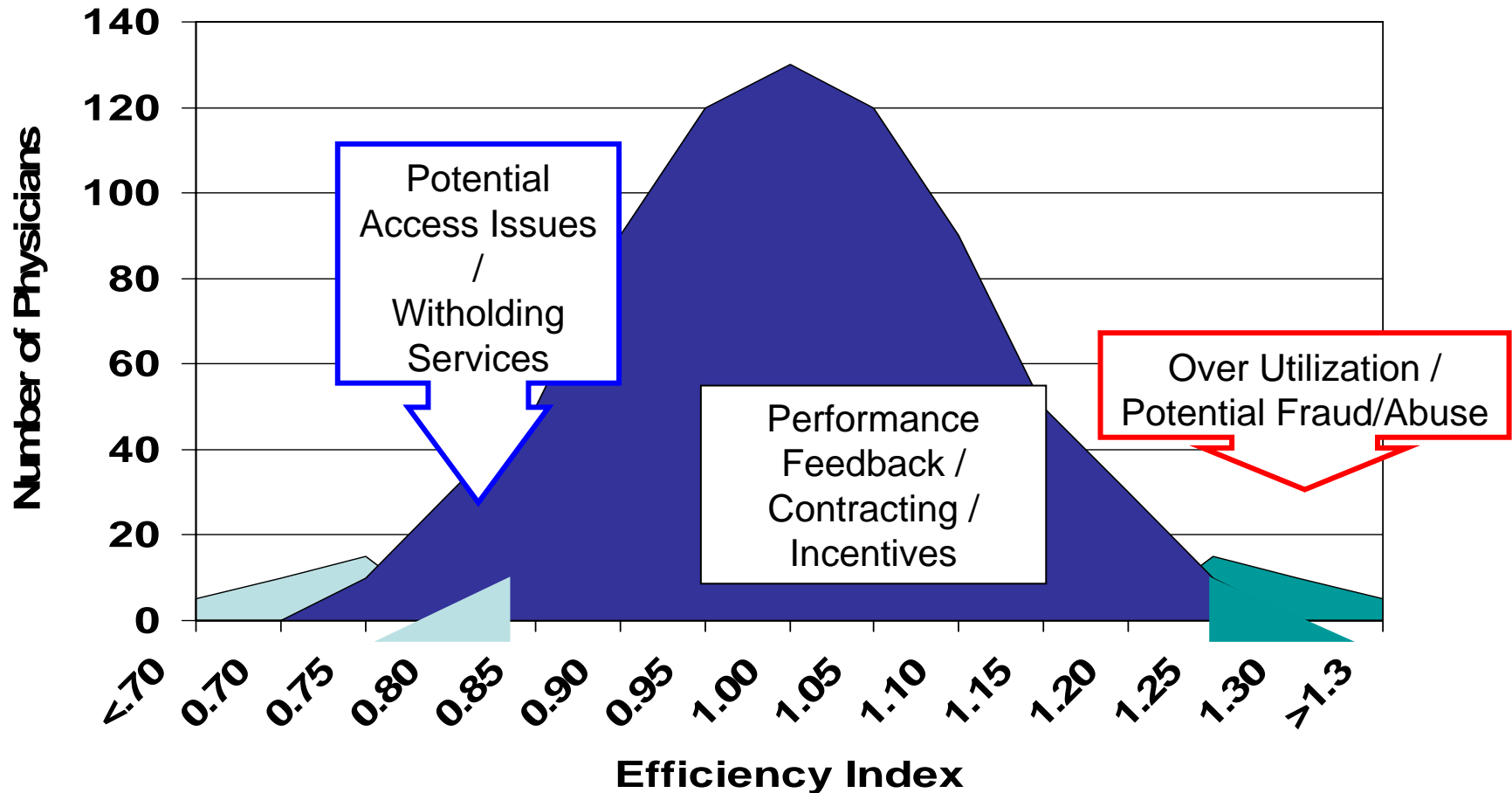
Diagnosed episodes and particular physician in 5 primary care centers

Morbidity burden based on RUBs (6 categories of ACGs)

