

# **Environmental Health in Washington State**

**Gregg Grunenfelder, Assistant Secretary  
Environmental Health Division  
Department of Health**

*March 6, 2008*



# Early Water Supply Engineering

- Filtration techniques 3000 BC.
- Specific source selection criteria — Sushruta (300-500 BC).
- Boiling, storage in silver jars — ancient Persian kings.
- Natural coagulants (seeds, clays) used in India, Middle East, South America.
- Aqueducts and lead pipes to supply Rome.

# Broad Street Pump

- Summer cholera epidemics.
- In 1849, over 500 deaths in 10 days.
- All deaths within a 250-yard radius.
- Common factor: water from the Broad Street well.
- Handle removed, # of deaths subsided.
- Contamination traced to privy vaults.

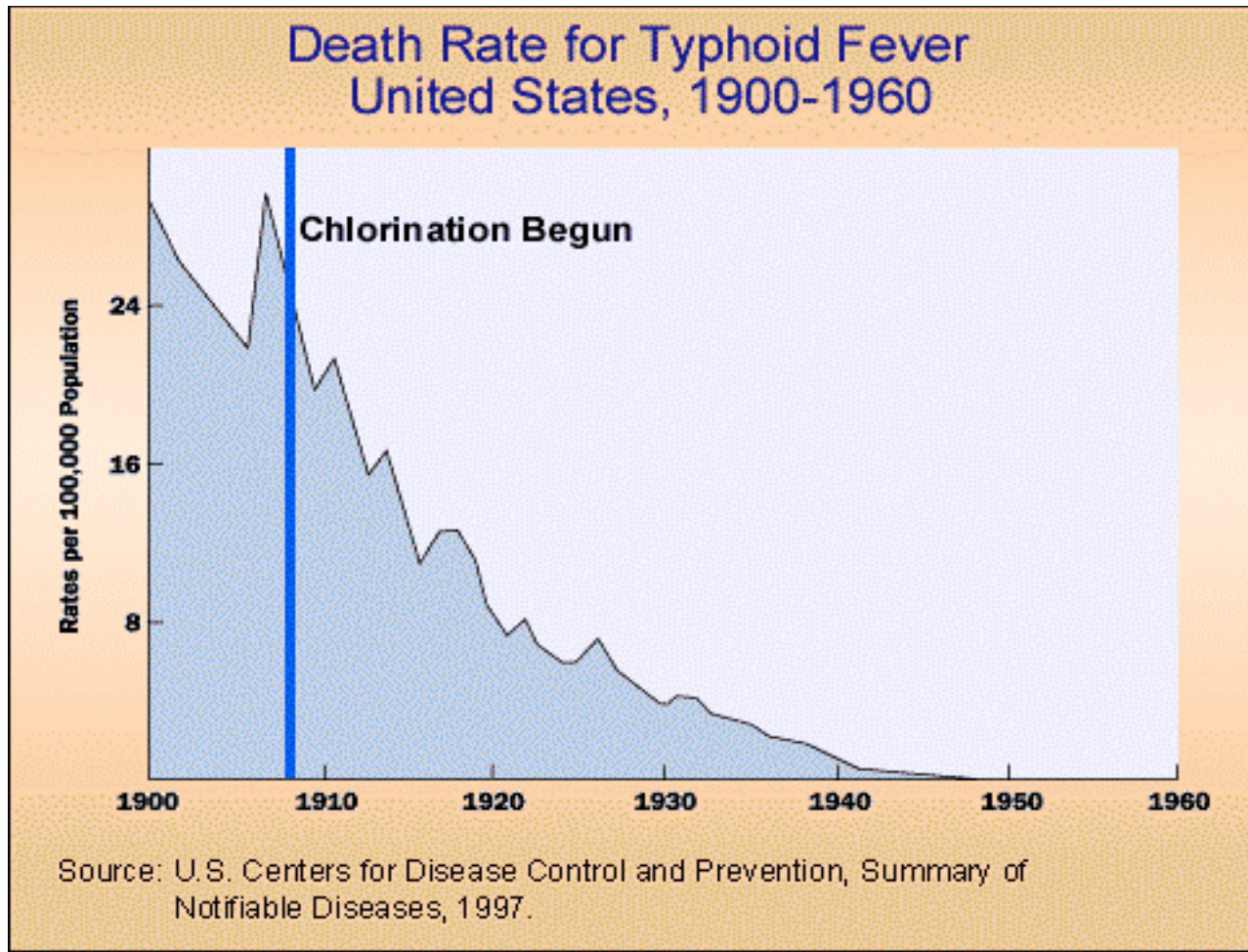
# Water Supply in the US

- 1650 first waterworks, Boston
  - used logs with center bored out
- 1900 over 3,000 water supplies
  - Diarrhea and Enteritis 10% of all deaths (3rd leading cause)
- 1910s filtration and chlorination
  - 65% reduction in deaths due to Typhoid

# Early Env Health Issues in WA

- 1906 - Watershed Protection: “If it is possible to have both the railroad and pure water, that is what the people here want; if it is not possible to have both, we want pure water.”
- 1908 – Vector Control: Seattle Dept. of Health formed with 80 men employed as rat trappers.
- 1909 – Code violations: the Yukon Expedition organizers pumped water from Lake Washington causing 200 cases of Typhoid.
- 1911 – Yakima forms the first county health department in the nation.

# Historical Context for Chlorination



*“The filtration of drinking water (plus the use of chlorine) is probably the most significant public health advance of the millennium.”*

*--Life Magazine describing their opinion of the 46<sup>th</sup> most significant event of the millennium.*

# A Less Sophisticated Approach in Centralia

- 1914 Typhoid outbreak:
  - 334 people ill
  - 22 deaths
- The source of the outbreak – the polluted city water supply.
- The Environmental Health solution: pipe, empty whiskey barrels, and hypochlorite of lime.

# Water Regulation in WA

- As early as 1917 there were very basic rules regarding drinking water.
- The first set of rules were very limited in scope and were only 3 pages in length.



# The 1930s

- New Deal projects brought significant improvements to rural WA:
  - Electrification
  - Communications
  - Water & sewer projects
  - Drilled wells & septic systems
- Kellogg Foundation grant to WA Dept of Public Health sent 5 from WA to Univ of Michigan to study environmental health – 1<sup>st</sup> such class in US.

