UNIVERSITY of MARYLAND MEDICAL CENTER

Population Health, and the "Third Revolution"

Chuck Callahan

March 2017

Basic assumptions:

Health
is a human right.

Basic **assumptions**:

Population health is a strategic problem.

Basic **assumptions**:

Medicine is intrinsically tactical.

It can't be done without IT.

"What is the optimal balance of investments (e.g., dollars, time, policies) in the multiple determinants of health (e.g., behavior, environment, socioeconomic status, medical care, genetics) over the life course that will maximize overall health outcomes and minimize health inequities at the population level?"

Kindig D. Understanding Population Health Terminology. Milbank Q. 2007.;85:139-161

Population Health
Bridging the Gap in 21st Century Medicine

- "Micro-medical" care
  - *Genomics, patient-centered care, individual outcomes*
- "Meso-medical" care
  - *Population Health – Group outcomes*
- "Macro-medical" care
  - *Public Health, health policy and planning*
- "Meta-medical" care
  - *Improving health and well-being*

Basic assumptions:

We need

IT systems that work

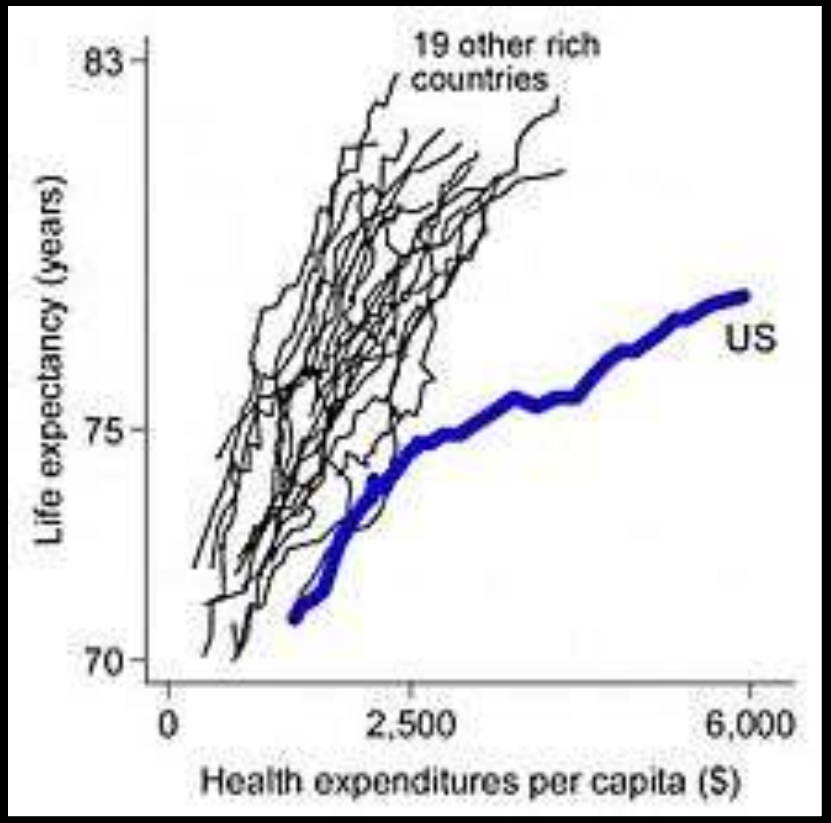
and

the work of IT systems.

Basic questions:

Why now?

Value = Outcome / Cost
Need for Healthcare Leadership



World Health Organization 2000

USA

***Global Ranking*:**

37th

Behind Columbia, Chile, Costa Rica & Cyprus

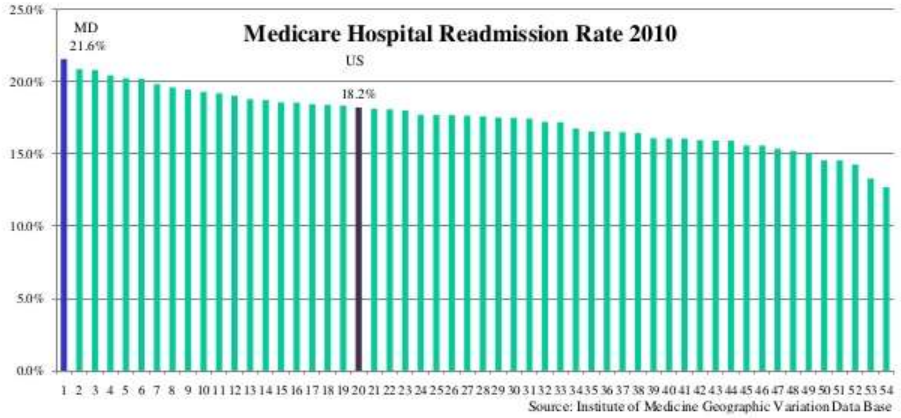
http://www.who.int/whr/2000/en/whr00_en.pdf

Maryland Medicare Exemption: Global Based Reimbursement

31 Hospitals Entered into ARR Agreements for FY 2012

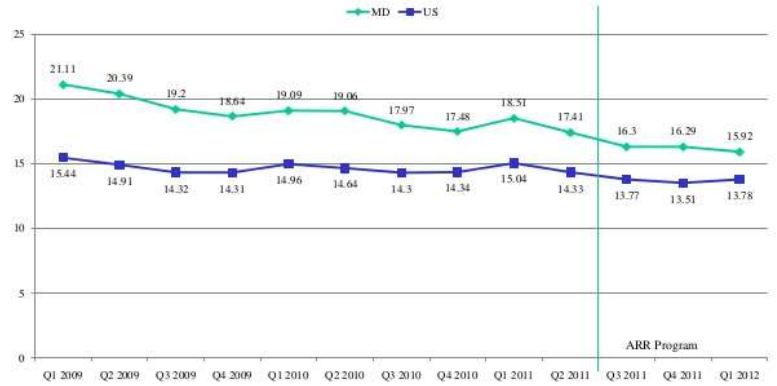
- Mercy
- LifeBridge - Sinai
- LifeBridge - Northwest
- UMMS - Baltimore Washington Medical Center
- UMMS - Civista Medical Center
- UMMS - Harford Memorial Hospital
- UMMS - Kernan Hospital
- UMMS - Maryland General Hospital
- UMMS - Upper Chesapeake Medical Center
- UMMS - University of Maryland Medical Center
- JHHS - Johns Hopkins Hospital
- JHHS - Johns Hopkins Bayview Medical Center
- JHHS - Howard County General Hospital
- JHHS - Suburban Hospital
- Anne Arundel Medical Center
- Bon Secours
- St. Joseph Medical Center
- MedStar - Franklin Square
- MedStar - Good Samaritan
- MedStar - Harbor Hospital
- MedStar - St. Mary's Hospital
- MedStar - Montgomery General Hospital
- MedStar - Union Memorial Hospital
- Holy Cross Hospital
- Washington Adventist Hospital
- Shady Grove Adventist Hospital
- Peninsula Regional
- Doctors
- GBMC
- Frederick Regional Health System
- Saint Agnes

Using Medicare Data, Maryland has the Nation's Highest Readmissions Rate



Source: Institute of Medicine Geographic Variation Data Base

Medicare Readmission Rates per 1,000 Beneficiaries



Source: Delmarva Foundation

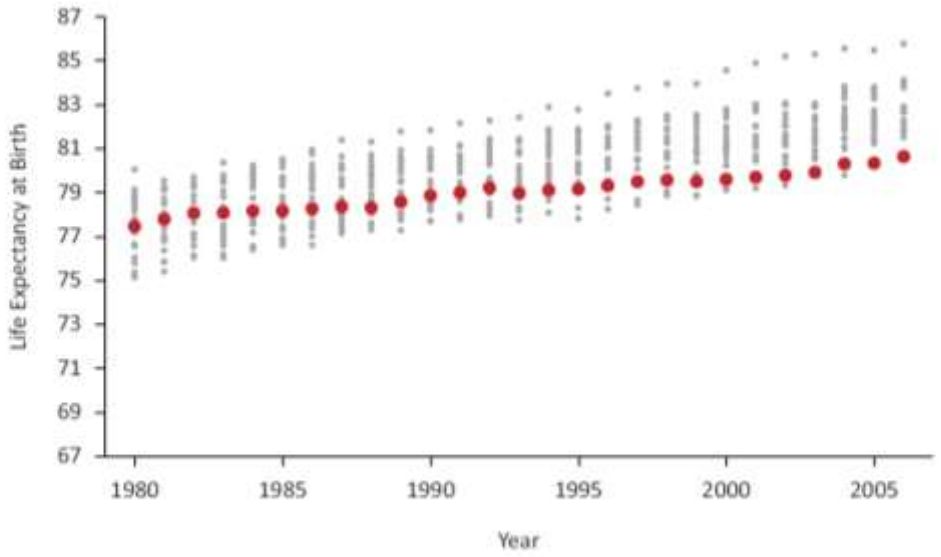
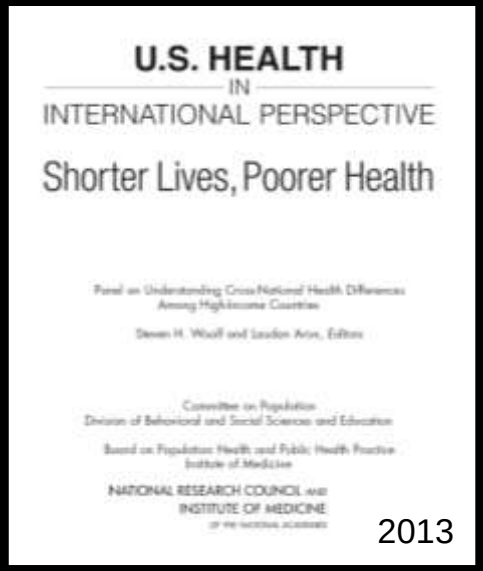


FIGURE 1-6 U.S. female life expectancy at birth relative to 21 other high-income countries, 1980-2006.



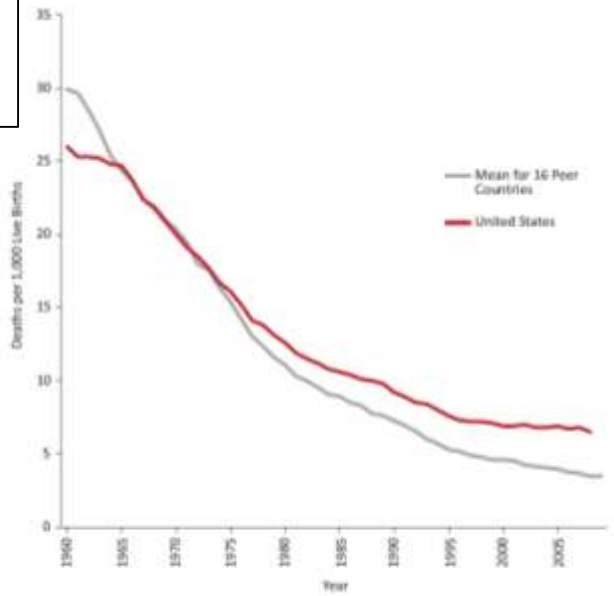


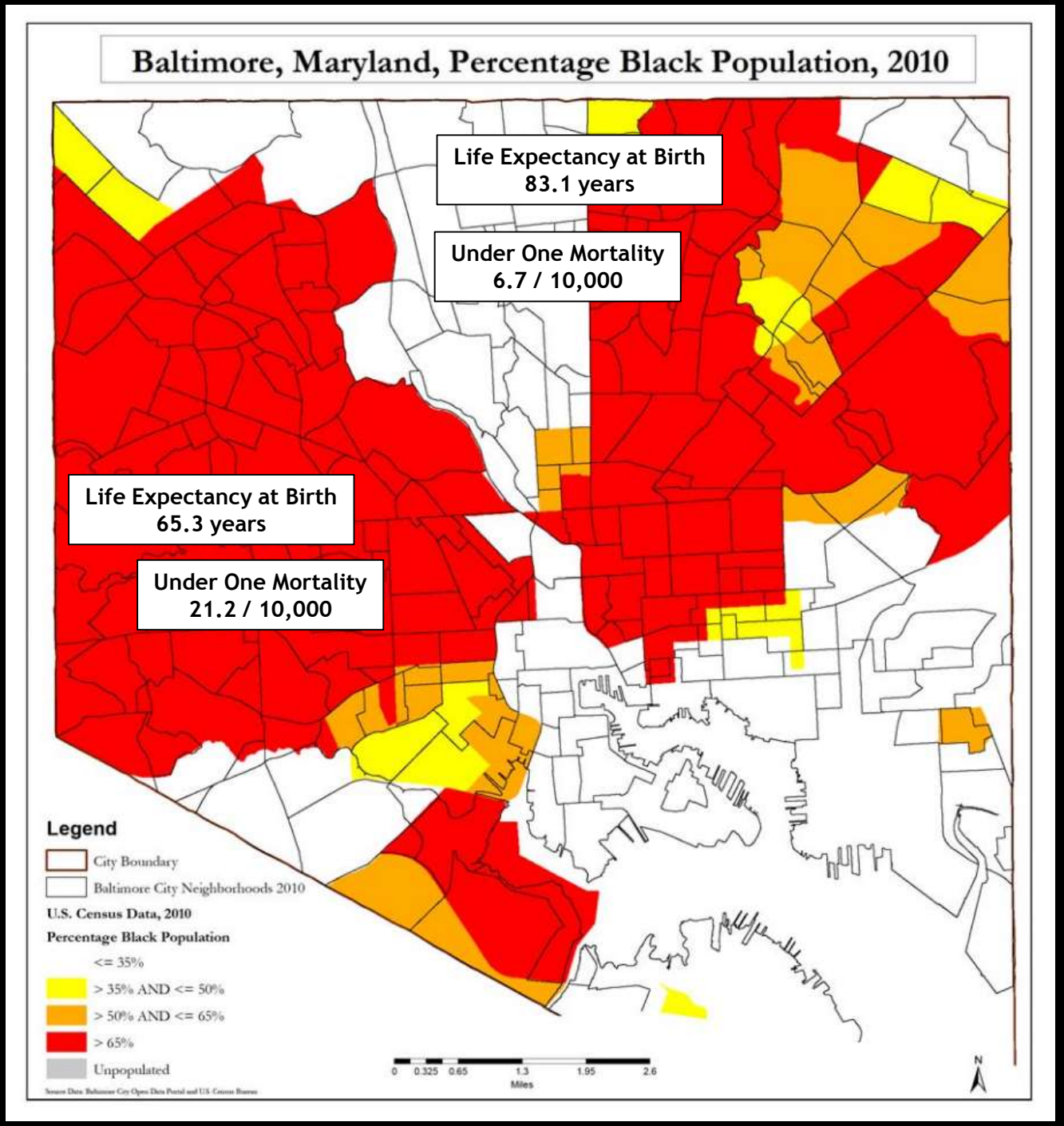
FIGURE 2-4 Infant mortality rates in the United States and average of 16 peer countries, 1960-2009.
NOTE: The average is calculated for the 16 peer countries examined in Chapter 1.
SOURCE: Viner (2012, supplemental analysis).

