

# Updates and Trends in Occupational Health and Safety

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Presented at

**Portals to the Future: People, Partnerships and  
Prevention**

**2011 NASA Occupational Health Conference**

# Learning Objectives

1. Review recent developments in the field of occupational medicine and environmental health.
2. Address current legislation landscape and discuss possible programmatic impacts.
3. Discuss possible means to improve the delivery of preventive program and minimize impacts of constrained resources.

# OPM Screening Survey

## Well-Check Categories (*highlighted*)

- *Mental Health*
- *Health Risk Appraisal and Assessment*
- Substance Abuse
- *Depression*
- *Mammography*
- Prostate
- *Readiness to Change*
- *Body Mass Index*
- *Osteoporosis*
- *Diabetes*
- *Cholesterol*
- *Blood Pressure*
- Sun Damage
- *Height*
- *Weight*
- *Other (communicable diseases)*

# Relationship of the Survey to the Occupational Health Outcomes

## Type of Intervention

- *Environmental/radiation health*
- *Screening for lifestyles*

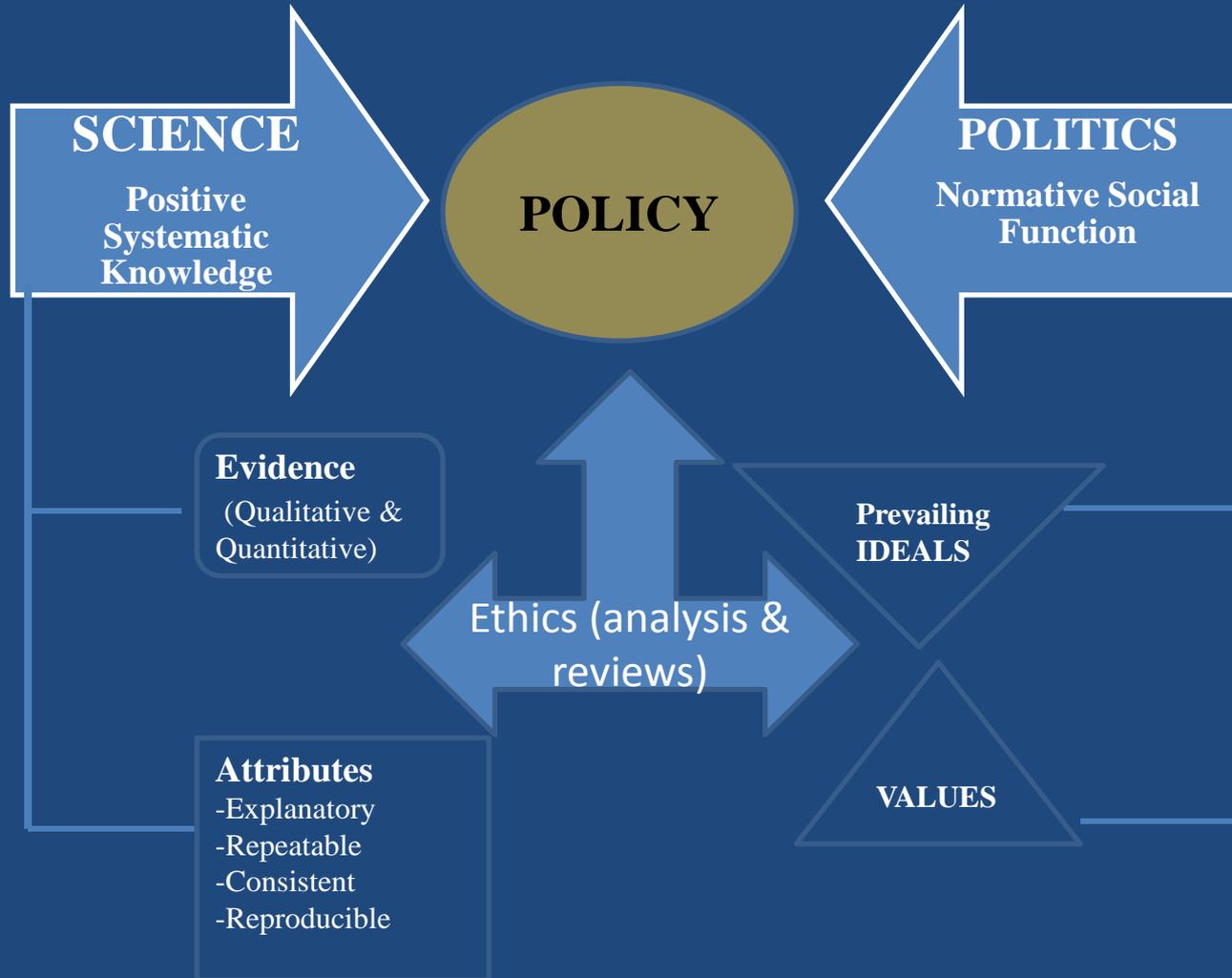
## Health and Productivity

- Hearing conservation
- Decreased Fatigue & Accidents
- Minimize Cancer
- Reduce lung diseases
- Improved mental health
- Prevent Injuries and chronic disorders
- Reduce absenteeism

