Disease, Disparities, Distributions, and Dynamics
Put out the fire, of course.....
Issue 1: Caries is a disease of poverty*

It is a social problem and consequently, any permanent solution will have to have a social component

“The easiest way to tell the difference between the have and the have-nots is to look in their mouths.”

HRSA Administrator Betty Duke

* In developed nations
**Environment**

Risk transmitted to children
- Families
- Culture
- Economic conditions
- Social Status

Fisher-Owens, 2007
CVD Death

State Level Effect

Age-adjusted Cardiovascular Death Rate, By State

Deaths Per 100,000 Population

Virginia
United States
Minnesota - Leading State
North Carolina
Tennessee
Maryland

'00 '01 '02 '03 '04 '05 '06 '07 '08 '09
Tooth loss and Poverty

Poverty is a risk factor for (oral) disease
Child DMFT by Family Income

2 fold difference caries experience
Large “treatment effect” (5 x)
Gradient with no threshold
Disparity starts before age 2
DMFT by SES (cross sectional data)

Caries Trajectories Vary as a Function of SES

Disparity trajectory worsens over time
Issue 2: Distributions

What they can tell us
Gaps: Epidemiology & Measurement

- We need better measures of disparity
- Allows us to understand why (mechanisms)
- Which gives us approaches for interventions
Decline in Caries in Industrialized Economies

Mean DMFT (Age 12) By Country
What are the Mechanism of OHD

At Risk

All Children

DMFT 1979

Mean DMFT (Age 12) By Country

DMFT 2009

At Risk

- Maori
- AI/AN
- Head Start
- Rural Poor (Appalachia)
- Migrant Worker
- Etc.
Change in Caries Distribution
Change in Caries Distribution
Change in Caries Distribution
Change in Caries Distribution

Freq vs. Caries 2010
Disparity Questions

Many have no or little disease

Some have much disease – why?
Why High Disease Group

- Refractory to traditional (prevention/treatment) interventions
- Refractory to traditional approaches to delivery of interventions
- Characterized by membership in a “marginalized” group
- Live with severe environmental adversity (SES, racism, social isolation...)

Caries is a largely preventable disease.....
The Problem

Severe Caries

Extensive (OR/GA) Treatment

US Pop

AI/AN Pop
Why Index for CIPD

- Traditional approach: dmft/dmfs
  - Is important, but fails to consider:
    - Consequences of disease (prognosis)
    - Treatment needs
    - Changes in disease trajectories for very severely affected children
What we need

• A better understanding of how to measure disparity (in general)
• A better understanding of how to measure ECC distribution (in specific).
  o A measure that works at the “high end”
  o A measure that accounts for:
    • prognosis,
    • helps guide clinical interventions
    • can assess outcomes of interventions for seriously affected children.
We can conclude....

- OHD Robust Finding
- Socially Produced
- Occur at all levels of aggregation
- No threshold
- Relative & absolute differences matter
- Require novel approaches for prevention
We lack a comprehensive theory: “How does the environment get into the body?”

1. Resource
2. Salutogenic
3. Stress
4. Lifecourse

Theory guides perception of reality and structures the questions we ask.
“Lifestyle” Drift

• We have a strong urge to focus on lifestyle issues (“lifestyle drift”).
  o We are (politically and clinically) biased toward “individual responsibility” for health
  o Many clinicians working in field
  o It’s the easiest place to intervene

• But its not always the optimal place to intervene

• Many recent successes have shown the value of “upstream” interventions.

• “Sick People, Sick Populations”
What we need to know

**Primary Prevention**
- When to intervene (lifecourse)
- Why traditional approaches failed
- How to intervenes
  - Who are our partners
- What approaches can be borrowed
- What approaches are unique
  - AI/AN
  - Caries
  - Children

**Treatment Existing Disease**
- Optimal treatment (NOACC)
  - How best to do it
  - When best to do it
Obesity, Diabetes, CVD, Caries

We have seen the enemy…and it’s BK’s Bacon Hot Fudge Sundae
Influences on Diet

**Governmental Policies and Systems**
- Political systems
- Food Assistance Programs
- Food & Agricultural Policies

**Food & Beverage Industry**
- Transportation
- Marketing & Media

**Communities/Neighborhoods/Schools**
- Vending, School Stores, Celebrations
- USDA Breakfast/Lunch Program
- Home, Child Care & Parenting
- Food Markets
- Restaurants/Fast Food Outlets
- Extended Families & Peers
- Cultural Norms & Values

**Global Environment**

**Social Environment**

**Individual (Personal) Environment**
- Cognition
- Skills
- Attitudes
- Beliefs
- Lifestyle
- Demographics

**Eating Behavior**
"Every system is perfectly designed to achieve exactly the results it gets"

So if your results are consistent, but unsatisfactory, you need to redesign the system (...but first you have to realize you are in a “system”).

Donald Berwick,
How do we study complex systems to understand which interventions give best return on investment?