Baltimore 2015:

- Life expectancy 70.2 vs. 76.2 years (B vs. W)
- Black infants
  - 2x higher likelihood death before 1 year
- Black adults:
  - 8x more likely to die from HIV/AIDS
  - highest rate death CV disease
  - highest rate death from cancer
  - 2x more likely to die DM

"Place not Race" Health Affairs 2011
"Income not Race" JAMA 2016

Basic bias:


Baltimore, Maryland, Percentage Black Population, 2010
Life Expectancy at Birth
83.1 years
Under One Mortality
6.7 / 10,000
Life Expectancy at Birth
65.3 years
Under One Mortality
21.2 / 10,000
Legend
City Boundary
Baltimore City Neighborhoods 2010
U.S. Census Data, 2010
Percentage Black Population
<= 35%
> 35% AND <= 50%
> 50% AND <= 65%
> 65%
Unpopulated
0 0.325 0.65 1.3 1.95 2.6
Miles
N

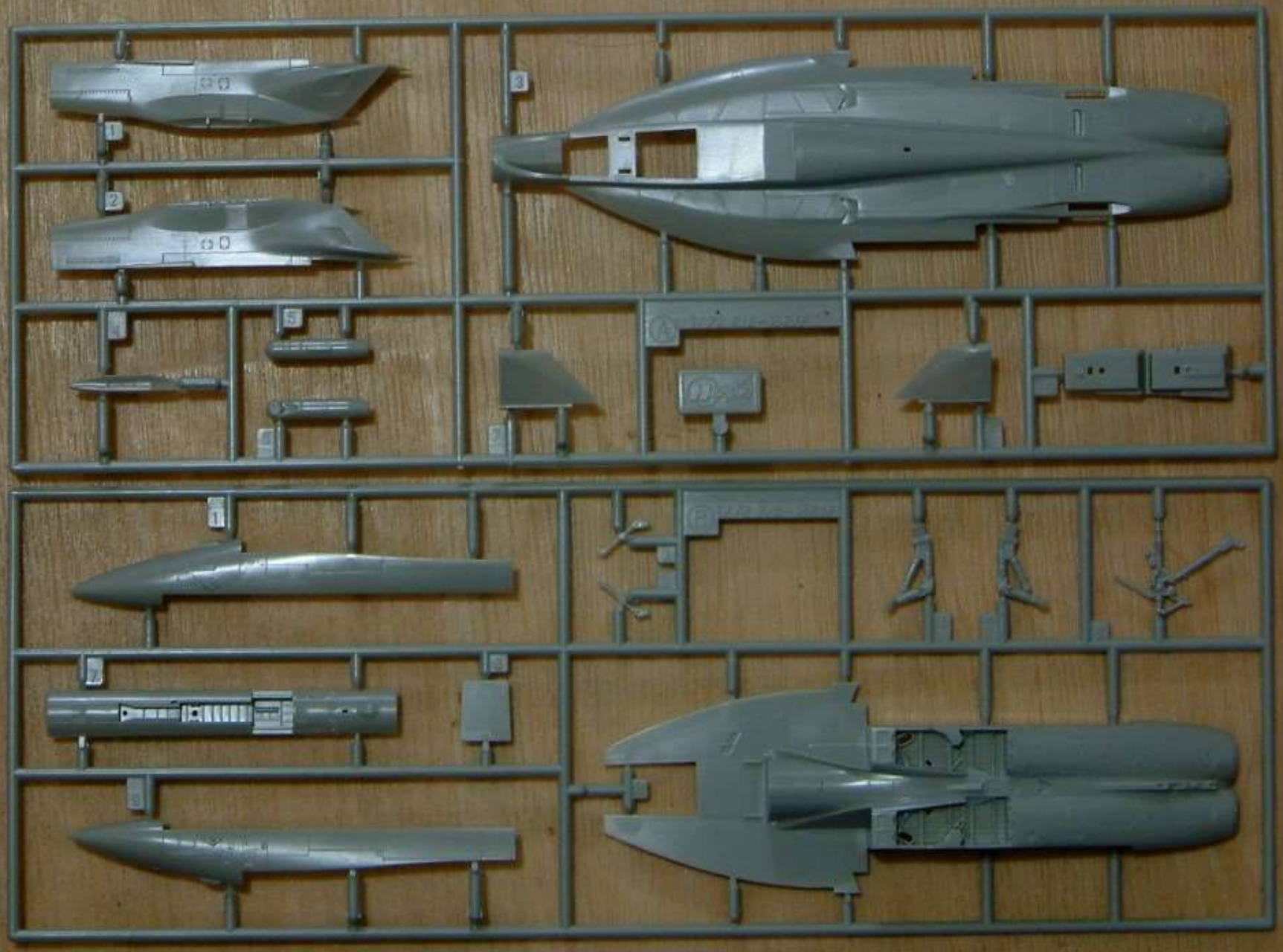
Healthcare Access…

Access ♦ Convenience ♦ Excellence

Information ♦ Insight ♦ Intervention

Basic questions:

…So how?



“All models are wrong…
but some are useful.”

George E. F. Box

Basic definitions:

Public health:
efforts to assure conditions where people can be healthy.

Population health:
the health outcomes of a group of individuals.
(Includes the distribution of outcomes within the group.)

First Revolution:

Communicable Disease

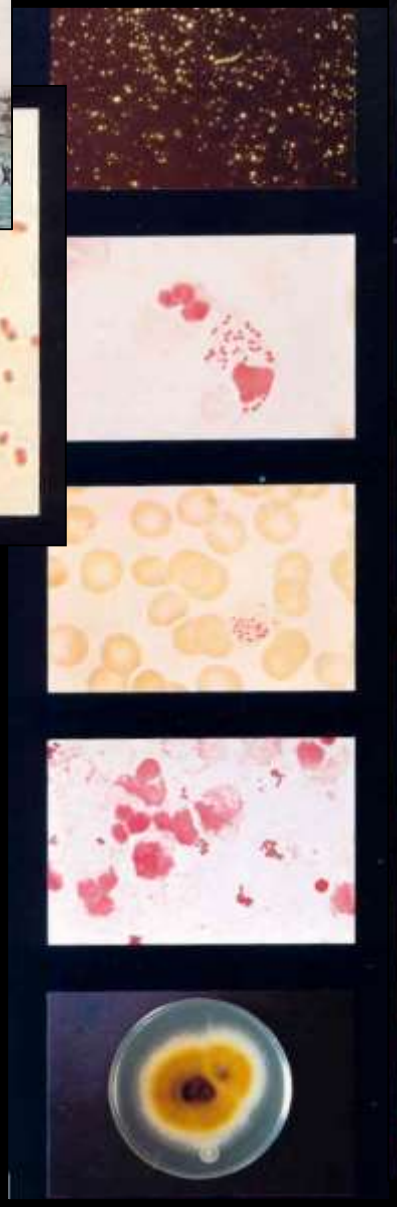
Lester Breslow, MD

Google *"Breslow Third Revolution in Health"*

First Revolution: Communicable Disease

1882

1943



First Revolution and the changing cause of death: *Communicable to Non-communicable causes*

TABLE 1 Death rates for leading causes of death. Death registration states, United States, 1900 and 1948. Source: Abstracted from (1)

Rank order	1900 cause of death	Rate per 100,000	Rank order	1948 cause of death	Rate per 100,000
	All causes	1719		All causes	989
1	Pneumonia, influenza	202	1	Diseases of the heart	323
2	Tuberculosis	194	2	Cancer	135
3	Diarrhea, enteritis	143	3	Intracranial vascular lesions	90
4	Diseases of the heart	137	6	Pneumonia, influenza	39
9	Cancer	64	7	Tuberculosis	30

Breslow L. The Third Revolution in Health. Ann Rev of Pub Health.2003;25

Second Revolution:
Non-communicable Disease

Lester Breslow, MD

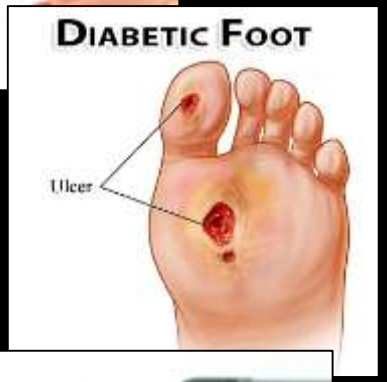
Second Revolution and the cause of death: *Non-communicable causes remain but improving*

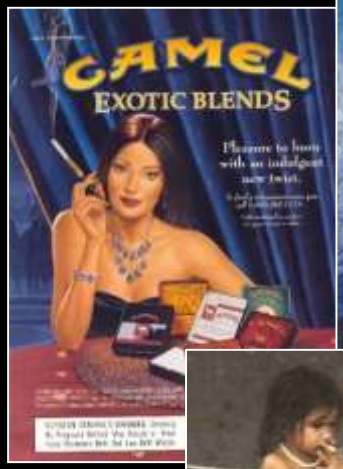
TABLE 2 Age-adjusted death rates, selected causes, selected years, United States. Source: (9)

	All causes	Heart disease	Cerebrovascular disease	Cancer	Diabetes
1950	1446.0	586.8	180.7	193.9	23.1
1960	1339.2	559.0	177.9	193.9	22.5
1980	1039.1	412.1	96.2	207.9	18.1
1990	938.7	321.8	65.3	216.0	20.7
1999	886.9	272.4	59.5	202.4	24.2

Breslow L. The Third Revolution in Health. Ann Rev of Pub Health.2003;25

Second Revolution:
Non- Communicable “Chronic” Disease



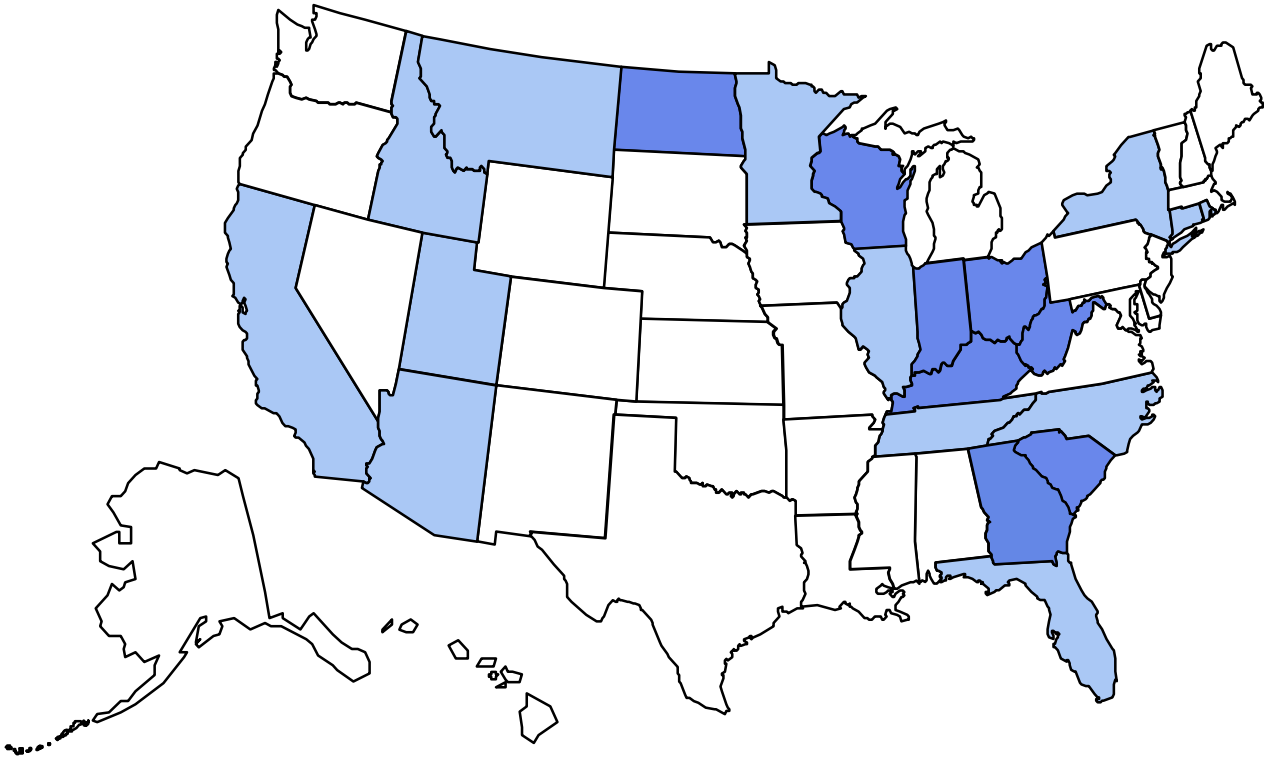


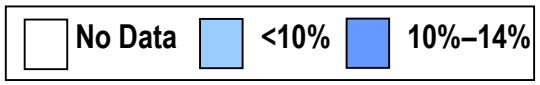
Second Revolution:
Affluence and Chronic Disease