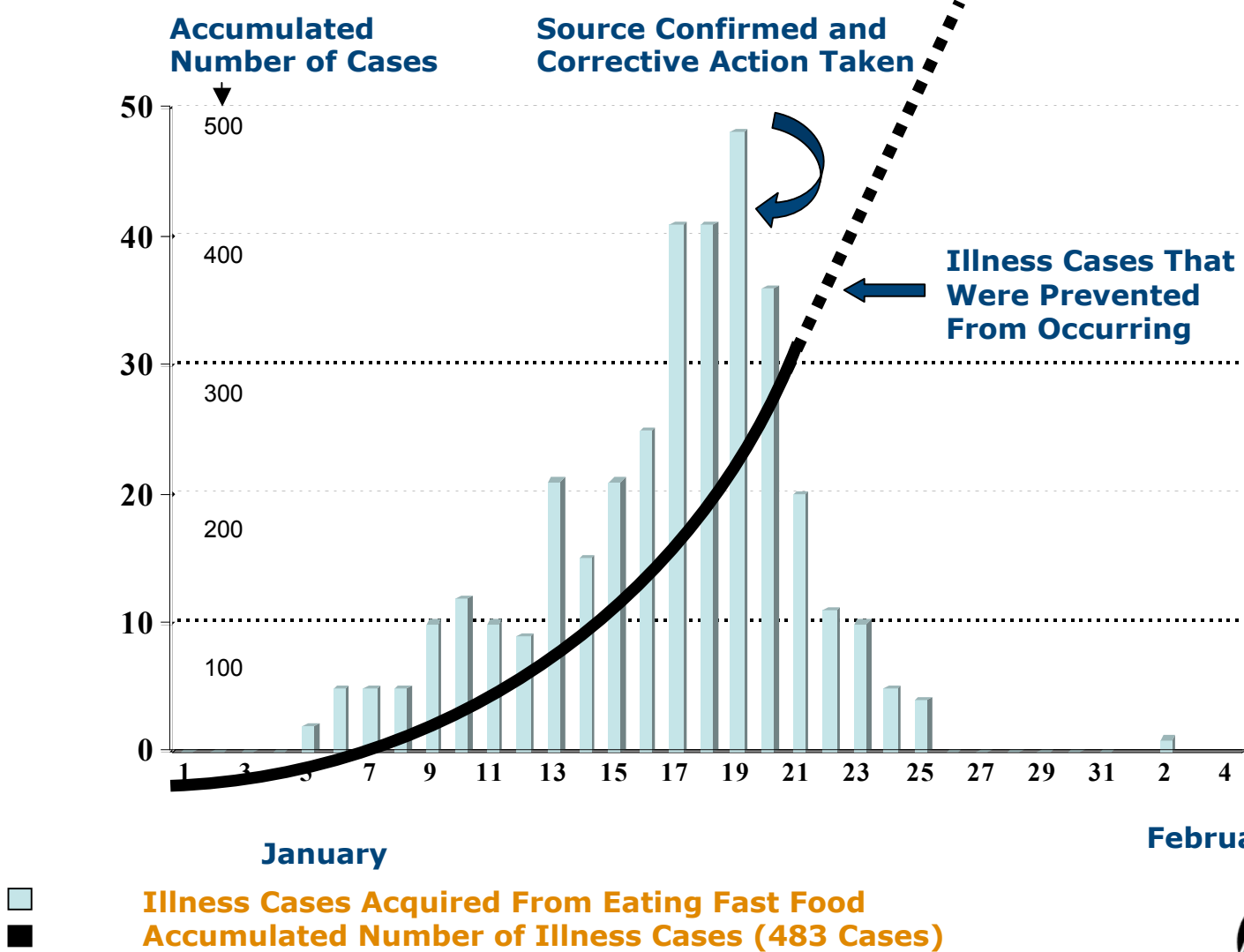
# The 1940s

- 1943 – Hayes Evans was the 1<sup>st</sup> sanitarian to be President of the WSPHA.
- 1946 – Washington State Association of Sanitarians formed (Ed Hochsprung first President).
- 1949 – Jack Hatlen graduates from UW's first class of Sanitary Science majors. Joins John Fish to do the initial inspections of food establishments in King County.

# Modern Times

- 1966 – Air Section in Seattle Dept. of Health became PSAPCA.
- 1969 – Rock festivals were an emerging Env Health issue in WA.
- 1970 – Seattle water was fluoridated.
- 1989 - Washington Dept. of Health established.

