This talk will cover:

1. A model of Oral Health Disparities (OHD) Development
2. The rationale for eliminating OHD.
3. Strategies for reducing OHD
Understanding Health Disparities

What We Know

1. Systematic
2. Socially Produced
3. Unfair

Causes and Solutions Lie Upstream

Whitehead and Popay, 2010
Health Disparities: Systematic

- Not Random.
- Relationship between: Groups
  - SES strata
  - Race/Ethnicity

Look Upstream

Whitehead and Popay, 2010

Health Disparities: Social Process

- Cause – social
  - (not biological)
- Solution – social
  - (not biological)
**Health Disparities: Unfair**

- Health equity (social justice) issue
- Created and maintained by social factors.
- A symptom of underlying issues

**Look Upstream**

Whitehead and Popay, 2010

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**Ecological Systems Theory**

- Biology/Behavior
- Peers
- Family
- School
- Community

Oral Health Systems Theory

- Oral ecology/biology
- Child-level
- Family-level
- Community-level


Determinates of oral health status

Societal & Environmental Characteristics

Oral Health System

Individual & Family Socioeconomic constraints

Health Beliefs, Values, Attitudes, Knowledge

Oral Health Related Behavior (Lifestyle)

Oral Health Status, Satisfaction & Q of L

Clinical Care
Dental Prevention Program
Modern (Traditional) Epidemiology

Socio-political

Lifestyle
Characteristics of Disparities
What We Know

Social Determinants of Health: Whitehall
CVD Risk Factors by Employment Grade

- Metabolic Syndrome
- Fibrinogen
- Cholesterol
- Wait to Hip Ratio
Social Determinants of Health: Whitehall
Mortality by Employment Grade

1. (Steep) Gradient
2. NO Threshold
   - RELATIVE social position matters

Every group is worse off than the group above

CVD Death

State Level Effect

Age-adjusted Cardiovascular Death Rate, By State
**Children (2-4 yrs) Who Have Ever Had Tooth Decay**

![Bar Chart](chart1.png)

- Family Level Effect
- Source: NHANES III, 1988-94

**Edentulism > 65 y/o NHANES**

![Bar Chart](chart2.png)

- Lifecourse Effect
- Source: NHANES III, 1988-94
PA School Children (12 yrs) (2000)

DMFT by Family Income (12 year olds)

- Family Level Effect

Disparities in Dental Caries in the Primary Dentition
Start Early and Persist as a Function of SES
Trajectories in Dental Caries in the Permanent Dentition Vary as a Function of SES

Increasing disease trajectory

Epidemiology: Tooth loss

Regional Level Effect

Complete Tooth Loss, 65+ Years 1995-98
Gradient

- Exists for many (most?) chronic diseases
- Extremely robust finding (developed nations)
- Found all levels of aggregation
  - Family
  - Community
  - State/Region
  - Nation

Rationale

*Why reduce health disparities?*

4 reasons
Why Address Health Inequalities

- Unfair
  - Free will and personal responsibility (for health) challenged

Woodward & Kawachi, 2000

Why Address Health Inequalities

- Unfair
- Affect Everyone

Wilkinson & Pickett, 2009
Why Address Health Inequalities

- Unfair
- Affect everyone
- Avoidable

"imagine if..."

Woodward & Kawachi, 2000

Why Address Health Inequalities

- Unfair
- Affect everyone
- Avoidable
- Cost Effective

Woodward & Kawachi, 2000
We can conclude....

- OHD Robust Finding
- Socially Produced
- Occur at all levels of aggregation
- No threshold
- Relative & absolute differences matter
- Unfair
- Impact all people in society
- Have substantial costs

Mechanisms and Theories

What we know
Decline in Caries in Industrialized Economies

Mean DMFT (Age 12) By Country

What are the Mechanism of OHD

At Risk
All Children

At Risk
Maori
AI/AN
Head Start
Rural Poor (Appalachia)
Migrant Worker
Etc.
Theories

We lack a comprehensive theory:
“How does the environment get into the body?”

- Resource
- Salutogenic
- Social Support
  - Stress
  - Lifecourse

Characteristics of Disparities

What We Don’t Know

Where are the Gaps in Knowledge?
**Gaps: Gradient**

- Why a gradient?
- Why no threshold?
- What impacts slope?