# Resource Allocation and Emphasis

Evidence Based Policy Formulation

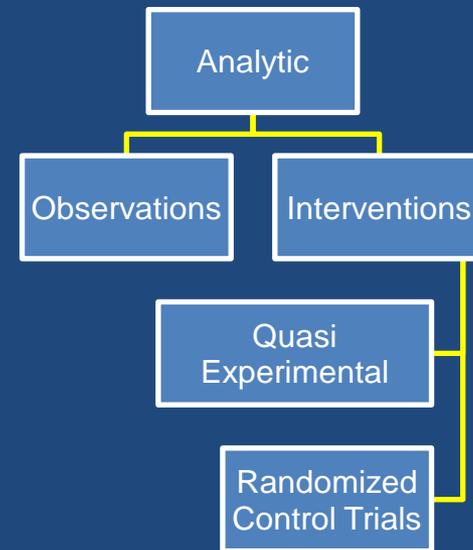
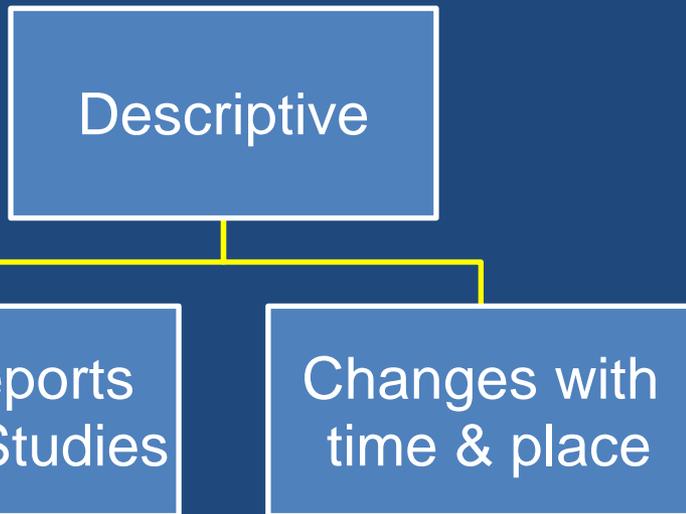
# Medical Policy Formulation Process



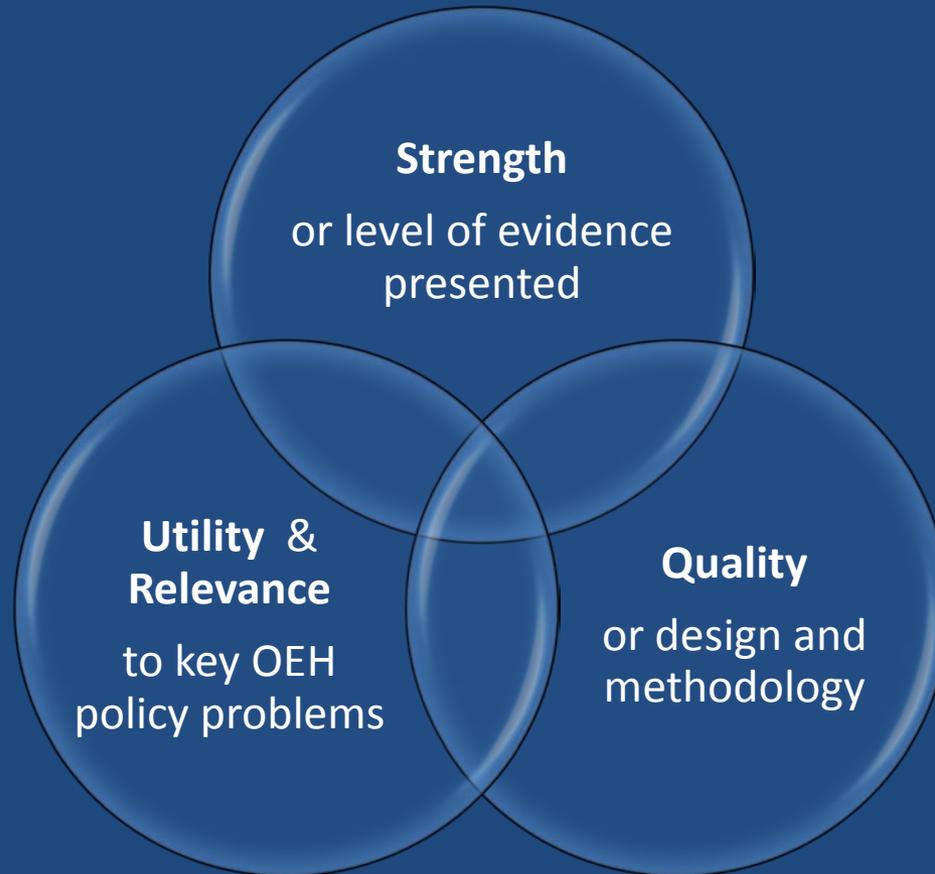
Adapted from : Kraemer JD and Gostin LO. "Science , politics and values: the politicization of professional practice". JAMA 2009 Feb 11; 301 (6): 665-7