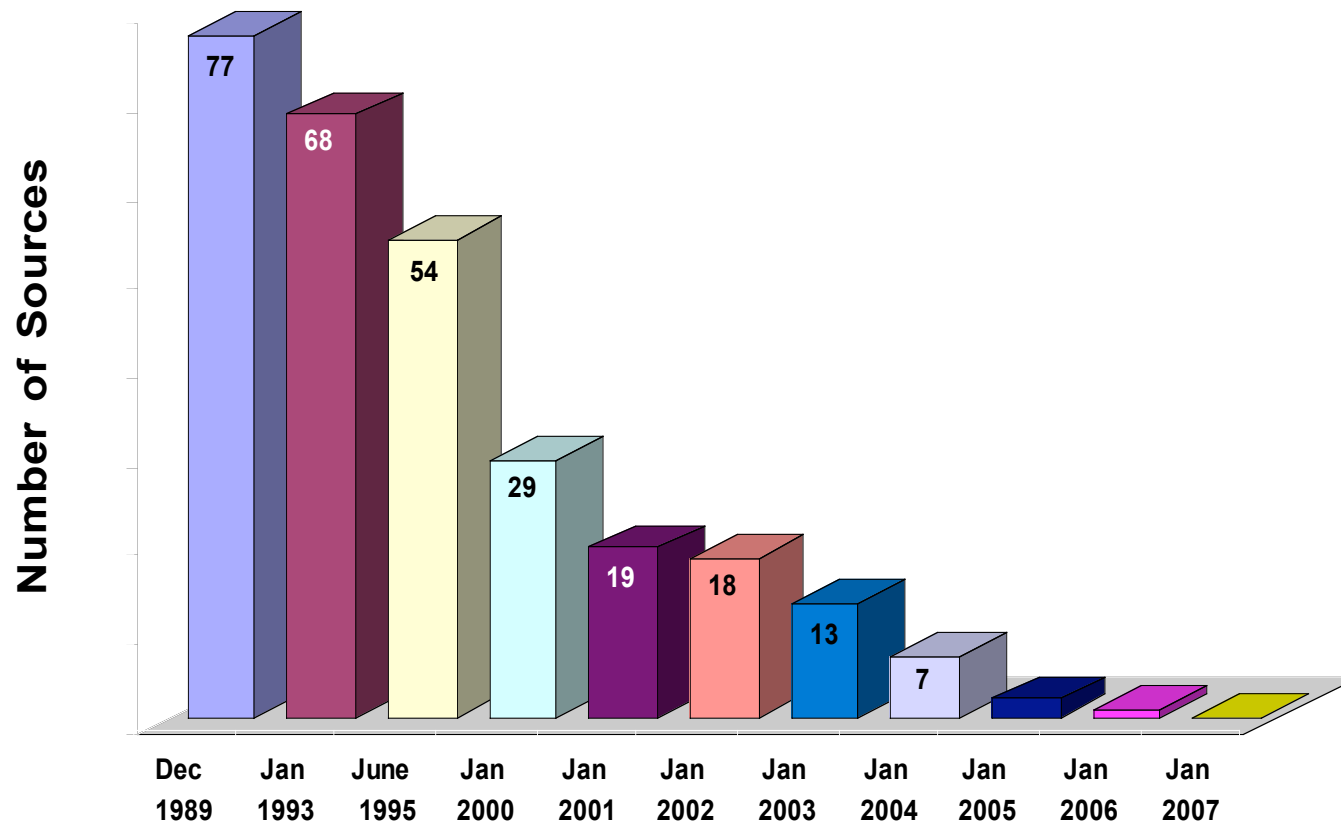
**E.COLI 0157:H7 OUTBREAK WASHINGTON STATE 1993**



# Milwaukee, WI – A wake up call...

- 1993 – The year that made Milwaukee infamous.
- Outbreak of *Cryptosporidium*.
- The largest waterborne disease outbreak documented in US history.
- 104 deaths.
- 400,000 illnesses.