Obesity Trends* Among U.S. Adults

BRFSS, 1985

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)



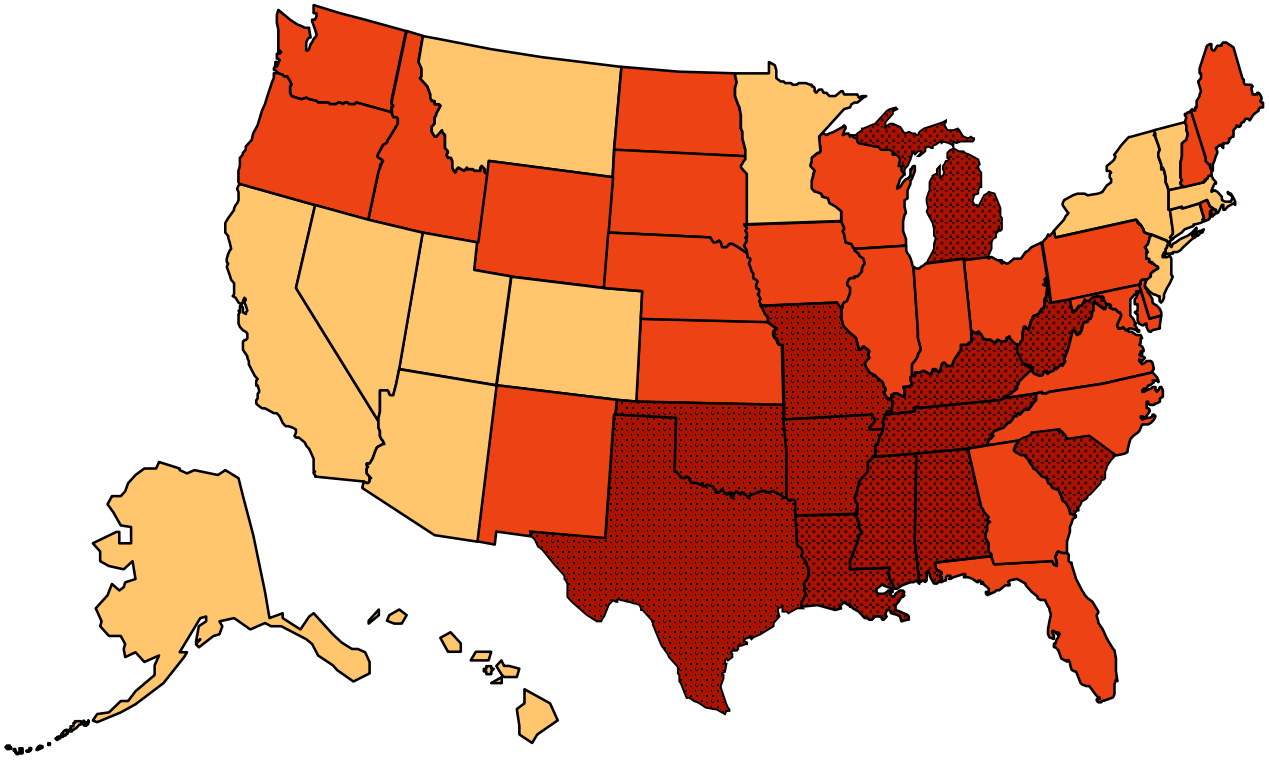


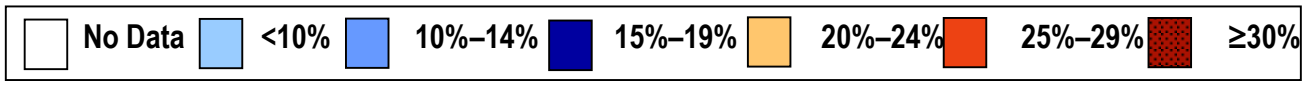
Source: Behavioral Risk Factor Surveillance System, CDC.

Obesity Trends* Among U.S. Adults

BRFSS, 2010

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

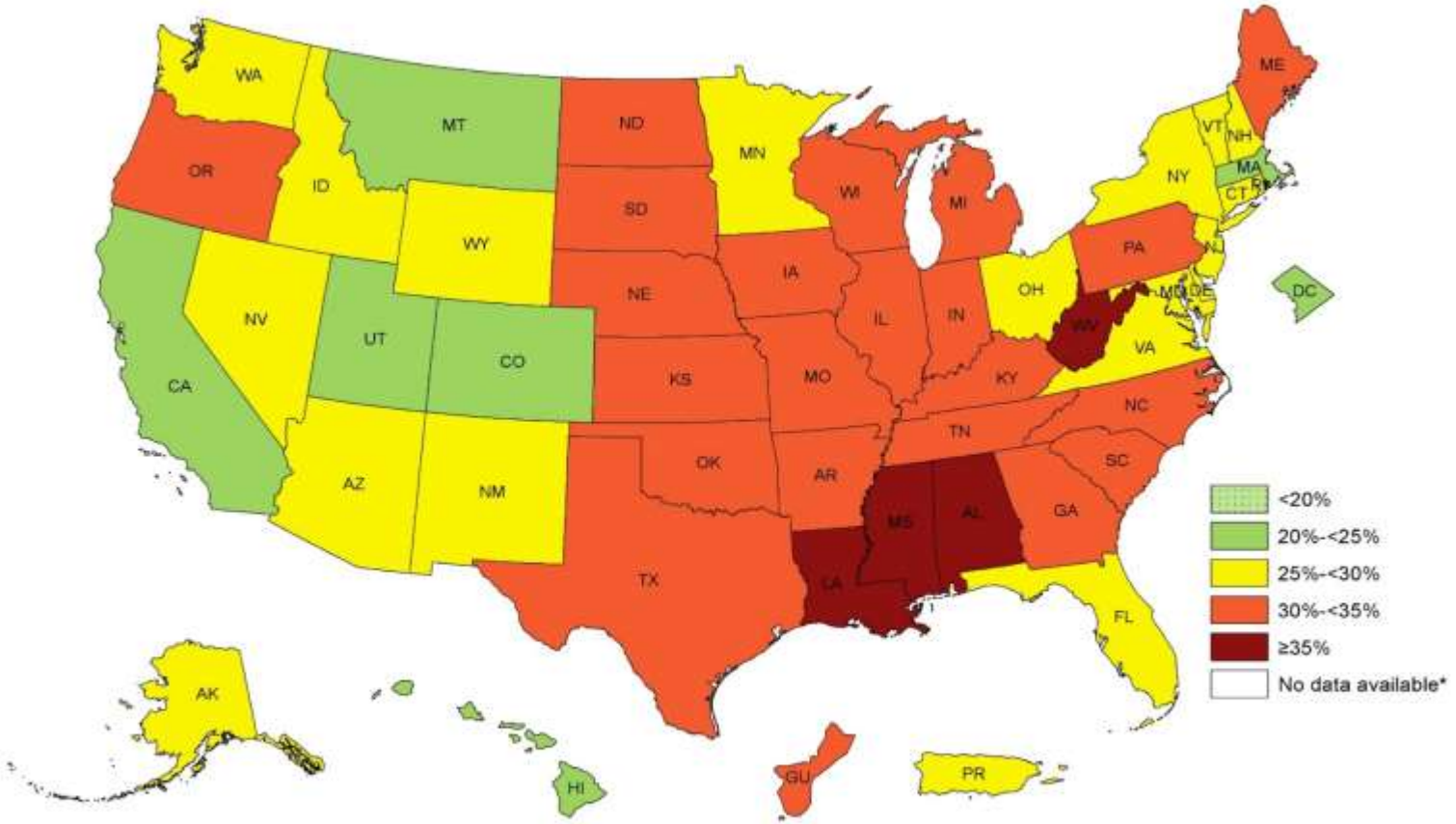




Source: Behavioral Risk Factor Surveillance System, CDC.

Prevalence¶ of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2015

¶ Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

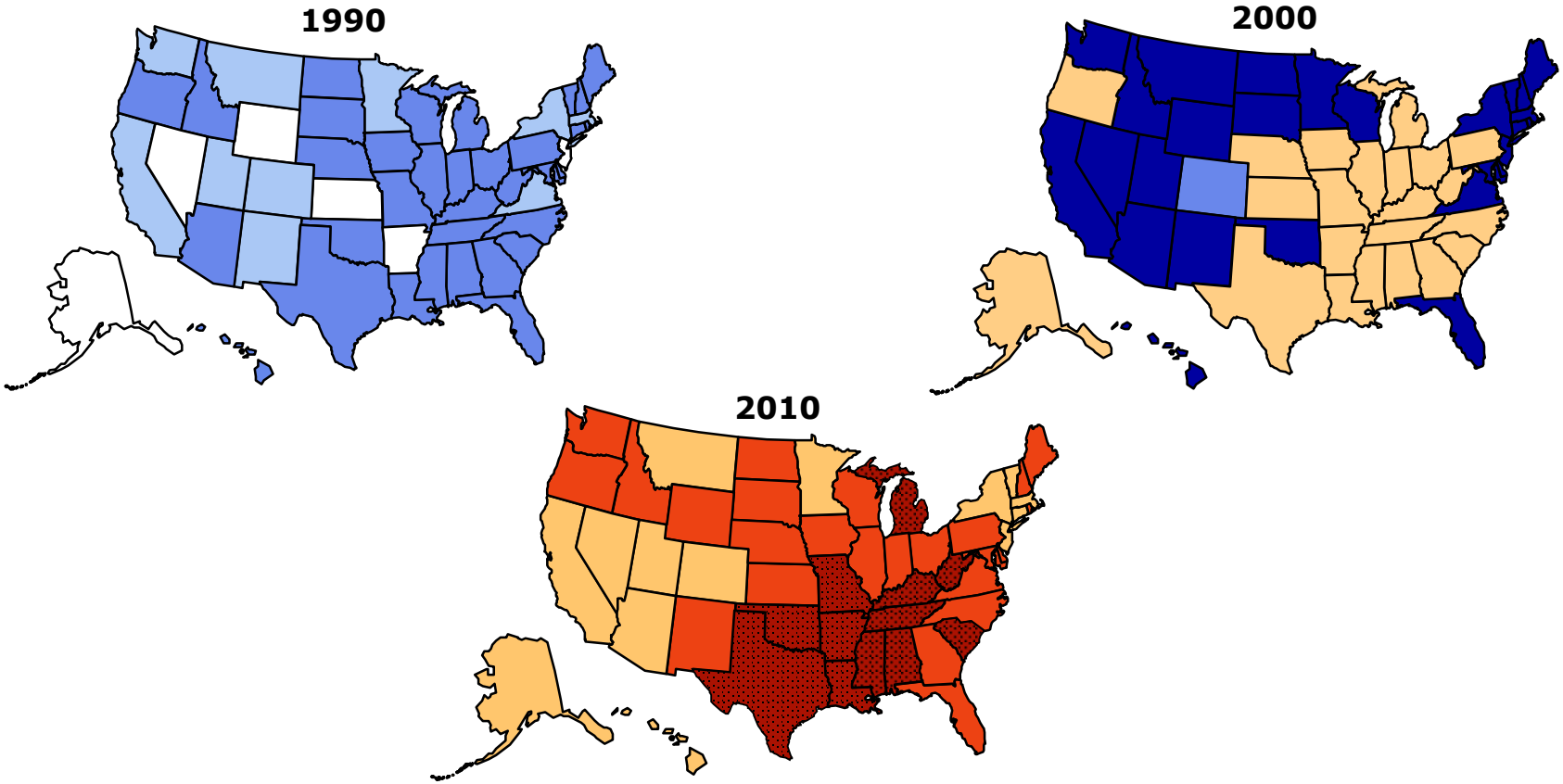


***Sample size <50 or the relative standard error (dividing the standard error by the prevalence) ≥ 30%.**

Obesity Trends* Among U.S. Adults

BRFSS, 1990, 2000, 2010

(*BMI ≥30, or about 30 lbs. overweight for 5’4” person)



Source: Behavioral Risk Factor Surveillance System, CDC.

Third Revolution:
Building health*

*More than just the absence of disease.

Lester Breslow, MD


“Am I well?”