# Scientific Inquiry: Methodology in Health Risk Assessments

- Two Types of Studies are used in risk assessments
  - Descriptive or Hypothesis generating
  - Analytic or Hypothesis testing



# Three Core Tenets of the Literature Evaluations



# *Objective 1*

**REVIEW RECENT DEVELOPMENTS IN THE FIELD OF  
OCCUPATIONAL MEDICINE AND ENVIRONMENTAL HEALTH**

# Women's Health 2010

1. Bisphosphonates and fractures risk is insignificant
  2. Calcium and Vit. D uses to for CVD\* protection not significant
  3. HRT/Menopause increases risk for breast Ca\*\*
  4. Post menopausal Rx with estrogen increase kidney stone risk
  5. Reduction in weight helps with hot flashes
1. “Risk reducing surgery” reduces mortality from hereditary breast and ovarian Ca
  2. Potential for lower incidence of cervical cancer with HPV testing
  3. Emergency contraception using medication might be effective
  4. Estrogen/progestin does not decrease the risk of CVD

# Diet and Health

- **The effect of Mediterranean diet on metabolic syndrome and its components a meta-analysis of 50 studies and 534,906 individuals showed promise in reducing metabolic disorders incidence. *Journal of the American College of Cardiology 2011; 57 (11):1299-1313***

# Adult/Children Obesity Rates (TFAH & RWJ 2011)

- **Trust for America Health & RWJ Foundation Report**
  - Adult obesity rates for African Americans topped 40 percent in nine states, 35 percent in 34 states, and 30 percent in 43 states and D.C.
  - Rates of adult obesity for Latin-Americans were above 35 percent in two states (North Dakota and Tennessee) and at 30 percent and above in 19 states.
  - Ten of the 11 states with the highest rates of diabetes are in the South, as are the 10 states with the highest rates of hypertension.
  - No state had rates of adult obesity above 35 percent for Caucasians. West Virginia had an adult obesity rate for Whites greater than 30 percent.
  - The number of states where adult obesity rates exceed 30 percent doubled in the past year, from four to eight --Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee and West Virginia.
  - Northeastern and Western states had the lowest adult obesity rates; Colorado is the lowest at 19.1 percent.

# Physical Exercise & Nutrition 2011

- Intensive practical lifestyle intervention improves endothelial function in metabolic syndrome independent of weight loss: a randomized controlled **trial.:** **improvements were greater with low carb diet** (*Seligman; 2011 Metabolism RCT*)
- Workplace weight loss program; comparing live and internet methods: outcomes were independent of the delivery method in a 12 week program (**PCT:** *Touger-Decker ;2009 Diabetes Obesity Metabolic*)
- Long-term effectiveness of diet-plus-exercise interventions vs. diet-only interventions for weight loss: a meta-analysis: diet + exercise are more effective after 2 years and also have partial weight regain (*Wu 2007; Obesity*)
- Efficacy of Aerobic Exercise and a Prudent Diet for Improving Selected Lipids and Lipoproteins in Adults: improved TC, TC:HDL-C, LDL-C and TG, but not HDL-C concentrations, in adults (**MA/RCT;** *Kelly 2010: Aust N Z J Public Health*)
- Effects of carbohydrate sugars and artificial sweeteners on appetite and the secretion of gastrointestinal satiety peptides: secretion of GLP-1, PYY and ghrelin depends on more than the detection of (1) sweetness or (2) the structural analogy to glucose (**Double/blind study 2011, Steinert; Curr Opin Clin Nutr Metab Care**)

# Physical Exercise & Nutrition 2011

- Use of the internet in obesity treatment programs has a modest effect on weight control. The effect was inconsistent, largely depending on the type of usage of the Internet or the period of its use were deemed to be potentially harmful ( **Meta analysis:** *International Journal of Obesity advance online publication 21 June 2011*)
- The effect of Mediterranean diet on metabolic syndrome and its components a meta-analysis of 50 studies and 534,906 individuals showed promise in reducing metabolic disorders incidence. ( **Meta-analysis:** *Journal of the American College of Cardiology 2011; 57 (11):1299-1313*)
- Role of sleep duration in the regulation of glucose metabolism and appetite: decreases insulin sensitivity without adequate compensation in beta-cell function, resulting in impaired glucose tolerance and increased diabetes risk; decreases leptin and up-regulates ghrelin increasing appetite. (**Lit. Review;** *Morselli 2010; Nutrition Reviews*)