# Unfiltered Surface Water Sources in Washington



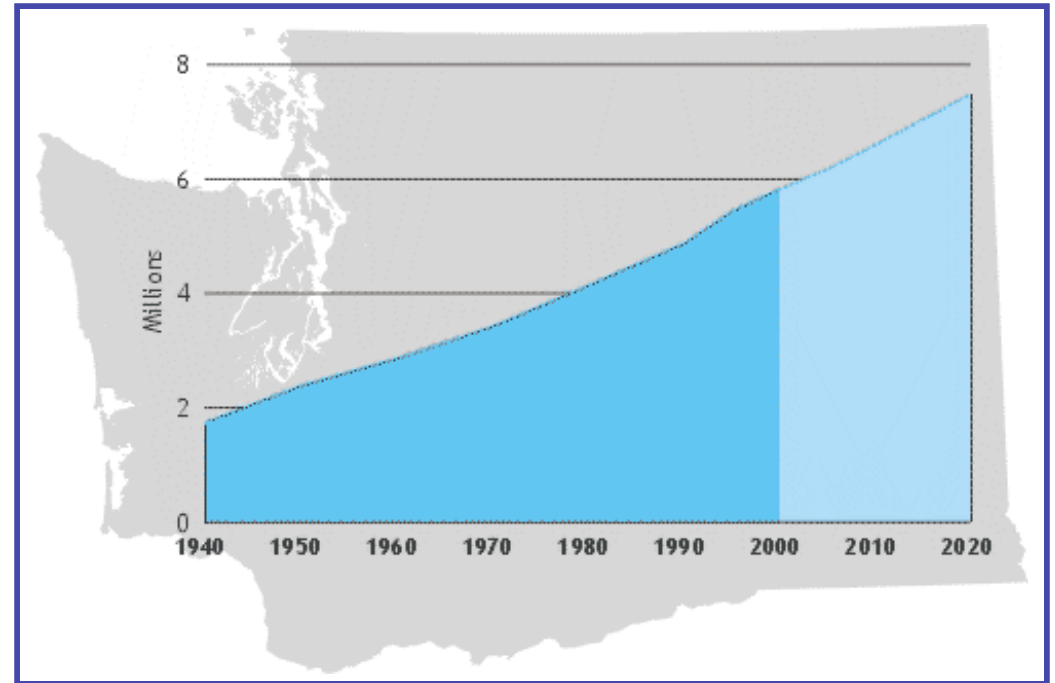
# North Battleford, Saskatchewan

(March-April 2001)

- Outbreak of *Cryptosporidium*.
- 5,800 – 7,100 ill.
- No known deaths.
- “The report concludes that the city lacked an appreciation that safe drinking water is a public health priority...”
- “...he did not regard himself as a regulator of safe water but a regulator of bacteriological sampling only.”

# A Key Challenge for the Future: State Population Growth

- 20% growth per decade since 1960s
- 5.9 million in 2000
- Approach 7.6 million by 2020



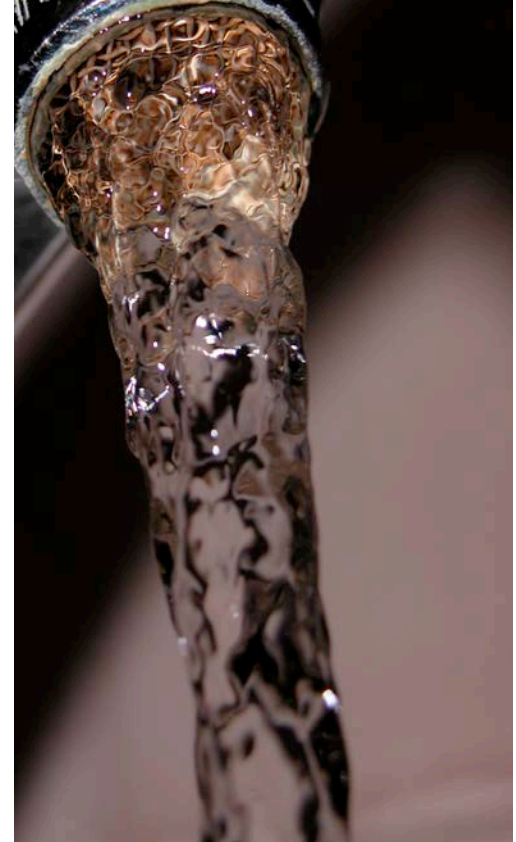




*Discussing Water Rights, A Western Pastime*

# Sustainable Water Management

- Water use efficiency
- Regional planning & growth
- Infrastructure needs



# Management of Wastewater in Puget Sound

## Population served

Sewers: 2.85 million (71%)

Septics: 1.15 million (29%)