Assure
Insure
Restore
Well-being

Ecology of Health Care:

The patients aren't "in" the hospital

9 inpatients vs. 330 outpatients 1000/month

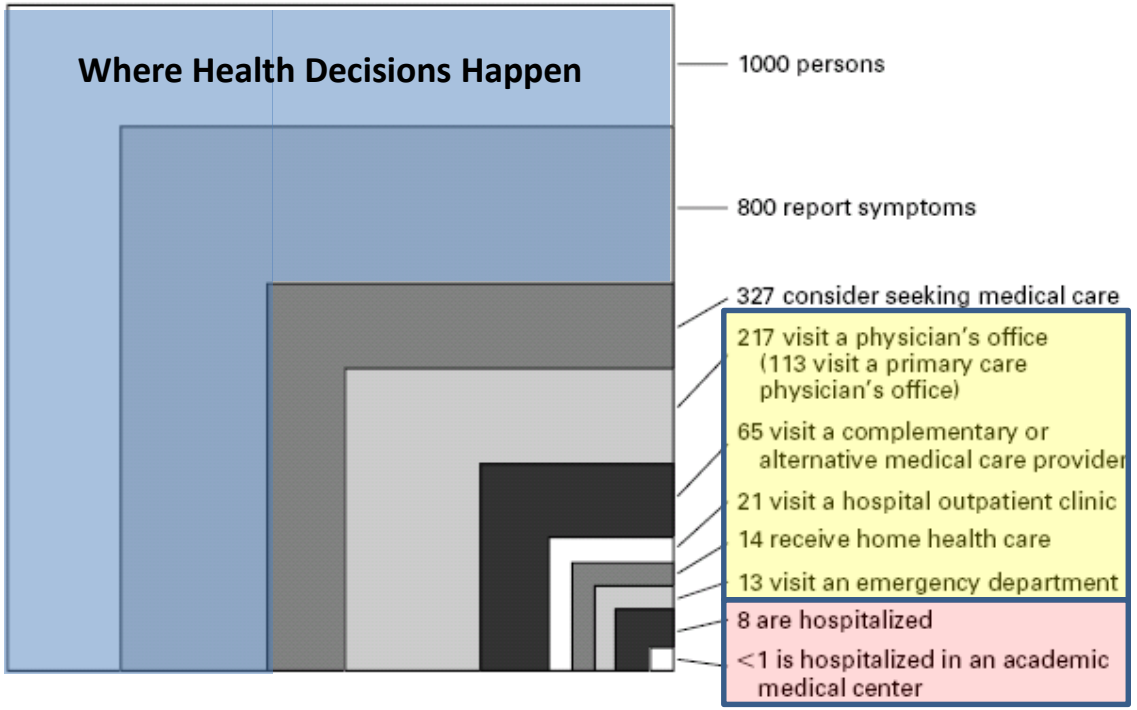
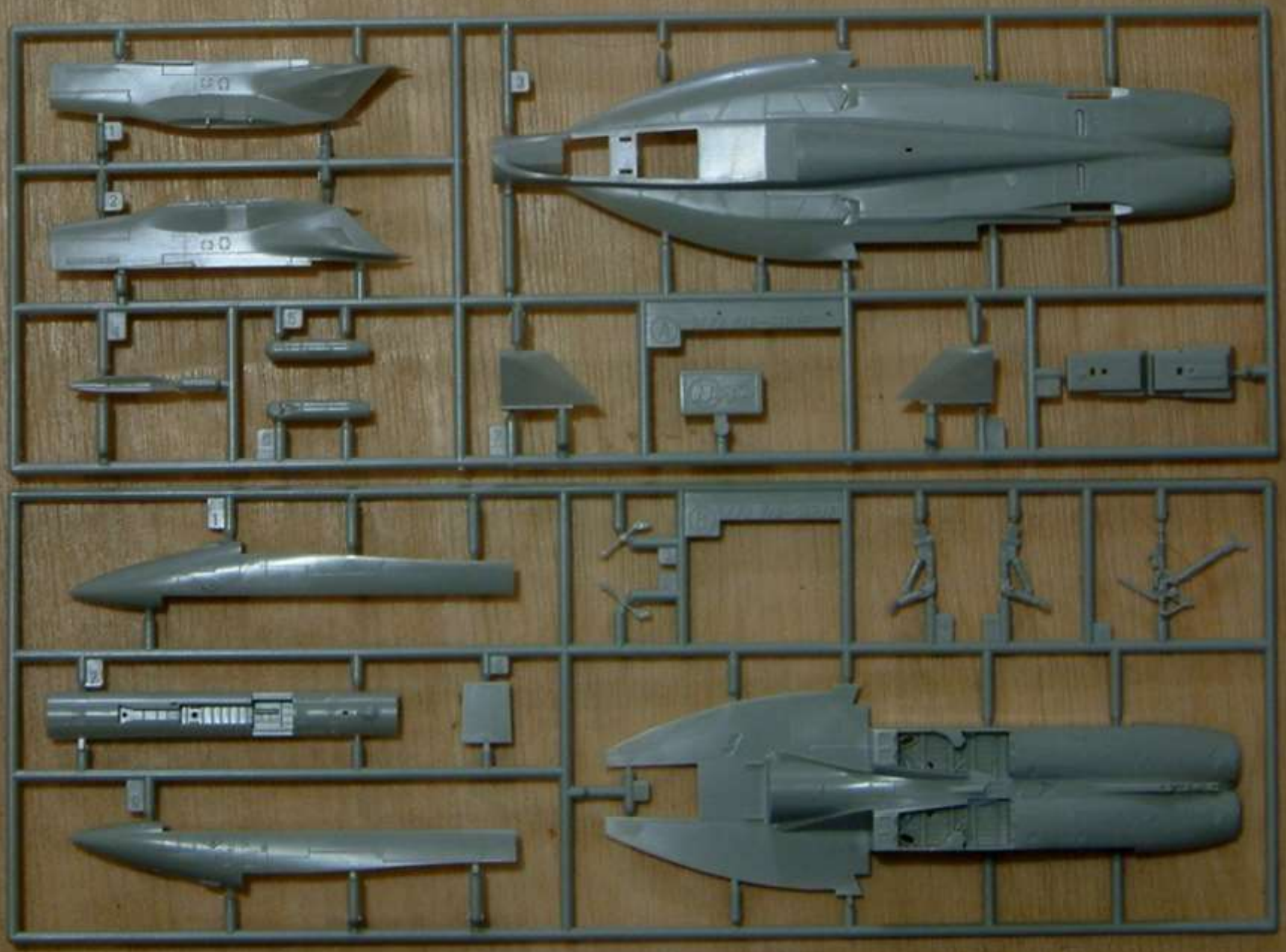


Figure 2. Results of a Reanalysis of the Monthly Prevalence of Illness in the Community and the Roles of Various Sources of Health Care.

Each box represents a subgroup of the largest box, which comprises 1000 persons. Data are for persons of all ages.

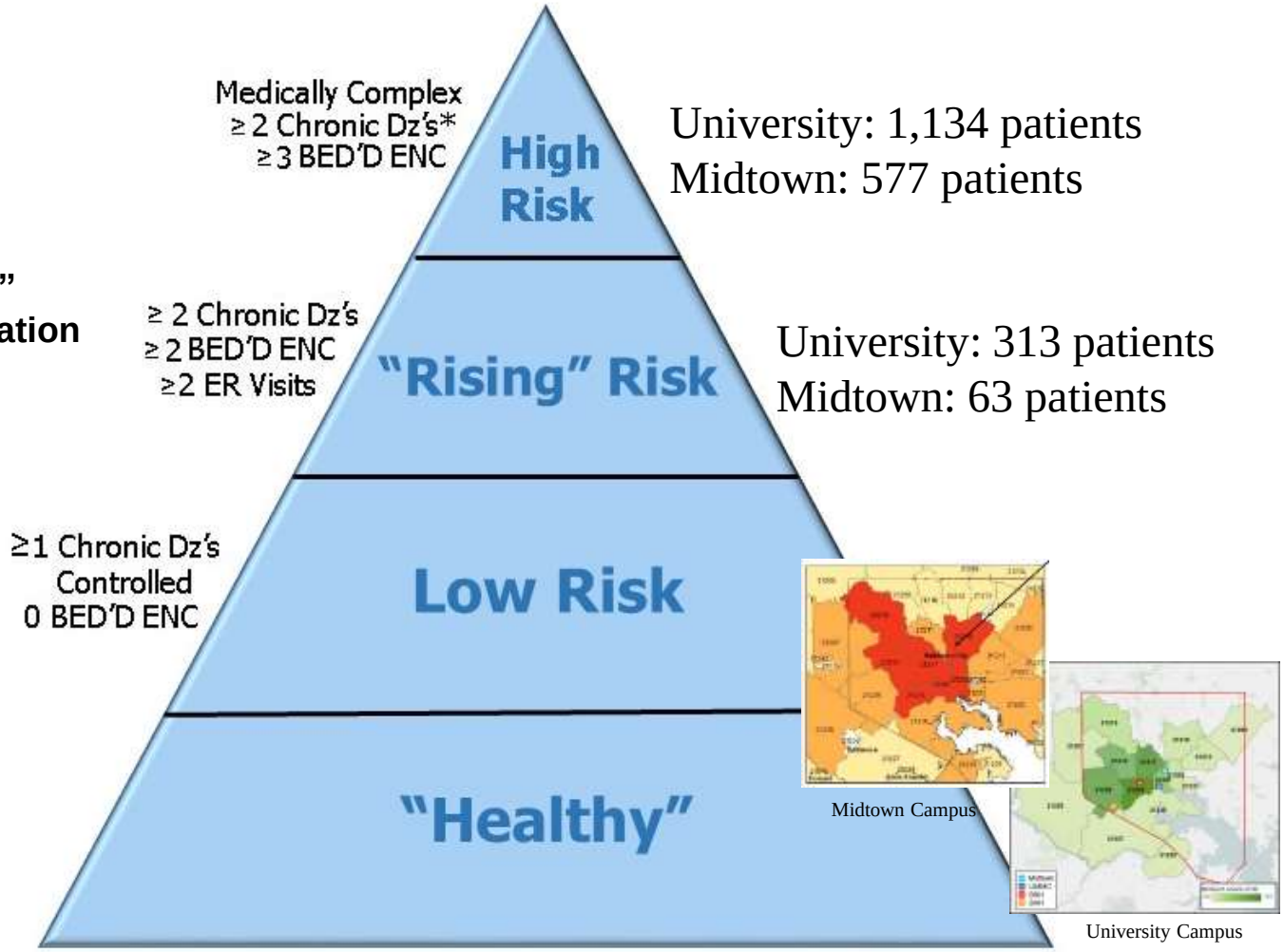
Green LA et al. The ecology of health care revisited. New Engl J Med 2001;344:2021-2024.



UMMC Approach to Patient Populations

Updated HSCRC Risk Definitions December 2016

"BED'D ENC"
"Bedded Encounter"
(Inpatient or observation hospital stay.)



* Hypertension, Chronic Obstructive Pulmonary Disease, Diabetes, Congestive Heart Failure
(Pediatric: asthma, sickle-cell anemia, seizures/neurologic/developmental delay, pneumonia/chronic lung disease)

UMMC: Simultaneous approach to small "p" and capital "P" Population health

population health (*small "p"*)

- *Peak* of the pyramid
- Health & well-being of population *affects healthcare institution*
- *Short-term* imperatives and ROI
- Requires investment in the *healthcare system*
- *Healthcare system-based* interventions and metrics
- Seen through the lens of the *healthcare provider*
- Tendency to be *"pejorative"*

Population health (*capital "P"*)

- *Base* of the pyramid
- Healthcare institution *affects health & well-being of population*
- *Long-term* imperatives and ROI
- Requires investment *in community*
- *Community-based* interventions and metrics
- Seen through the lens of the *healthcare recipient*
- Tendency to be *"restorative"*

Population Health and the "Three Block" Medical Neighborhood

February 2017

2. 
SPECIALTY CARE

Patient-Centered Specialty Care Practice

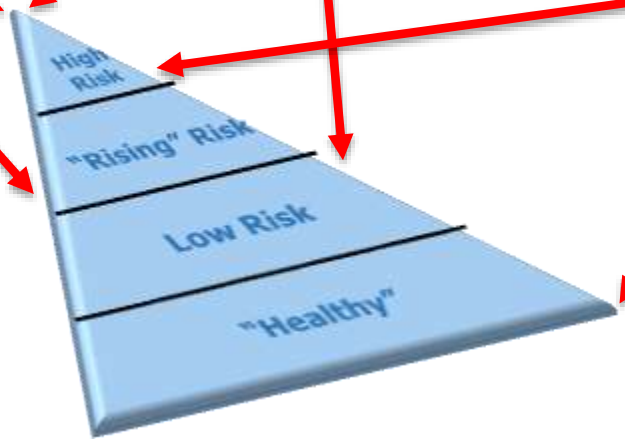
1. 