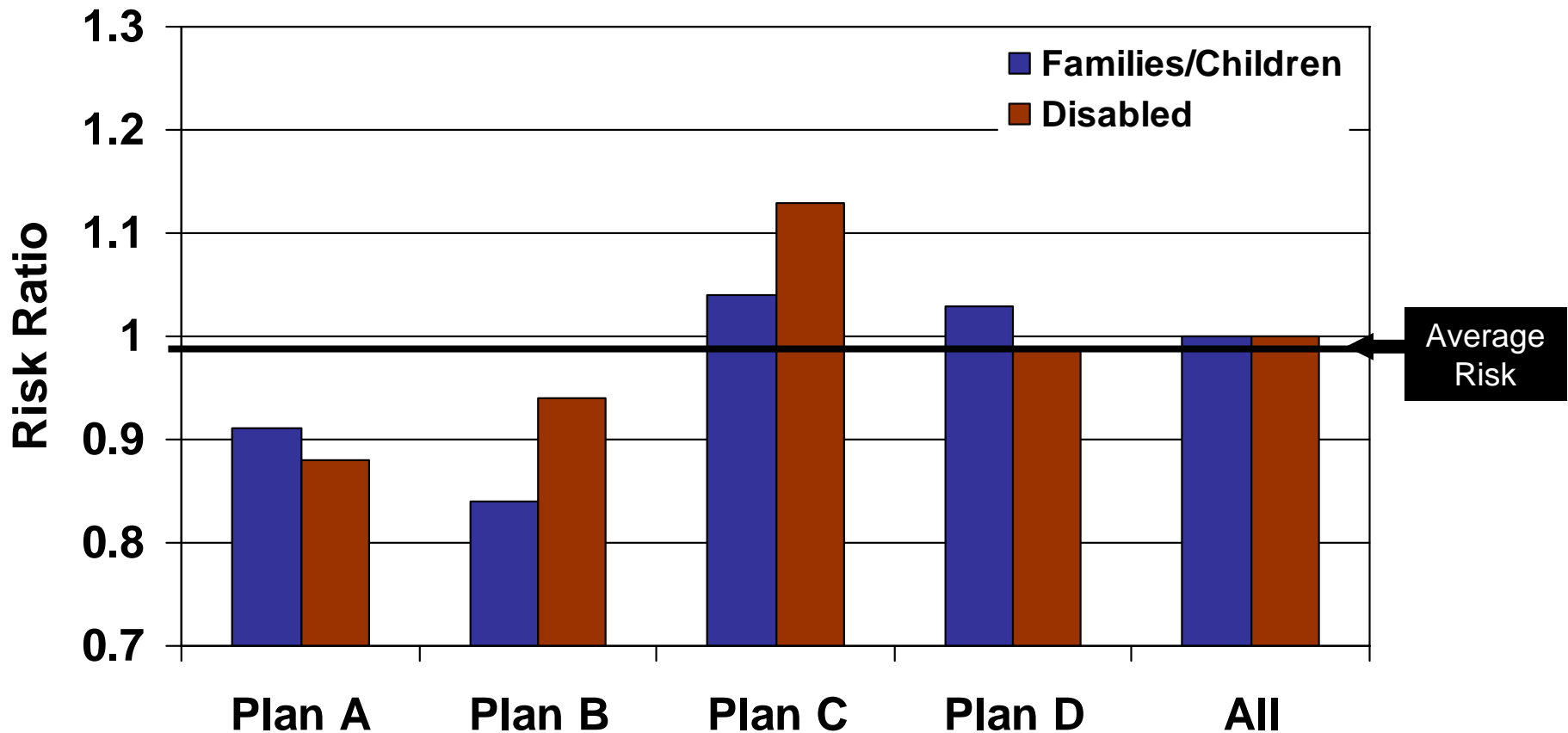
Case mix (ACG designations) explains much of the variation in prescription drug expenditures. Physicians with lower adjusted pharmaceutical costs have higher medication quality scores.

ACGs for Payment

Interpreting Profiling Results



Profiling Used for Maryland Medicaid Risk Contracting



Using ACGs, risk ratios were determined for each contracting managed care organization / health plan. Expected values were determined separately for the two enrollee groups with this State Medicaid program.

ACGs as a Control for Morbidity

- Starfield et al., 1994
 - 2024 medical records of 135 providers obtained from Medicaid claims
 - Type of provider, quality of care criteria, total charges generated
 - ACGs used as control variable
 - No consistent relationship between quality and charges, although average cost CHCs had best quality overall

ACGs as a Control for Morbidity

- Powe et al., 1996
 - Claims data, people with 3 chronic illness
 - Patient characteristics, costs, type of practice
 - ACGs to derive iso-cost categories
 - No relationship between cost and quality

ACGs as a Control for Morbidity

- Blumenthal et al., 1999
 - National Ambulatory Medical Care surveys, primary care providers
 - Practice patterns, physician characteristics, patient characteristics
 - CADGs used at level of visits
 - Case mix control for analyses

ACGs as a Control for Morbidity

- Reid, 1998
 - Claims data for people with diabetes, province of Alberta, Canada
 - Referral patterns and types of referral (long-term, short-term, shared care)
 - ACGs and ADGs separately
 - Case-mix control for analyses

Starfield et al, 2008

Percentage of people seeing one or more different specialists and resource use

Age, gender

Number of ADGs, trichotomized into low, medium, high

Specialty of physician

Number of primary care physicians seen and number of visits

Resource Use, Controlling for Morbidity Burden*

- More DIFFERENT specialists seen: higher total costs, medical costs, diagnostic tests and interventions, and types of medication
- More DIFFERENT generalists seen: higher total costs, medical costs, diagnostic tests and interventions
- More generalists seen (LESS CONTINUITY): more DIFFERENT specialists seen. The effect is independent of the number of generalist visits.

*Using the Johns Hopkins Adjusted Clinical Groups (ACGs)

Source: Starfield et al, Ambulatory specialist use by patients in US health plans: correlates and consequences. Submitted 2008.

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The findings were confirmed by using a variety of types of approaches available in the ACG system, including:

- Number of different types of morbidity (ADGs) – trichotomized
- Presence or absence of each type of morbidity burden (ADGs)
- Number of different types of morbidity (1-10, 11+)
- Alternative cutoffs for low, medium, high
- Degree of overall morbidity burden (ACGs)

ALL METHODS PRODUCED THE SAME FINDINGS, INDICATING ROBUSTNESS OF THE ACG METHOD FOR CHARACTERIZING MORBIDITY BURDEN.