## Total volume

Sewers: 400 million GPD

Septics: 175 million GPD

## Operation & maintenance

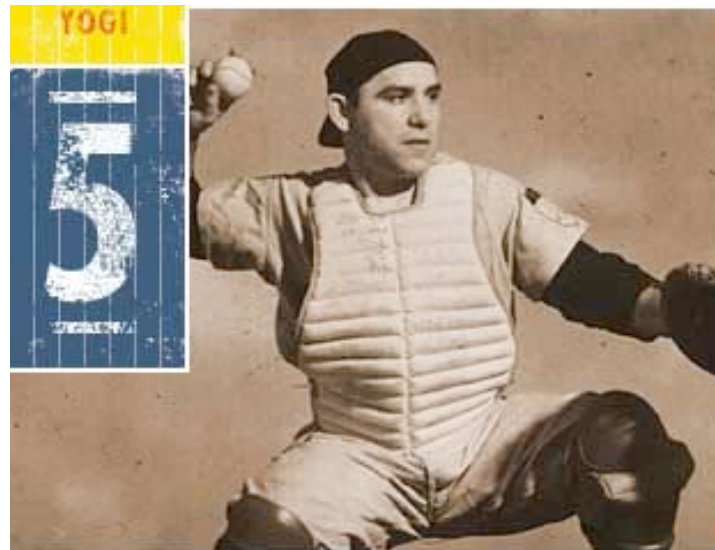
Sewers: Daily

Septics: Limited and highly variable

# Insight from a Notable American Philosopher

**“The future ain't what it used to be.”**

**-- Yogi Berra**



**Environmental Health**  
**Perspectives**  
**Volume 114, Number 2,**  
**February 2006**  
**Focus - New Thinking on**  
**Neurodevelopment**



Duncan Walker/Stockphoto, geopaul/Stockphoto, Matt Ray/EHP

# Toxics in the Environment

- Exposure occurs everywhere to everyone.
- Both new and old contaminants.
- Cumulative dose
  - Body burden increases with age.
- Developmental toxicity.
- Chemicals are used without adequate health information (no data on 75%)
  - 80,000 chemicals in commerce.

# Toxics in the Environment

- Particulates in the air
  - Aggravates and possibly causes asthma.
  - Sources include: cars, trucks, off-road diesel, wood stoves, ships.
- Increased exposure in urban/industrial areas.

# Toxics in the Environment

## Opportunities

- Address toxics in products
  - Testing
  - Lead in consumer products
- Lunchboxes, candy, jewelry, pottery
  - Green chemistry
- Increase monitoring
  - Good data is essential