HOSPITAL CARE

Inpatient / Emergency Care

3. 
PRIMARY CARE

Patient-Centered Primary Care Medical Home



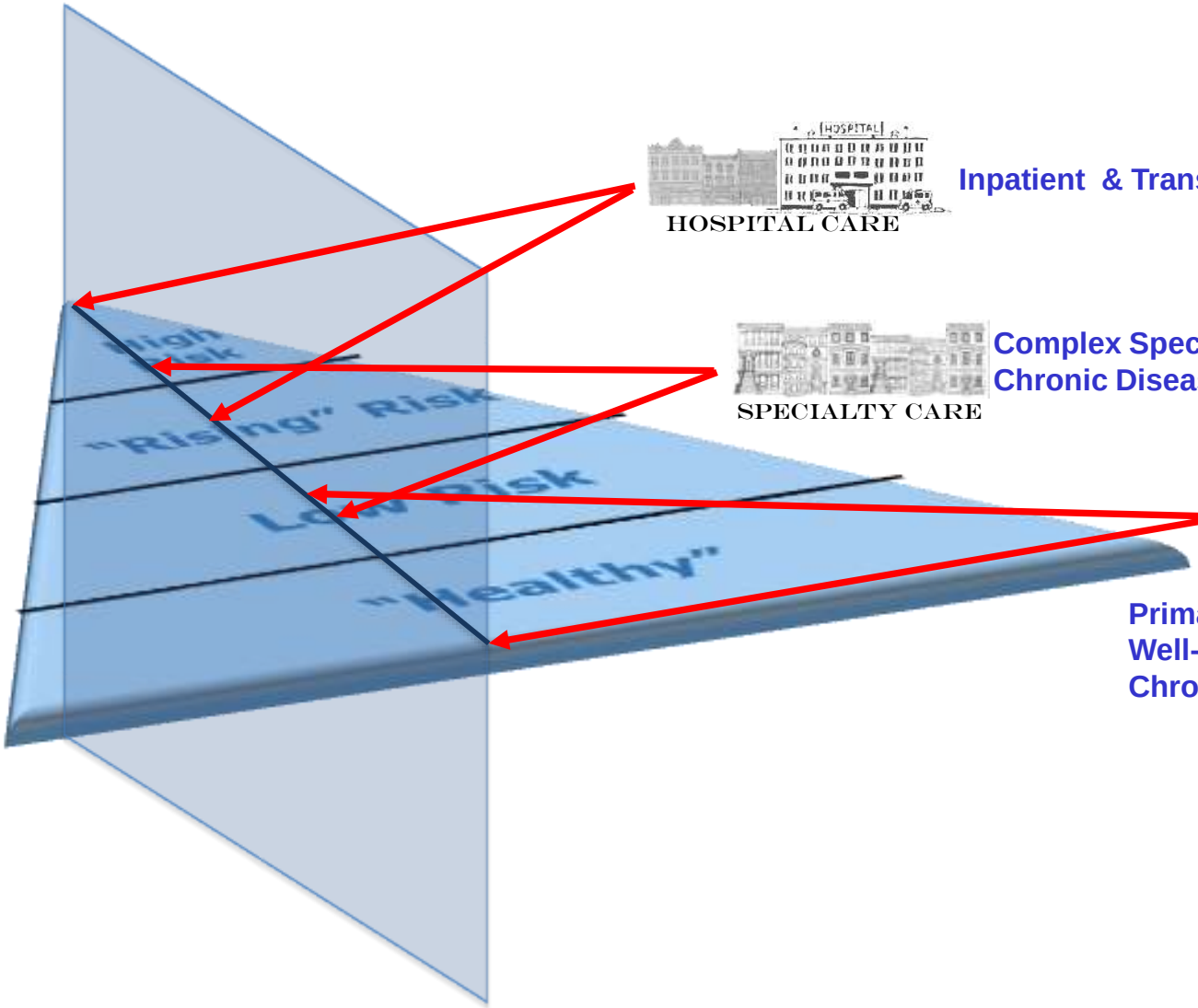

CONNECT & COORDINATE

Transitional Care Coordination (TCC)

Home
Family
Community
Schools
Congregations


HOME

"Cross-Sectional" Approach



HOSPITAL CARE

Inpatient & Transitional Care Coordination

SPECIALTY CARE

Complex Specialty-Based
Chronic Disease Management

PRIMARY CARE

Primary Care
Well-Care
Chronic Disease Management

UNIVERSITY of MARYLAND
COORDINATED CARE
CENTER

The Coordinated Care Center ("C3")
36 W Paca St, Baltimore Maryland

Coordinated Care Center Outcomes

Intensive Ambulatory Care (as of February 12, 2017)

Patient referrals:

- 930 scheduled appointments
- 562 arrived visits
  - 60% appointment completion rate
  - 13% no-show rate

    (others cancellation, reschedule etc.)
  - Transportation supported as needed
- 223 unique patients
- *70% reduction in rate for all admissions*
  - *243 pre program – 73 post program*

Coordinated Care Center Outcomes

Heart Failure Readmission Initiative (as of February 12, 2017)

Patient referrals:

- 399 scheduled appointments
- 225 arrived visits
  - 56% appointment completion rate
  - 9% no-show rate

    (others cancellation, reschedule etc.)
  - Transportation supported as needed
- 107 unique patients
- *92% reduction in rate for all admissions*
  - *147 pre program – 12 post program*

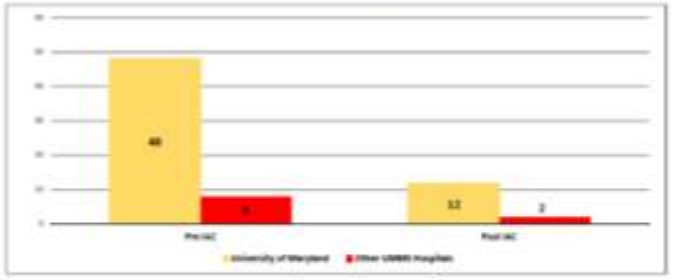
Coordinated Care Center

Excellent early progress

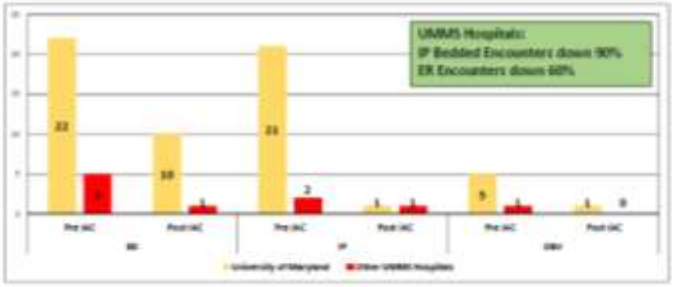
Unique Patients:24

UMMC C3/IAC Patient Analysis

UMMS Hospitals

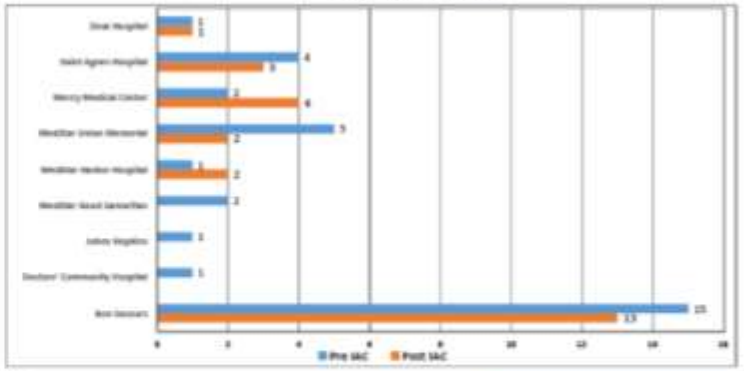


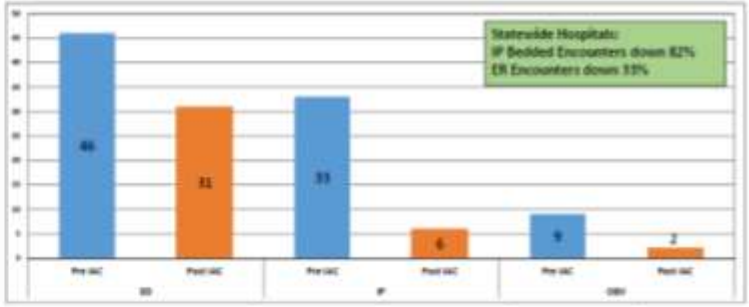
Hospitals	Pre IAC	Post IAC
University of Maryland	46	12
UM Medical Center Midtown Campus	0	2
Harford Memorial	1	0
Upper Chesapeake Medical Center	1	0
UMMS Total	59	14



	ED		IP		OBV	
Hospital	Pre IAC	Post IAC	Pre IAC	Post IAC	Pre IAC	Post IAC
University of Maryland	22	10	21	1	5	1
UM Medical Center Midtown Campus	0	1	0	1	1	0
Harford Memorial	0	0	1	0	0	0
Upper Chesapeake Medical Center	0	0	1	0	0	0
UMMS Total	27	11	23	2	6	1
Total Utilization % Change Pre to Post	(59.3%)		(91.3%)		(83.3%)	

Statewide Effect

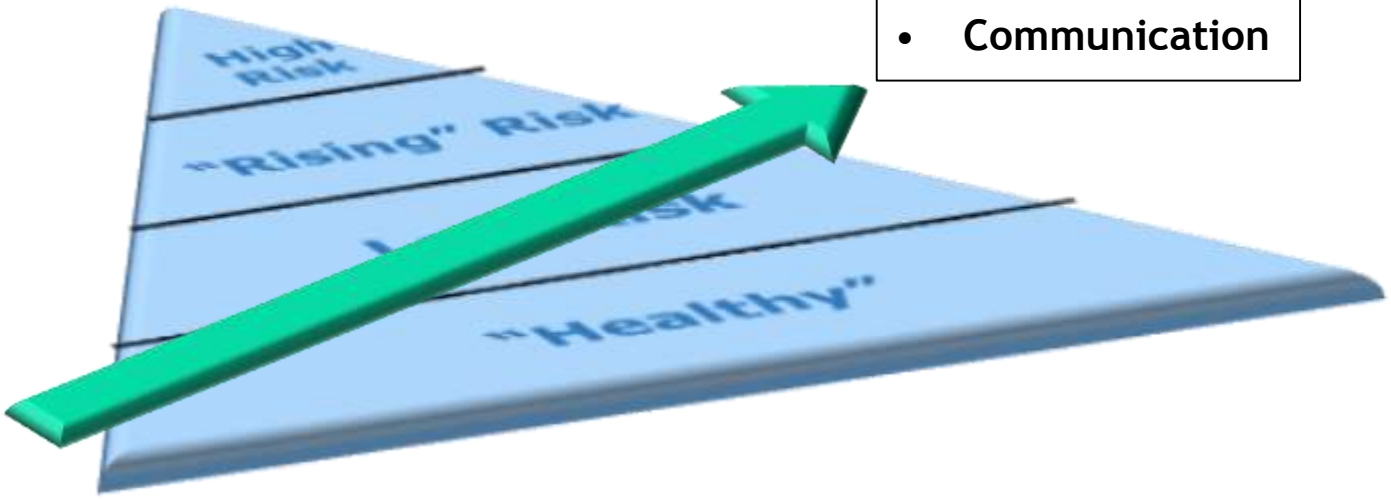




	ED		IP		OBV		Total Visits	
Hospitals	Pre IAC	Post IAC	Pre IAC	Post IAC	Pre IAC	Post IAC	Pre IAC	Post IAC
University of Maryland	22	10	21	1	5	1	48	12
UM Medical Center Midtown Campus	0	1	0	1	1	0	1	2
Harford Memorial	0	0	1	0	0	0	1	0
Upper Chesapeake Medical Center	0	0	1	0	0	0	1	0
Bon Secours	11	12	4	1			15	13
Doctors' Community Hospital					1		1	0
Johns Hopkins	1						1	0
MedStar Good Samaritan	1		1				2	0
MedStar Harbor Hospital	1	1		1			1	2
MedStar Union Memorial	2	1	3	1			5	2
Mercy Medical Center		4	1		1		2	4
Saint Agnes Hospital	3	2	1			1	4	3
Sinai Hospital				1	1		1	1
UMMS Total	27	11	23	2	9	1	56	14
Non-UMMS Total	19	20	10	4	3	1	32	25
Grand Total	46	31	33	6	9	2	88	39
Total Utilization % Change Pre to Post	(32.6%)		(81.8%)		(77.8%)		(55.7%)	

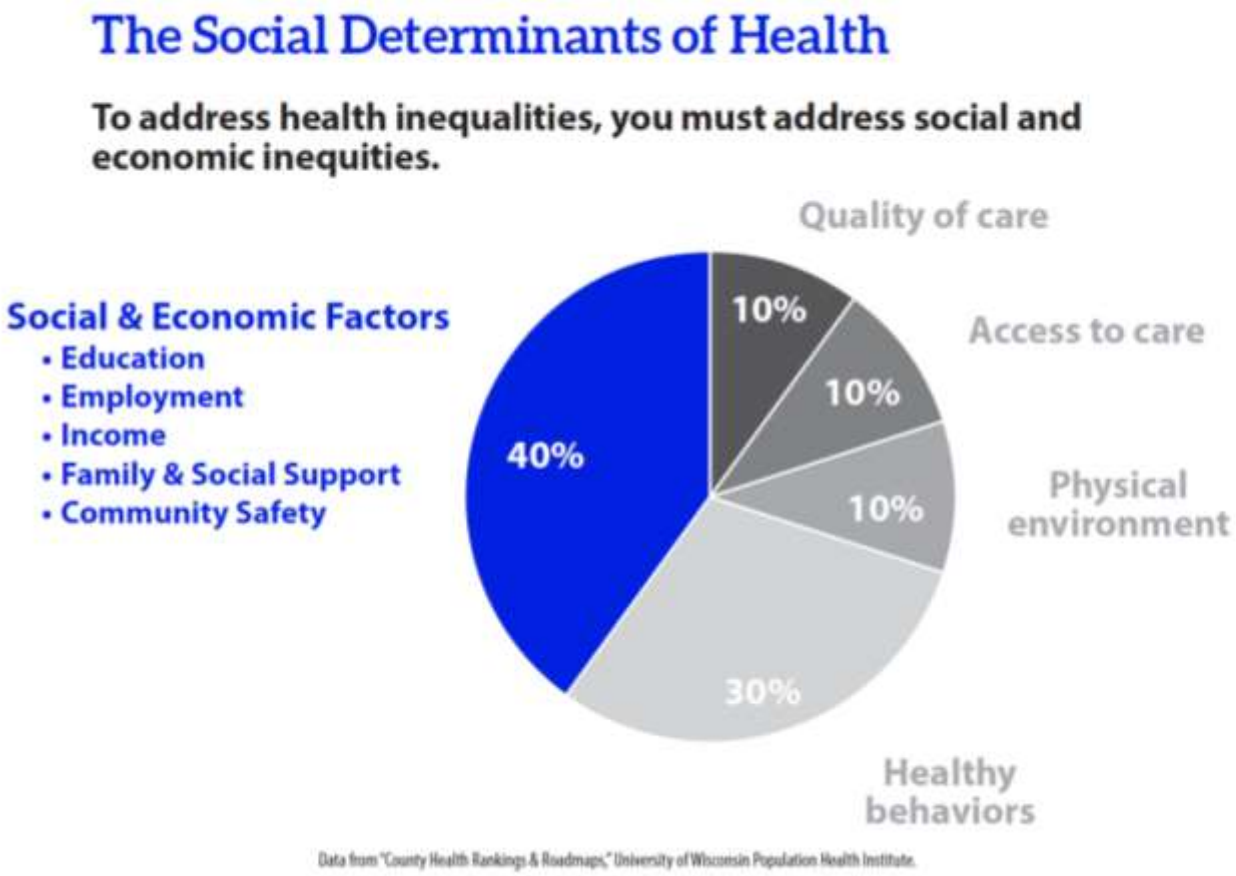
Notes: CRISP Data
Analysis of Given Patient list From 7/1/2016 to 11/31/2016
Intersystem Volume is based upon patient initial visit date
Patients selected based upon an initial visit date of September
Statewide Volume calculated based on Oct. 1 as initial visit.