**Child Caries by Family Income**

**Gaps: Epidemiology & Measurement**

- Better surveillance system needed
  - Data at all levels.
- Better measure of disparities
- What is clustering with oral health
  - Is oral health a “marker” ...the canary in the coal mine
Small impacts in early life can result in major health consequences in later life.

What are critical ages?


**Gaps: How to intervene (lifecourse)**

- Lifecourse
  - Gene by Environment
  - Epigenetics
    - Prenatal exposures
  - Attitudes and Behavior
Gaps: Theories

- Understanding Social Level:
  - Mechanisms
    - Cause of Causes
  - Testing Theories
    - Generalizable
  - Intervention Research

Gaps: Theories

- Bring in theory and methods from “outside” dentistry
- Disseminate best practices
- Don’t reinvent the wheel
Gaps: Why Reduce Disparities (Policy)?

- Grounded in “Justice”
  - No guidance on how much to reduce inequalities.
- Most health inequalities are (in principle) avoidable,
  - Lack data on effectiveness and cost of interventions in groups.
- Reducing health inequalities will benefit society
  - How do we sell it (politically)

Remedies

Collaborative & Upstream Approaches

Both are needed
Four generation of disparities research.

1. Do disparities exist?
2. Why do disparities exist?
3. Do interventions work?
4. The need for Comprehensive, Multilevel, Interventions.

Building Bridges

Collaborative Approaches

Collaborative models leverage strengths and increase visibility for oral health.
Common Risk Factor (CRF) Approach (version 1.0)

Based on notion that:
• There are common risk factors for many diseases
• Working collectively will improve the result

Sheiham & Watt, 2000

Intersectoral Partners

- working with more than one sector of society
  - Government (health, education, environment and justice)
  - Ordinary citizens
  - NPOs
  - Business.
Not everyone sees your problem as a “problem”.

Intersectoral partnerships can help

- New partners
- New methods
- New resources
CFRA (V 1.0) Characterized by:

- Disease specific focus
- Interventions aimed at individual-level (lifestyle) “causes”

Moving upstream...

**Comprehensive Multilevel Interventions (CRFA (Version 2.0))**

upstream, we gain new insight and expand opportunities

So we don’t keep doing the same thing but expecting a different outcome
Why we need CRFA (V 2.0)

- Health inequalities are determined by patterns of social stratification arising from the systematic ‘unequal distribution of power, prestige and resources among groups in society’

Watt R, Sheiham A. Integrating the common risk factor approach into a social determinants framework. CDOE, 2012

Why we need CRFA (V 2.0)

- “The enduring nature and universality of the social gradient in health (and oral health) status indicates the influence of broad underlying social factors rather than specific disease risks highlighted by the CRF approach.”

Watt R, Sheiham A. Integrating the common risk factor approach into a social determinants framework. CDOE, 2012
An improved understanding of power relationships can inform action to tackle health inequalities at both the microlevel of individual households and workplaces, and the macrosphere of structural relations between economic, social and political institutions.

Watt R, Sheiham A. Integrating the common risk factor approach into a social determinants framework. CDOE, 2012

Changing the distribution of power within society to the benefit of disadvantaged groups requires political processes that empower disadvantaged communities and the responsibility of the state.

Watt R, Sheiham A. Integrating the common risk factor approach into a social determinants framework. CDOE, 2012
Why we need CRFA (V 2.0)

Lifestyle interventions (alone) ineffective:

- Behavioral choices situated within: historical, political, economic, and community contexts.
- Health behaviors – only modest impact on overall health difference by SES.
- Individual health behavior change interventions – small impact on sustained behavior change.
“Lifestyle” Drift

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

Obesity, Diabetes, CVD, Caries

We have seen the enemy...and it's BK’s Bacon Hot Fudge Sundae

Partners:
- Pediatricians
- Schools (PE programs)
- Parents

Approach:
- Diet counseling
- Exercise counseling
- Food purchases

A Symptom
Comprehensive, Multilevel Approach

Influences on Diet
**Policy-level Action**

**McDonald’s Will Post Calorie Counts on Its Menus**

McDonald’s said on Wednesday that it would begin posting calorie counts on all its menus next week—a move that could put pressure on other fast-food restaurants to do the same.

The company also unveiled several menu additions aimed at making its offerings more healthful. They include an egg white McMuffin, a grilled chicken option for the Happy Meal and seasonal fruits and vegetables.