# Travel and Infections

## Types of Travel

- Business(commerce)
- Pleasure (tourism)
- Medical Tourism
- Extreme tourism
- Marriage Tourism
- Illicit Business
  - People (new slavery)
  - Drugs
  - Pets
  - Foods
- Humanitarian Assistance and Interventions

## What was spread

- HIV/AIDS + STD\*
- MRSA/EHEC\*\*
- SARS
- Tuberculosis
- Influenza
- Norovirus
- Malaria

\*Sexually-Transmitted Diseases

\*\*Enterohemorrhagic Escherichia Coli

# How It Was Spread (Examples)

## Infections

- HIV/AIDS + STD
- SARS
- TB
- Influenza
- Norovirus

## Transport

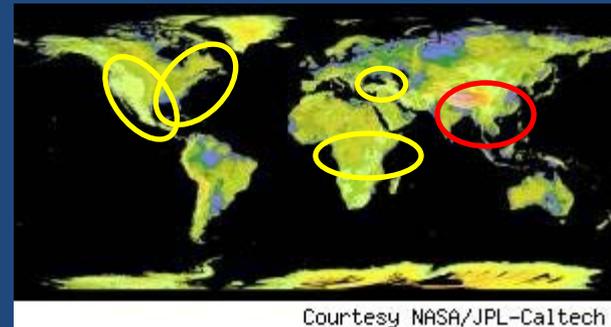
- Air, maritime, ground (truckers, tourists, refugees, soldiers, rescue workers)
- Air
- Air
- Air, ground
- Entertainment (tourist) industry

# Travel and Infections

## Novel Infections

- **Malaria** (*P. knowlesi*)
- **Influenza**
- **SARS**
- **E. Coli**
- **MRSA**
- **MDRTB**
- **Acinetobacter baumannii/STI (chlamydia ABDR)?**

Geographic Threats (red and yellow from left column)



Drinking water fountains and soft drink dispensers reported as sources of *E. coli*



# Influenza 2011-2012

- “The high case-fatality rate--especially among young adults--during the 1918-1919 influenza pandemic is incompletely understood. Although late deaths showed bacterial pneumonia, early deaths exhibited extremely "wet," sometimes hemorrhagic lungs. The hypothesis presented herein is that aspirin contributed to the incidence and severity of viral pathology, bacterial infection, and death, because physicians of the day were unaware that the regimens (8.0-31.2 g per day) produce levels associated with hyperventilation and pulmonary edema in 33% and 3% of recipients, respectively. Recently, pulmonary edema was found at autopsy in 46% of 26 salicylate-intoxicated adults. Experimentally, salicylates increase lung fluid and protein levels and impair mucociliary clearance. In 1918, the US Surgeon General, the US Navy, and the Journal of the American Medical Association recommended use of aspirin just before the October death spike. If these recommendations were followed, and if pulmonary edema occurred in 3% of persons, a significant proportion of the deaths may be attributable to aspirin.”  
*Karen Starco.2009 Clinical Inf. Diseases*
- Metanalysis fom pooled studies on animals showed inceased risk of mortality associated with NSAID administration  
*Eyers 2010 Journal of the Royal Society of Medicine*

# Influenza 2011-12

## WHO surveillance *flu- net*

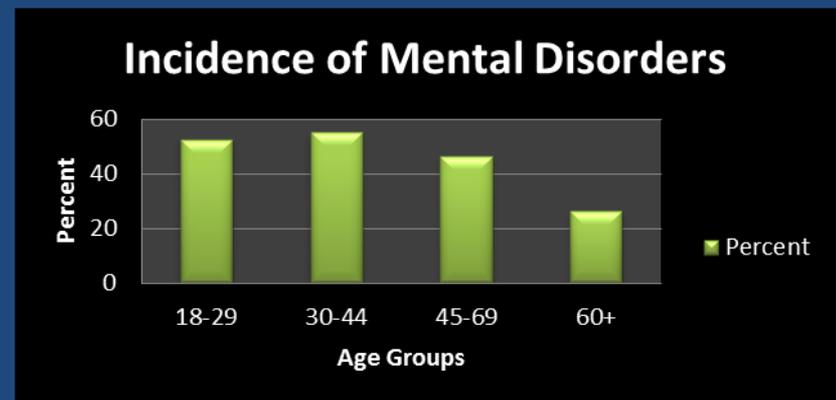
- Bolivia and South Africa activity high
- Bolivia A(H3N2)
- South Africa A(H1N1)2009 + sporadic A(H3N2) and B
- World wide predominant strains A with 68% H1N1 and 32% H3N2

## Vaccine composition/Types

- Current composition
  - A/California/7/2009 for H1N1
  - A/Perth/16/2009 for H3N2
  - B/Brisbane/60/2008 for B
- Intradermal will be available (*Fluzone by Sanofi*)