"Universal" Approach



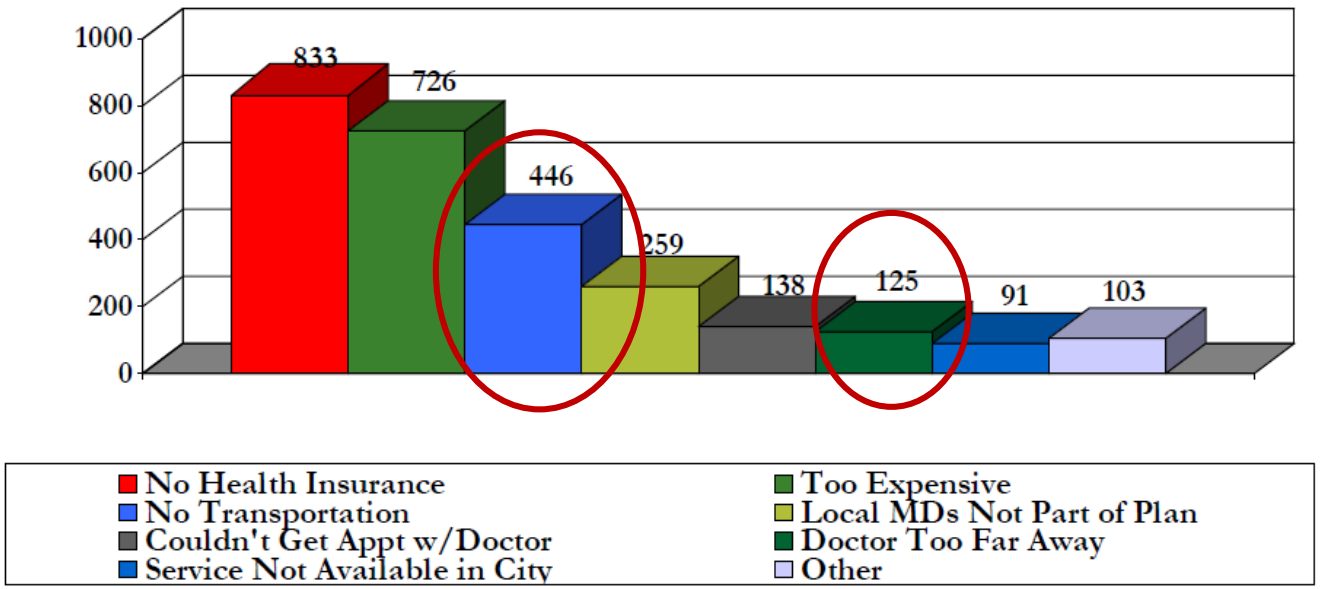
- Housing
- Health literacy
- Transportation
- Employment
- Communication

Impact of the Social Determinants of Health



UMMC Community Health Needs Assessment 2014

Chart 2 – Community's Top Barriers to Healthcare (All Baltimore City)



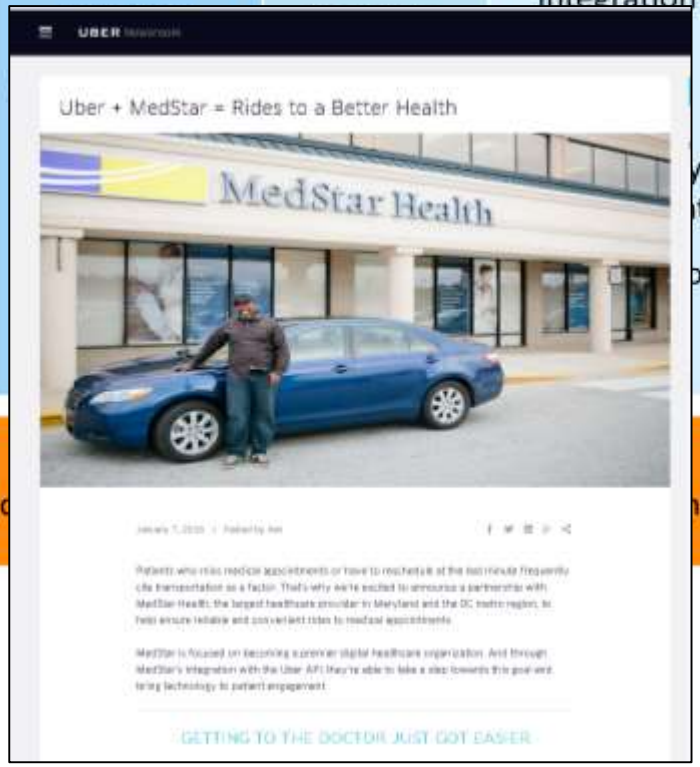
(N = 1,212)

West Baltimore population survey identify transportation as a major healthcare barrier.

Social Determinants of Health: Priorities and Partners

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social integration	Health coverage
Income	Transportation				Provider availability
Expenses	Safety				Provider linguistic and cultural competency
Debt	Parks				Quality of care
Medical bills	Playgrounds				
Support	Walkability				

Mortality, Morbidity, Life Expectanc ... nctional Limitations



THE HENRY J. KAISER FAMILY FOUNDATION

Integrity
Honor
Faith
Emotional Intelligence
Problem Solving Skills
Video Moderation
Good Body Image
Self-Discipline
True Friends
Study Skills
Literacy
Hobbies
Sport
Music
Ability to Dialogue
Living Wage
Relaxation
Good Sleep
Healthy Weight
Health Literacy
Marital Support
Aerobic Exercise
Parenting Mentors
EtOH in Moderation
Health and Well-Being
Reproductive Health
Rest
To love and be loved...
High School Diploma
Educational Success
Equal Opportunities
Developmental Milestones
Fruits & Vegetables
30 Million Words
Preschool
Reading
Play
0-3 Programs
Immunizations
Well-child visits
Secure Attachment
Good parenting
Fair Housing
Trauma-Free
Drug-Free Home
Access to Nature
Safe Neighborhood
Tobacco Free Home
Communication/Internet
The Chance to Serve
Vocational Training
Healthcare Access
Financial Acumen
Adequate Income
Higher-Education
Meaningful Work
Employment
Civic-Sense
Vocation
Hope
Culture
Justice
Violence Prevention
Good Public Policy
Community
Healthy Delivery
Nutritious Food
Parenting Classes
Smoking Cessation
Vitamins
Visits
Prenatal
Environmental Safety
Water
Housing
Greenspace
Transportation
Fresh Food
Safety
Support Systems
Family
...longitudinal approach
Baltimore

Basic questions:

...So how?

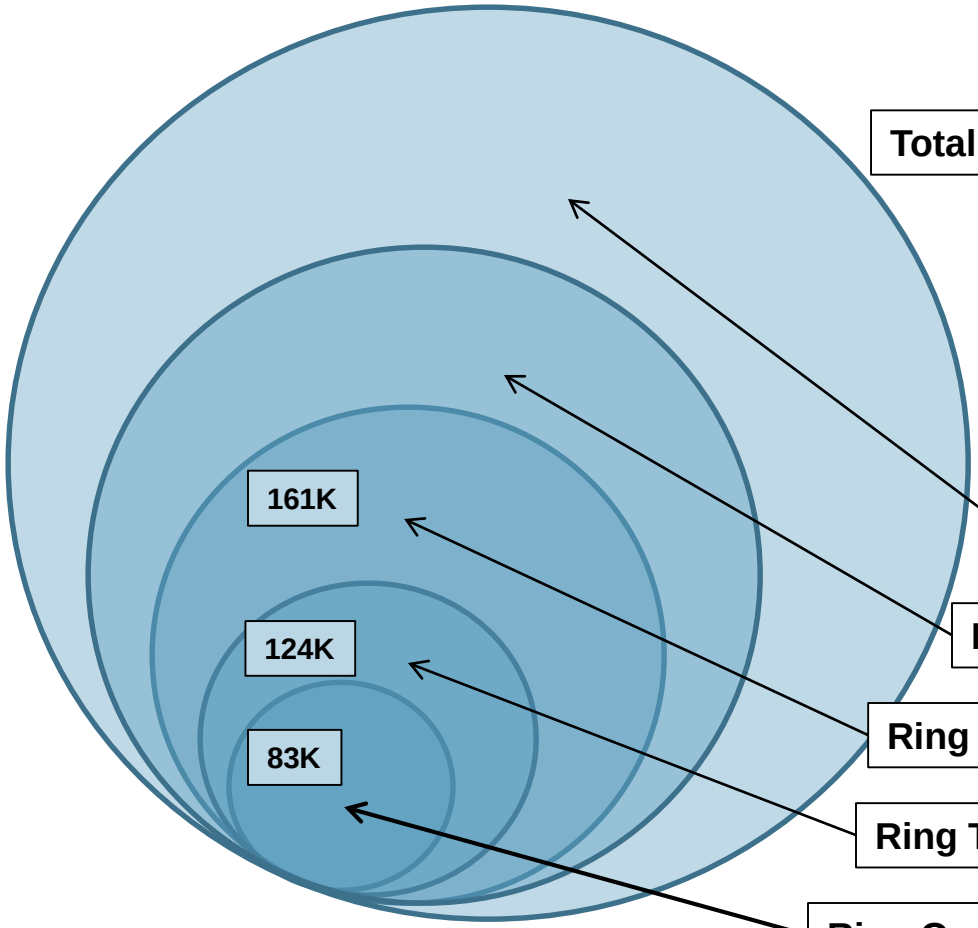
Medical Homes in a Medical Neighborhood caring for our military family.

“Ring Alignment”

Specialty Care and the Medical Neighborhood in an Integrated Delivery System

Fort Belvoir Community Hospital

Fort Belvoir Community Hospital: Specialty Care Capacity Alignment & Recapture



Total Catchment TriCare Prime = 161K

Ring Five: Others Global

Ring Four: Others in Region

Ring Three: Civ. Network Enrolled = 37K

Ring Two: Other MTF Enrolled = 41K

Ring One: FBCH MTF Enrolled = 83K

Ecology of Health Care:
The patients aren't "in" the hospital

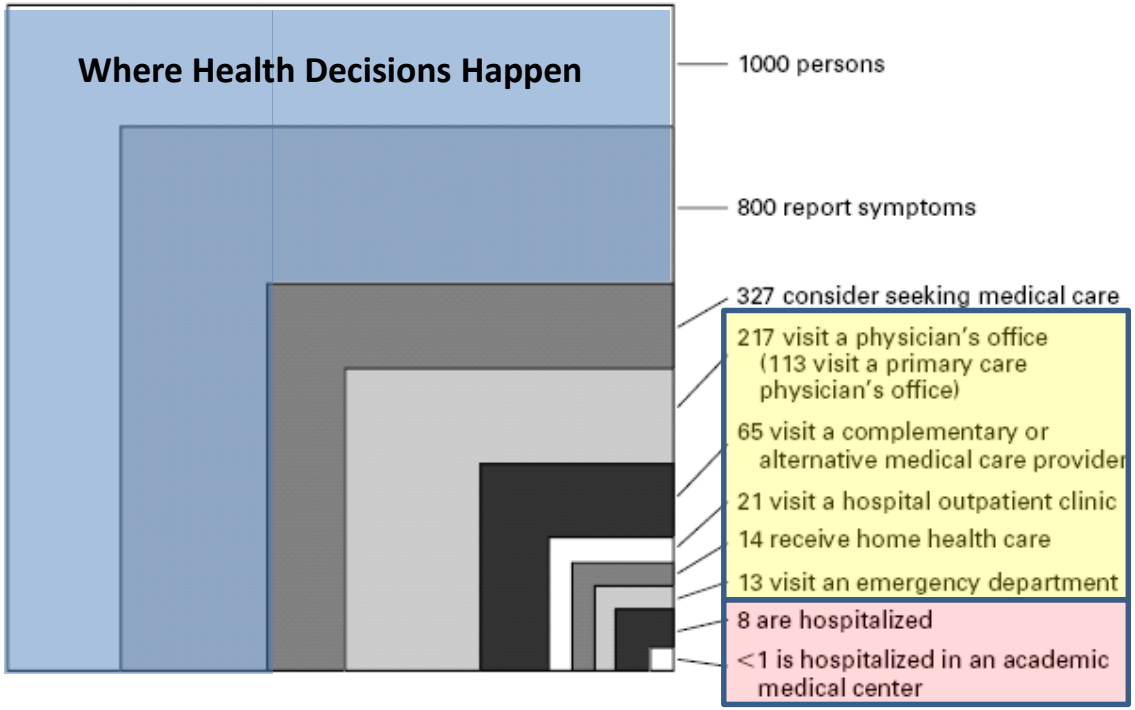


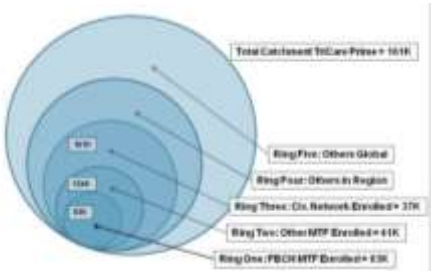
Figure 2. Results of a Reanalysis of the Monthly Prevalence of Illness in the Community and the Roles of Various Sources of Health Care.