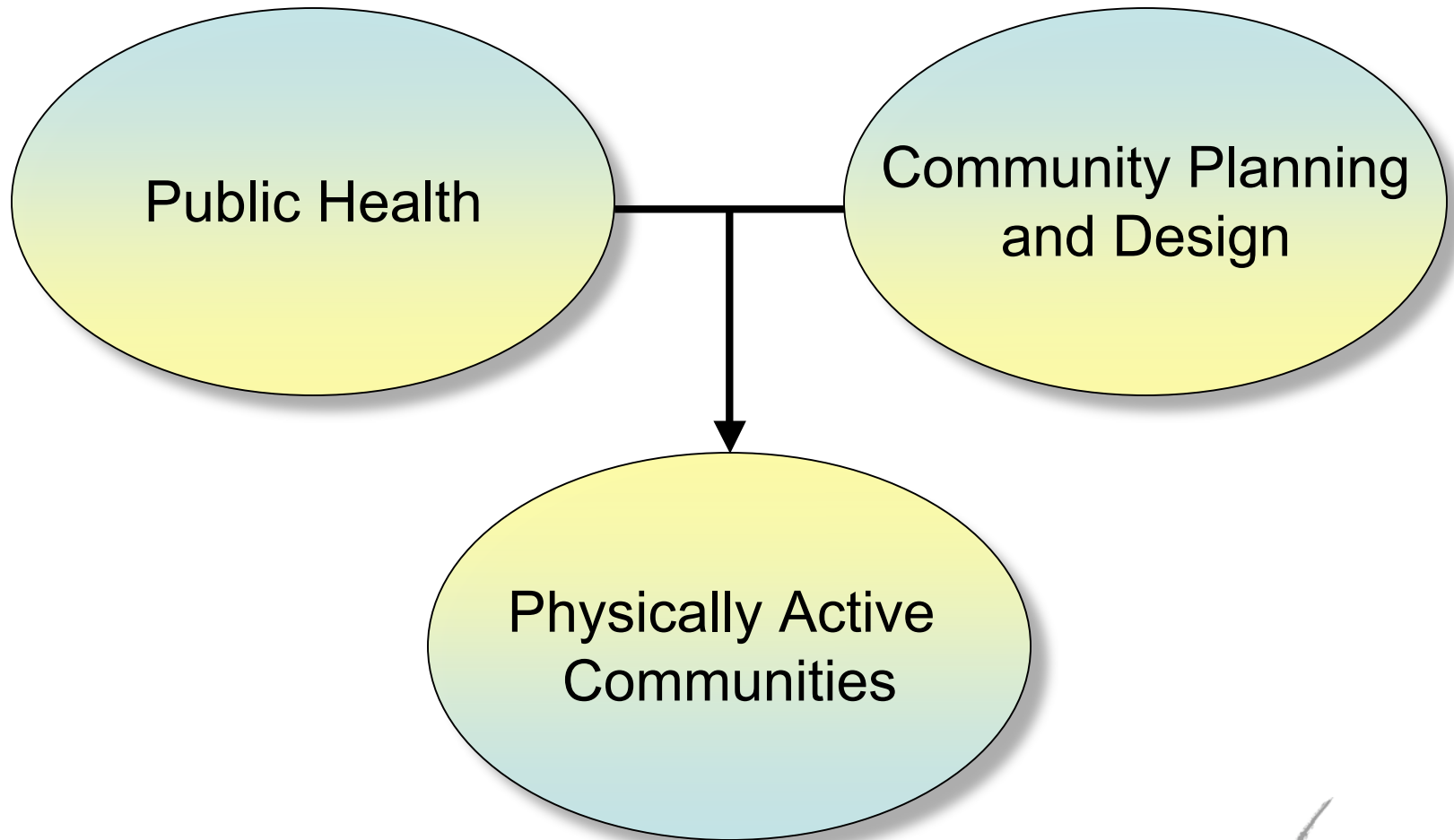
# The Outrage

- **Parent:**
  - “This jar contains the water that has been poisoning our children for over a decade. We’re seeing red over lead.”
- **Parent:**
  - “It’s bone-chilling. It’s a failure of our core values of society.”
- **State Representative:**
  - “These actions are scandalous and unforgivable.”

# The Other Side of the Story

- Director, Public Health Seattle-King County:
  - “The nature and duration of these exposures is highly unlikely to create any lead poisoning of a clinical nature.”
- Director, Pediatric Env Health Specialty Unit, UW:
  - “The chances of neurological damage are extremely, extremely low.”
- Director, WA State Poison Control Network:
  - “Just because there was a small amount of lead in the water doesn’t necessarily mean any children are being harmed. I think it was premature to conclude, in this case, that there was any health risk.”

# A Convergence of Priorities



# Engineering Physical Activity Out of Our Daily Lives



# Engineering Physical Activity Out of Our Daily Lives

## • CANINE CONSTITUTIONAL



Ben Harrell / The Spokesman

A brisk walk in the park keeps Macey II in shape between dog shows. His owner, Columbus resident Cathy Stumbo, got up early

to give her 3-year-old Doberman his regular workout. They typically log 15 miles in Berliner Park.

# Physical Activity in King and Pierce

	King County	Pierce County
Adults who report engaging in no PA in past month (BRFS).	14.5%	20%
High school students who exercise daily (Healthy Youth).	32.2%	25%

# Climate Refugees and Social Disparities



# Predicted Changes in NW Climate

- Increased average winter and summer temperatures (~ 1 degree F / decade).
- Precipitation pattern changes
  - Increased precipitation
  - Reduced spring snow pack
  - Increased storm intensities
  - Increased flooding and drought
  - Increased surface water temperatures
  - Reduced predictability



# Wildfires release fine particulate matter, CO, acrolien, benzene and formaldehyde

- Higher summer temperatures
- Earlier snow melt
- Longer fire season
- Expanded vulnerable area of high elevation forests



# Western Wildfires

- Since 1986 longer warmer summers resulted in\*
  - 4-fold increase in major wildfires.
  - 6-fold increase in area burned.
  - Active wildfire season increased 78 days.
  - Average burn duration of large fires increased from 8 to 37 days.
- Washington State summer 2006 wildfires in
  - Chelan, Columbia, Kittitas, Mason, Okanogan, and Yakima Counties.