# Prevalence of Mental Disorders in US (1 in 17 Adults: NIMH)

- 12 months Prevalence: 26,2 % of U.S. adults
- Severity: 22.3 % (5.8 % of adult population)
- Life time Prevalence: 46.4%
- Sex: no differences in incidence risk
- Race: Non-Hispanic blacks are 30% less likely than non-Hispanic white
- Age



# Happiness and Health

## Maslow's Pyramid Revisited

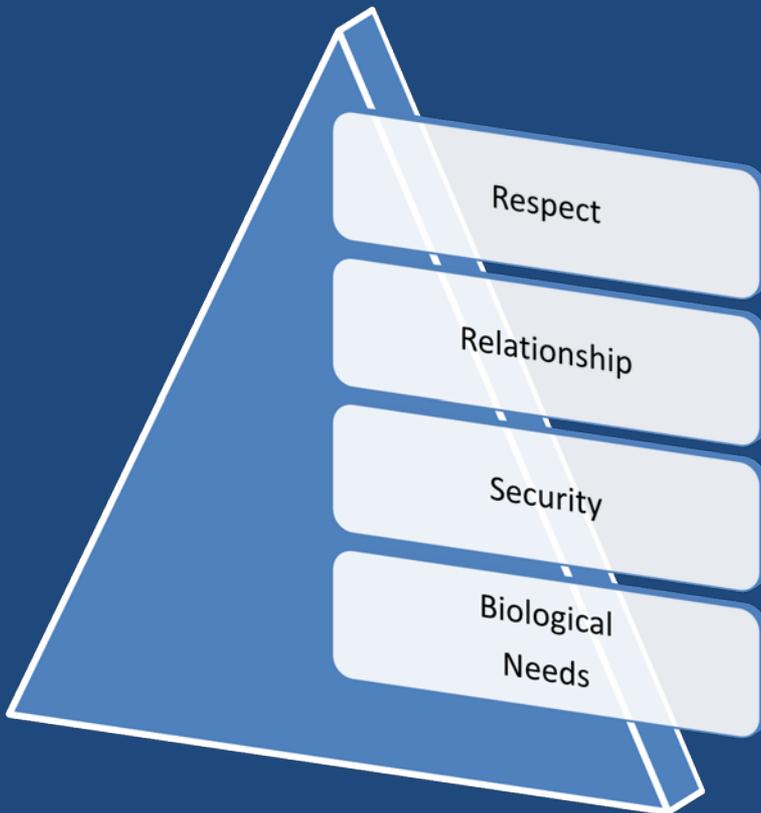
- 123 countries surveyed by University of Illinois(E. Diener 2011) from 2005-2010
  - Values are common to all cultures
  - Basic needs better correlate with life fulfillment
  - Life valuation correlates to the rest of the community
  - Self actualization and relationships poorly correlated to biological needs and safety

## Mental and Physical Health

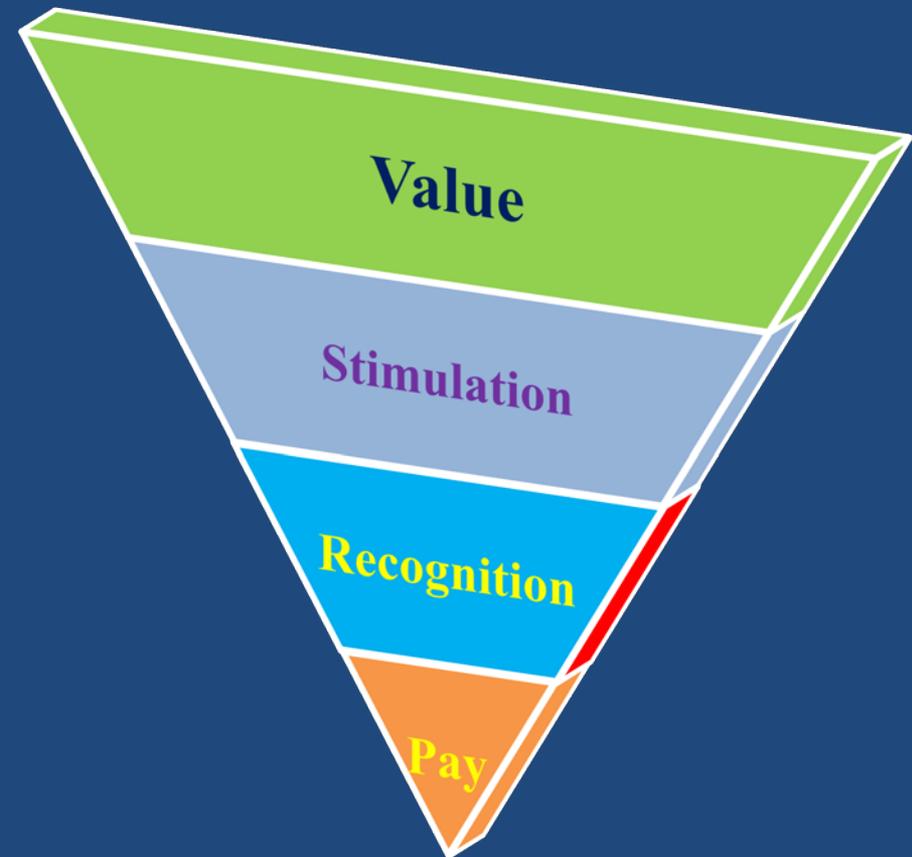
- Self Perceived Dignity and Behavioral/Metabolic Disorders
- PTSD and chronic metabolic disorders