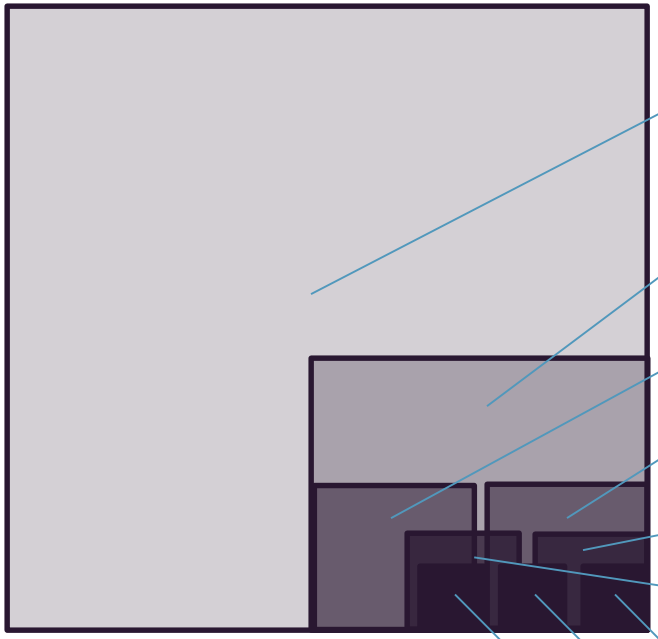
Each box represents a subgroup of the largest box, which comprises 1000 persons. Data are for persons of all ages.

Green LA et al. The ecology of health care revisited. New Engl J Med 2001;344:2021-2024.

Fort Belvoir Community Hospital:
Ring One & Two – All No. Virginia MTF Enrolled*

Number of Consults / Specialty / 1000 persons / month



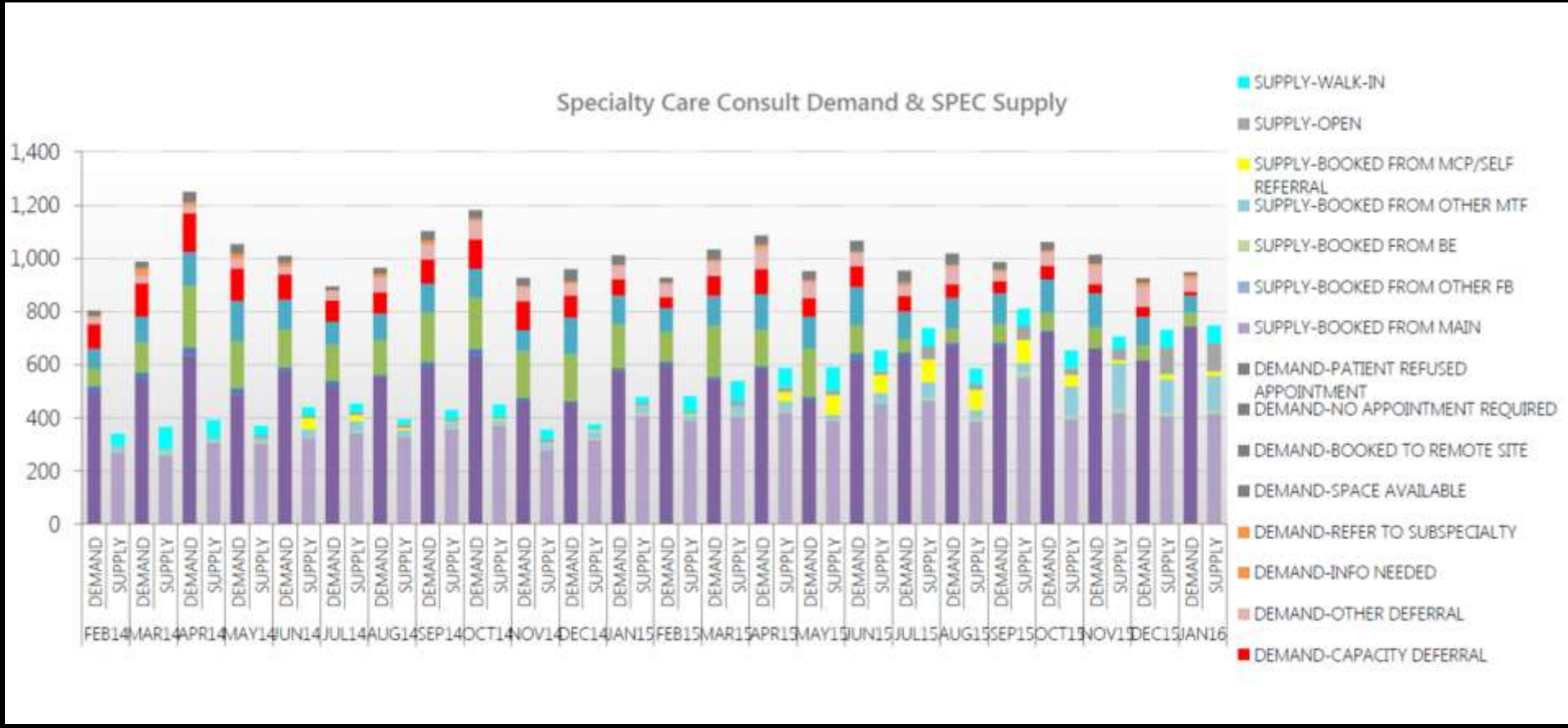


Total Rings: 124K

For 1000 persons:	Total New Patient Consults Needed per month:
Physical Therapy: 14	1736
Orthopedics: 10	1240
Dermatology: 10	1240
Cardiology: 5	620
Gastroenterology: 7	868
Ophthalmology: 4	496
Podiatry: 5	620
ENT: 4	496

*FBCH, Dumfries, Fairfax, Quantico, Rader, Pentagon, Dahlgreen

Fort Belvoir Physical Therapy "Demand Signal" and Adjustment:
Increased supply by focusing on demand.



Basic **assumptions**:

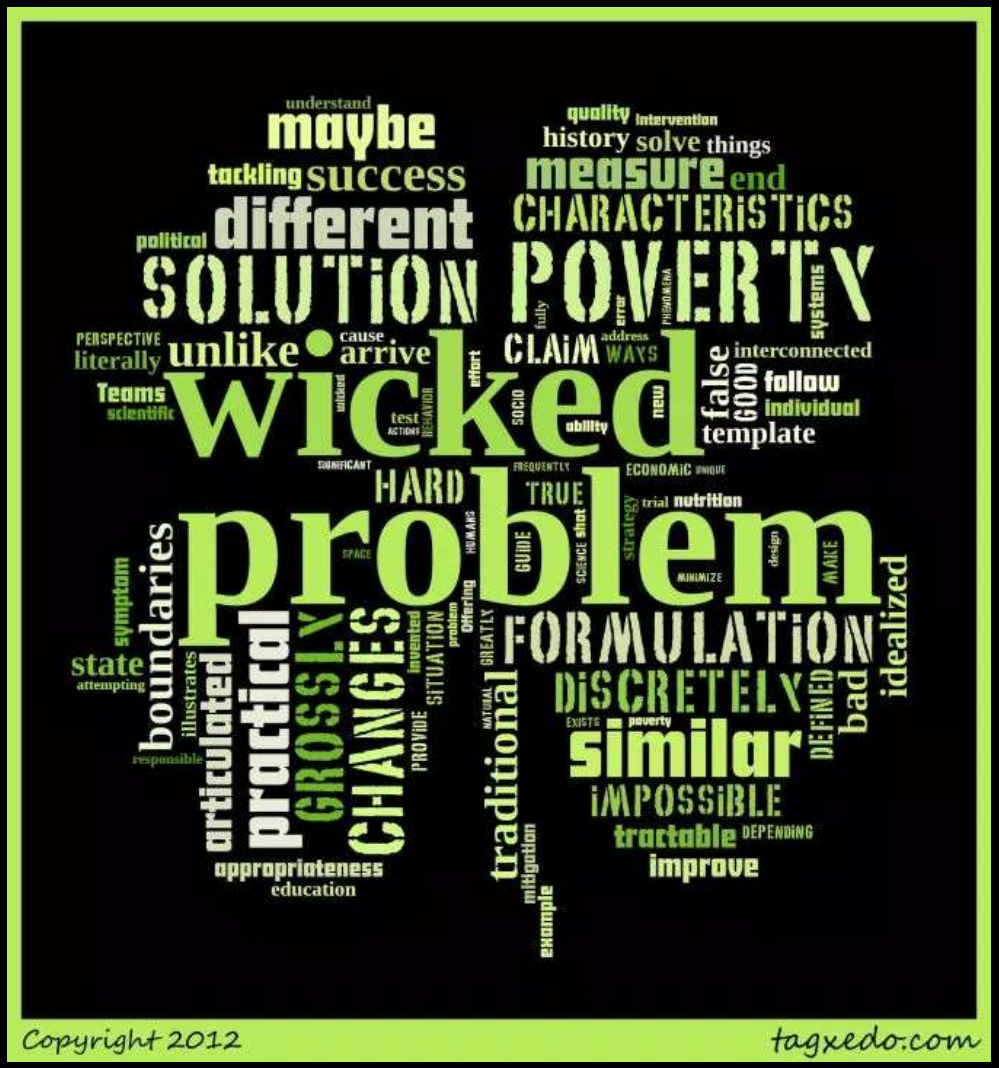
Population health is a strategic problem.

Basic conclusions:

Population health is a strategic problem:

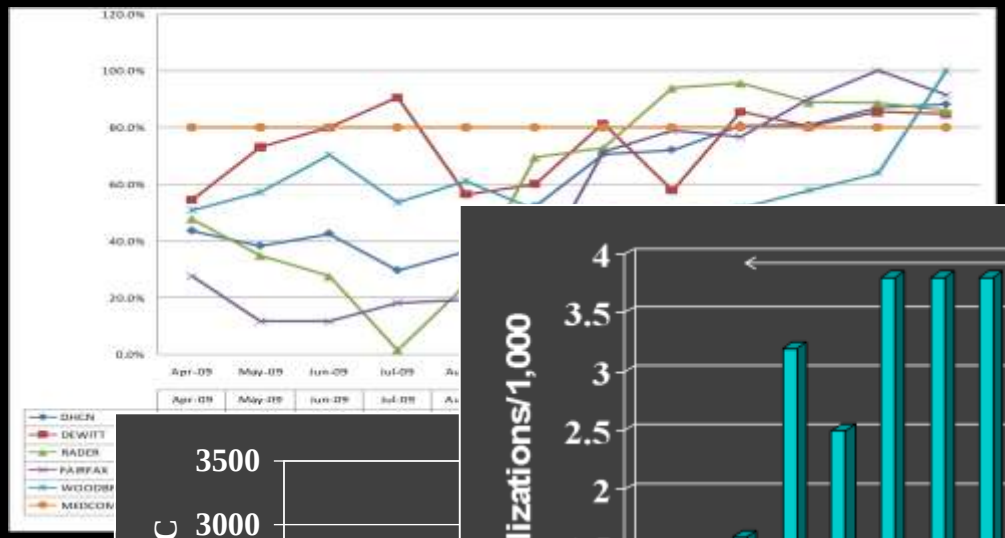
Solution requires:

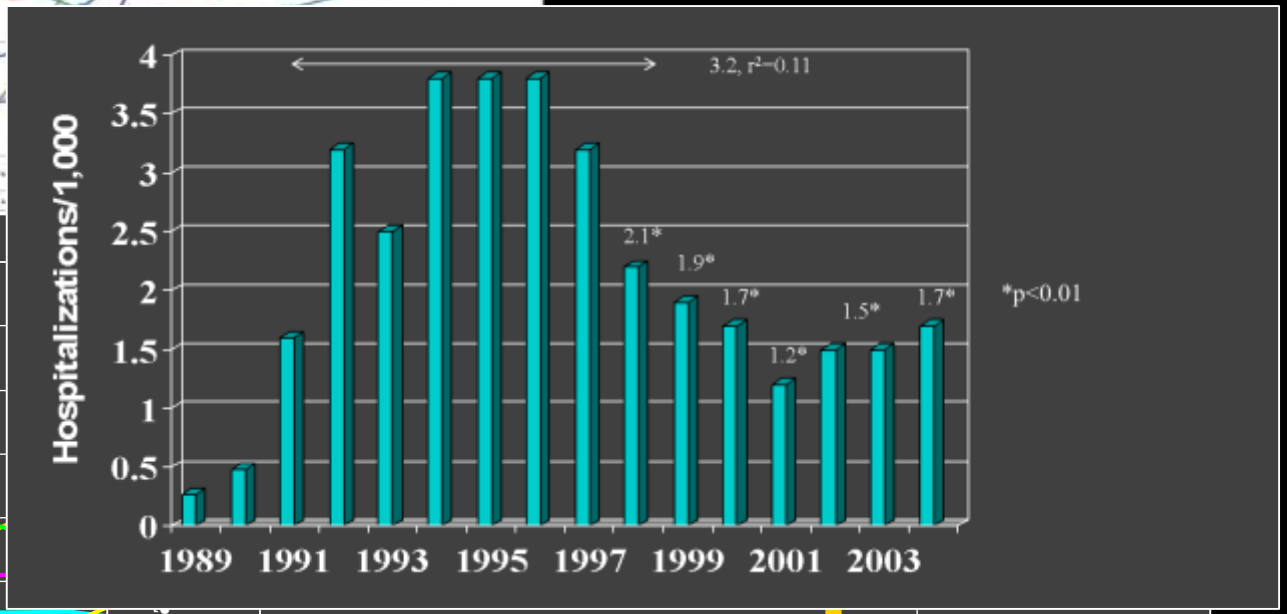
…coordinated care,
one person at a time.