\*Westerling, A.L., et al., 2006. Warming and Earlier Spring Increases Western U.S. Forest Wildfire Activity. *Scienceexpress*, July 6, 2006. (Based on 1166 fires)

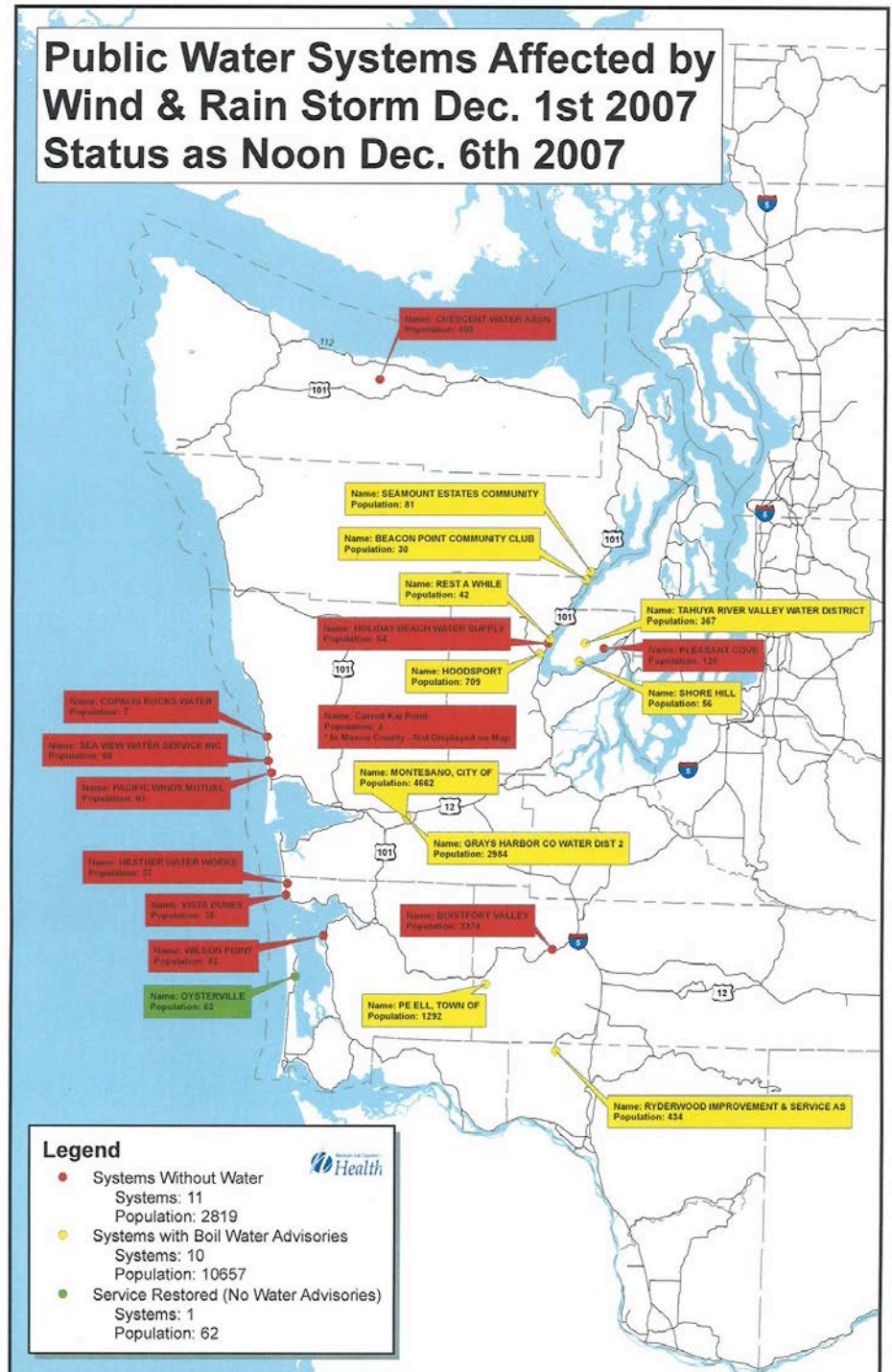
# Health Implications of Climate Change

- Health effects of excessive heat.
- Health effects of air pollution.
- Health effects associated with infectious diseases.
- Health effects of extreme weather events & rising sea levels.
- Psychological and social disruption effects.

# Flooding, Extreme Weather, Sea-Level Rise



# Public Water System Status Report



**“We can’t solve problems by using the same kind of thinking we used when we created them.”**

**- Albert Einstein**