# Happiness Index

## Maslow Hierarchy of Needs



## Organizational Performance



## Fatal Occupational TBI (Tiesman *AJMP* 2011)

- Workplace Surveillance (2003-2008)
- Fatality rates 0.8/100,000/year (declined 23% over 6 years). Workers >65 fatality rates increased by 101%.
- Leading causes (15 times > men)
  - Motor vehicles 31%
  - **Falls 29% (and increasing)**
  - Violence 20 %
  - Contact with surfaces 18%

# Top States Suffering Disasters Since 1953

By State:

|    | STATE             | NUMBER OF DISASTER DECLARED |
|----|-------------------|-----------------------------|
| 1  | <u>Texas</u>      | 84                          |
| 2  | <u>California</u> | 78                          |
| 3  | <u>Oklahoma</u>   | 67                          |
| 4  | <u>Florida</u>    | 63                          |
| 5  | <u>New York</u>   | 62                          |
| 6  | <u>Louisiana</u>  | 56                          |
| 7  | <u>Alabama</u>    | 55                          |
| 8  | <u>Kentucky</u>   | 54                          |
| 9  | <u>Arkansas</u>   | 52                          |
| 10 | <u>Missouri</u>   | 51                          |

# Information Technology: Governance, Privacy and Liability

- Concerns
  - Outpatient electronic prescribing systems don't cut out the common mistakes made in manual systems, suggests research published online in the Journal of the American Medical Informatics Association (JAMIA).
  - Of the 3,850 prescriptions assessed, more than one in 10 (452; just under 12%) contained a total of 466 errors.
- IT legislation and ethics (HIPAA)
  - Data contained within the medical record belongs to the patient
  - Data base belongs to the entity responsible for maintaining the records
  - Individuals involved in medical research, financial audits or program evaluation can access the medical record, but not any identifying information.
  - Non-disclosure and confidentiality (military precedent)
  - IRB approval for research
  - Oversight and control

## *Objective 2*

**ADDRESS CURRENT LEGISLATION LANDSCAPE AND DISCUSS  
POSSIBLE PROGRAMMATIC IMPACTS**

# Recent Appropriations

- Public Law 112-10, commonly referred to as a continuing resolution, is intended to fund the Federal government through September 30, 2011
- DOL/DHHS budget cuts approximately \$13 billion
- 49 million USD less than the DOL 2010 allocations, and \$132 million less than what was requested for FY 2011.
- The Voluntary Protection Program has been reintroduced as a continuing legislation by the Congress (H.R. 1511, S. 807) and OSHA plans to develop and propose standards for exposures to silica and airborne infection hazards to include influenza transmission and the risks posed by nanotechnology.
- *There is concern that the budget agreement of April 8, 2011 (HR 1473) and the anticipated out year budgetary shortcomings could translate to a reduction or at worst reprioritization of the health and safety activities by the federal agencies.*

# Budgetary Implications\*

## Not Affected

- Regulatory and legislated programs (ground based)
- Departments/Agencies specific safety and health mandated programs