McDonald’s has been experimenting this summer with placards held by the Supreme Court this summer, all restaurants with more than 20 locations will have to post calorie counts on their menus, though the precise regulations and timetable for doing so have not yet been detailed.

McDonald’s, which has 14,000 locations around the country, is by far the largest chain to post calorie counts nationwide. Panera Bread, much smaller with more than 1,500 bakery-cafés across the country, also posts calorie counts.

Wootan, director of nutrition policy at the Center for Science in the Public Interest. Not everyone applauded McDonald’s announcement. Sara Deon, who works on campaigns to reduce junk food marketing and build food sustainability at Corporate Accountability International, a watchdog group, said it had more to do with public relations than with improving public health, particularly as it related to children’s consumption of McDonald’s food.

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**The Challenge**

- Public health professionals therefore have a moral and ethical responsibility to resist and challenge the dominant behavioral doctrine in favor of a more radical upstream approach that tackles powerful vested interest groups and seeks to create a more equitable and just civil society.
Oral Health Policy Makers

- Goal is to **TAKE ACTION** (at all levels) to eliminate disparities.
- Must not use narrow interpretation of intersectoral partnerships.
- Seek a comprehensive, multilevel approach.
- Use a social determinants framework.

The First Law Of Healthcare Improvement

*Don Berwick, IHI (Boston)*

“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”).
Policy must change

Don Berwick, IHI (Boston)

- “You could have protected the wealthy and the well, instead of recognizing that sick people tend to be poorer and that poor people tend to be sicker and that any health care funding plan that is just, equitable, civilized and humane must, MUST redistribute wealth from the richer to the poorer and the less fortunate. Excellent health care is, by definition, redistributional

Donald Berwick, MD, 2011

Thank You
Decay = 66% of 8 year olds
- 37.5% untreated decay
- Northern Appalachia: Highest adult edentulism:
  - 47.7% of adults ≥ 65 completely edentulous
  - 1/3 adults age 35 have lost at least 6 permanent teeth
- Rank lowest in the nation on dental attendance (47%) compared to the national average (67%) (CDC).
- Adults use Smokeless Tobacco 3 times US average.
COHRA Rationale
It’s a “Social Problem”

- “The easiest way to tell the difference between the haves and the have-nots is to look in their mouths.” HRSA Administrator Betty Duke
- N. Appalachians are the “majority” population of US
  - But suffering environmental adversity

Research Issues

- Understand the nature of Environmental Adversity as a risk factor
- How does the environment get into the body?
  - Nancy Krieger
Conceptual Model: Caries in Children

- Family structure and function
- Community characteristic (economic, social, cultural)
- Child prodromal conditions
  - Attitudes
  - Knowledge
  - Behavior
  - Genetics
  - Micro
- Child oral health behaviors
- Child oral health status

Hierarchy of Effects on Health

- Social Influences
  - Family Influences
    - Individual Factors
      - Genetics
  - Transmission of Risk
- Health Outcomes
Mediated Model of Development of Risk Trajectories

GWAS: dental caries in primary dentition

RESEARCH REPORTS

Genome-wide Association Scan for Childhood Caries Implicates Novel Genes

INTRODUCTION

The importance of genetic factors in dental caries has been recognized for decades (Cowman et al., 1990), with heritability estimated to be from 30% to 60% (Bianco et al., 1988; Wang et al., 2010). However, the specific gene(s) that cause the disease are not yet identified. For a disease as widespread as dental caries, there is a critical need for additional genetic studies.
Results (to date)

TRANSMISSIBILITY
- High transmissibility
  - Caries (40%-60%)
  - Microbial ecology
  - Fear

GENE X ENVIRONMENT
- Smoking x Gene = periodontal disease
- Fluoride x Gene = caries

SOCIAL EFFECTS
- Family income:
  - Caries
  - Perio

Conclusion (Family Studies)
- Evidence: family-level risk exists + transmitted to children:
  - Parent education
  - Family income
  - Family size
  - Dose-response, no threshold
- Disparities begin early (< 2 yrs)
- Trajectory causes increasing disparity
G x E and Health Disparities

- Improves understanding of Mechanisms
- Helps explain resistance to prevention interventions
- Provides Targets for Intervention
- Begins to answer “how the environment gets in the body”.

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Systems Dynamic Modeling

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