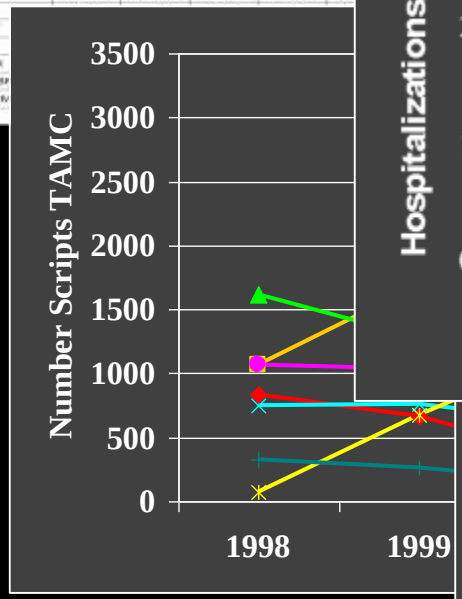


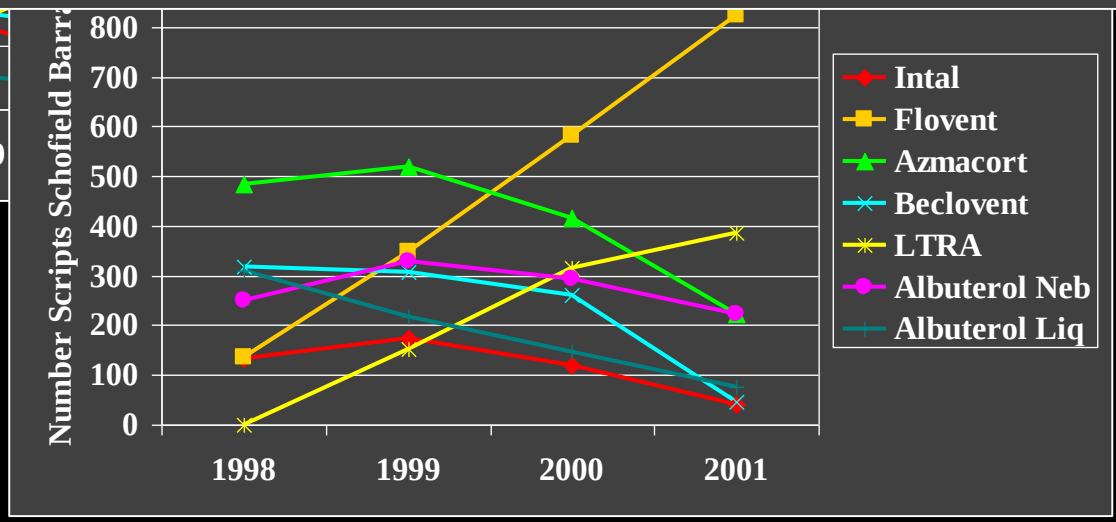
- No definite formula
- No stopping rule
- Many players
- Solutions “good or bad” not “true or false”
- Unpredictable
- Unique
- Problem symptom of another problem
- Complex
- Ambiguous
- Uncertain

Horst Rittel, 1973

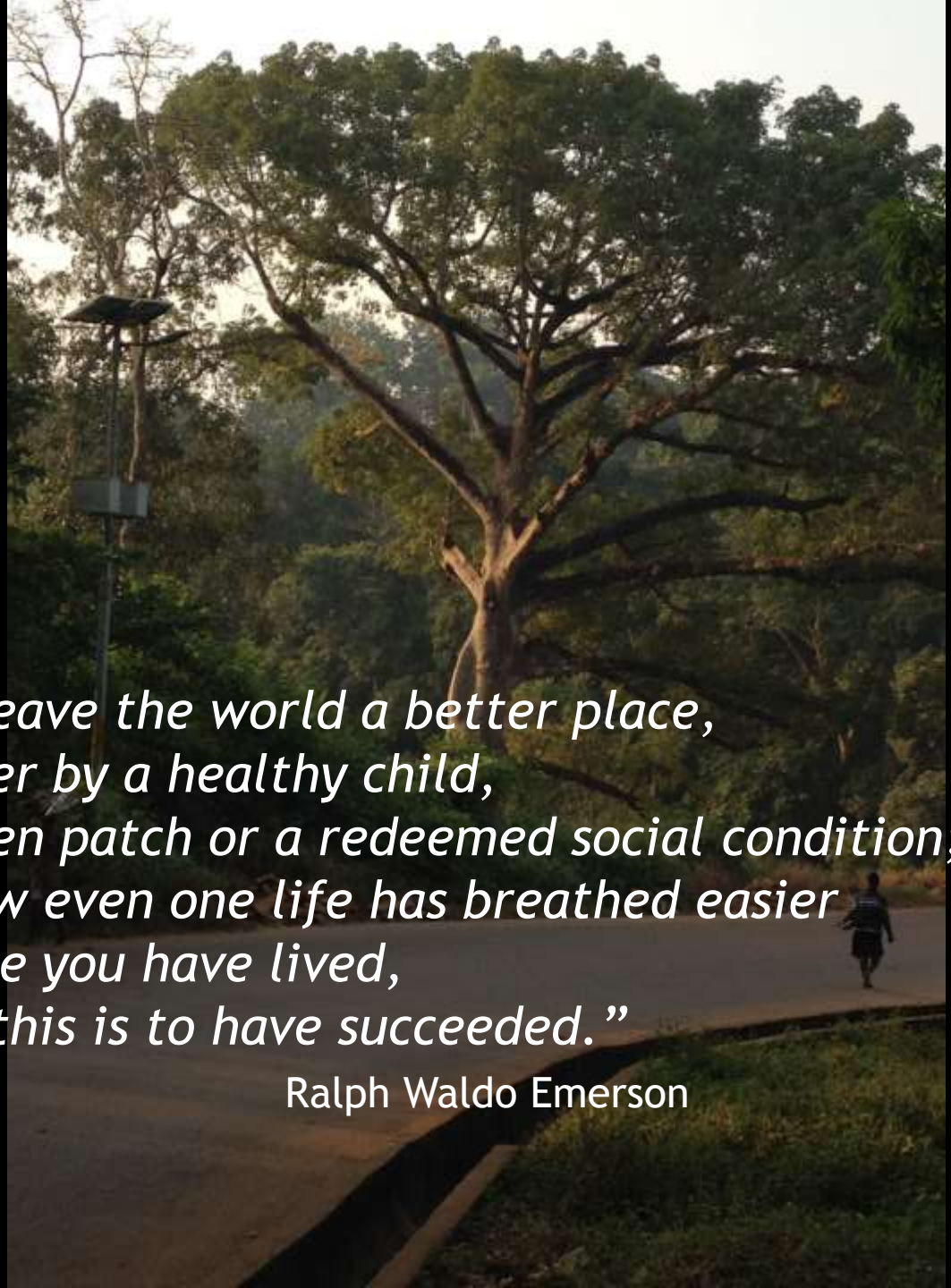


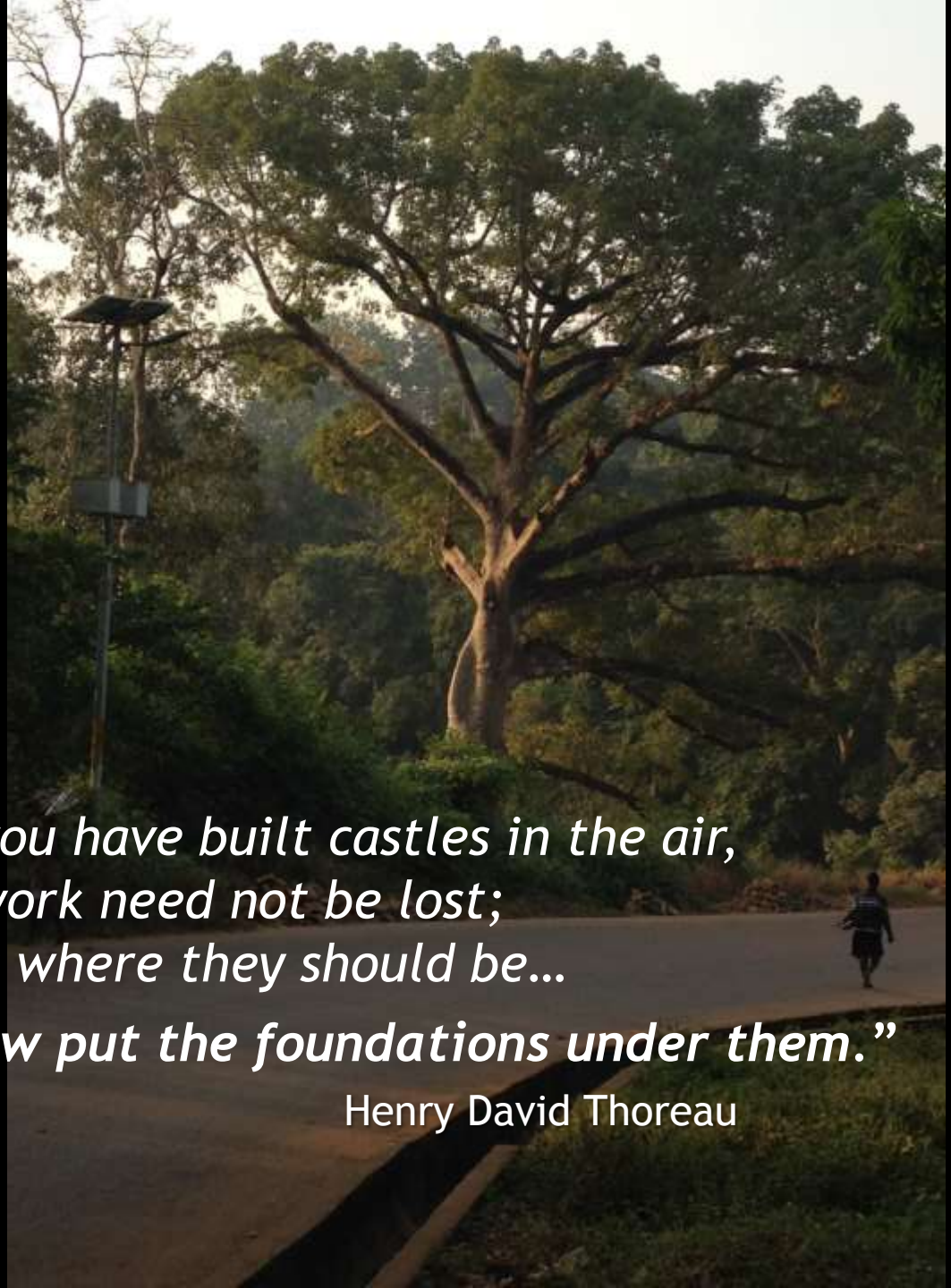

Hospitalizations/1,000
4
3.5
3
2.5
2
1.5
1
0.5
0
3.2, r²=0.11
2.1*
1.9*
1.7*
1.2*
1.5*
1.7*
*p<0.01
1989
1991
1993
1995
1997
1999
2001
2003


Number Scripts TAMC
3500
3000
2500
2000
1500
1000
500
0
1998
1999


Number Scripts Schofield Barr
800
700
600
500
400
300
200
100
0
1998
1999
2000
2001
Intal
Flovent
Azmacort
Beclovent
LTRA
Albuterol Neb
Albuterol Liq

success?


"…to leave the world a better place,
whether by a healthy child,
a garden patch or a redeemed social condition;
to know even one life has breathed easier
because you have lived,
this is to have succeeded."
Ralph Waldo Emerson


“If you have built castles in the air,
your work need not be lost;
that is where they should be…
…Now put the foundations under them.”
Henry David Thoreau