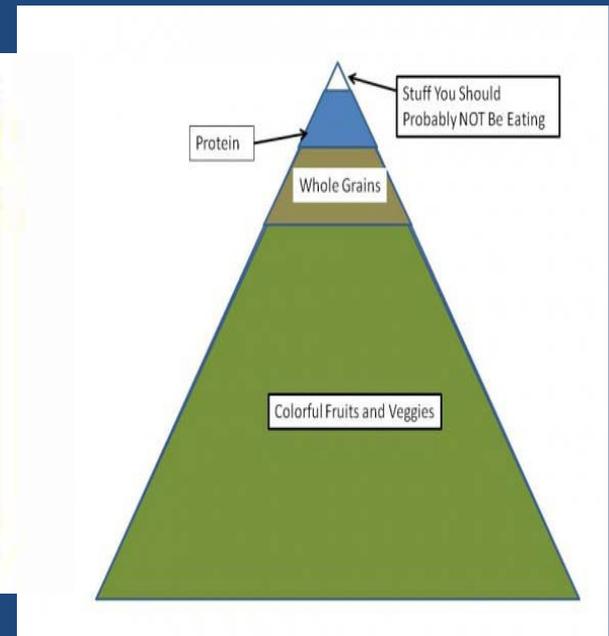
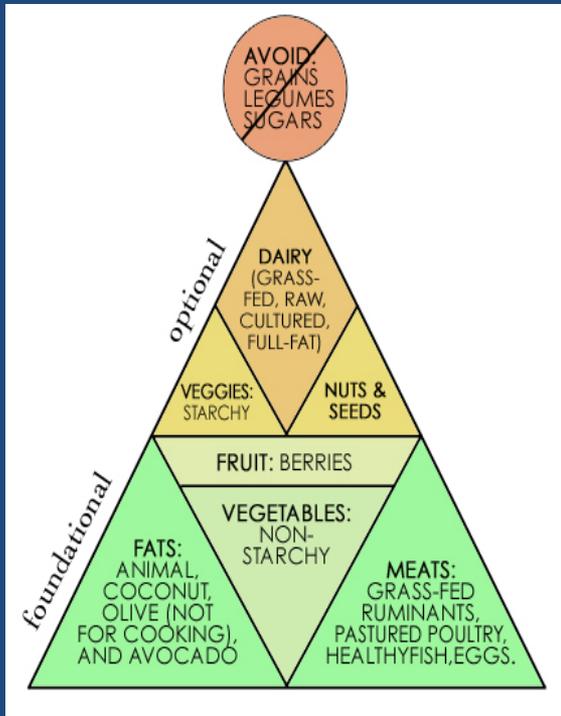
## At Risk Fiscal 2012- ?

- *Optional health services*
- *Surveillance programs {frequency and extent}*
- *Research and development activities (health and safety)*
- *Trainings/Travel/Education/ Personnel*
- *(Old buildings environmental health)*
- *Retirement age & Wellness programs*

## *Objective 3*

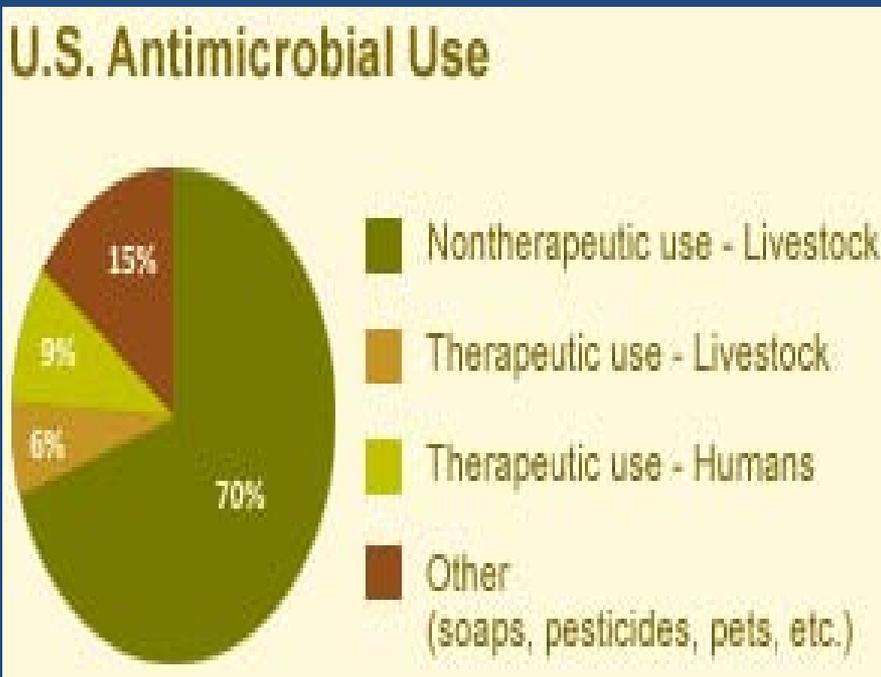
**DISCUSS POSSIBLE MEANS TO IMPROVE THE DELIVERY OF  
PREVENTIVE PROGRAM AND MINIMIZE IMPACTS OF  
CONSTRAINED RESOURCES**

# USDA 2011



# Antibiotics and Food Chain

## 2005 Agricultural Use



## Prevention

- Hand washing & gloves
- Environmental Hygiene
- Antibiotic Stewardship
- Substitute vaccines
- Food preparation practices and inspections

# Medical Interventions (weight loss)

## Diets

- Weight Watchers (*portion control/energy deficit*)
- LEARN (*energy deficit/lifestyle*)
- Ornish (*vegetarian base/fat < 10% of calories*)
- Zone (*Low Carb. = C40/P30/F30*)\*
- Atkins (*very low carb.*)\*\*

## Therapeutic

- Few drugs approved by the FDA and reserved for BMI > 30
  - Sympathomimetic amines
  - Orlistat
  - Off-label anti depressants (SSRI)
  - Anti-epileptics
  - Anti-diabetics
  - Glucagon-like peptides
- Surgical
  - Roux-en-Y gastric bypass
  - Adjustable gastric banding
  - Sleeve gastrectomy

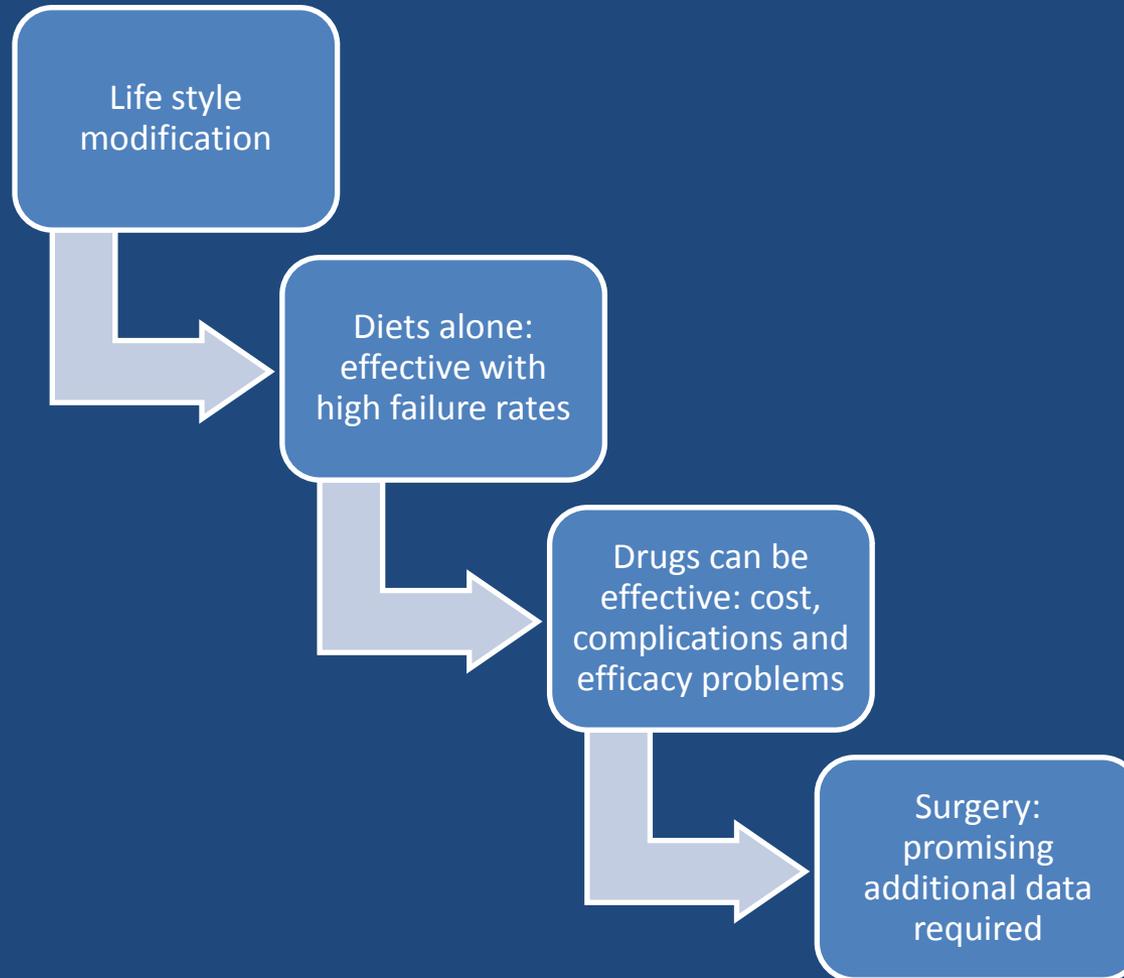
\*1.7 and \*\* 4,7 kg. losses in women

# Preventive Strategies & Life Style

- *Understanding nutrition*
  - “empty calories”
  - ‘healthy calories”
  - Labeling and cal. counts
  - “diet literacy”
  - Food markets and selections
- *Physical fitness and type of activities*
- *Biological effects: diets, hormones and gut microflora*
- *“Cafeteria interventions”*
- *Occupational health counseling*
- *Reinforcements*



# Weight Loss Intervention Rating



**Education + Diet + Exercise**

# Possible Priority Setting

## Wellness Programs

- *Health Risk Appraisal and Assessment*
- *Mental Health/Substance Abuse*
- *Mammography* }
- Prostate } }
- *Metabolic Syndrome/disorders*
- *Osteoporosis*
- *Disaster Preparedness (infection control)*
- *IT uses*

## Reason: Safety/Security/Performance

- Early interventions possible/ (CE and uses referrals)
- Safety and security issue
- Counseling referral
- Early intervention: CE
- Must
- Legislated and CE longterm

# Questions and Discussions

# David Mc Cann



A homeschooling father of five children and happily married for seventeen years, Dr. McCann is a devout Catholic man whose **Christ-centered approach to life and medical practice** is unabashed and refreshing.