



# Intervening on Inequalities in Infections

## A Framework for Intervention Strategies

Jan C. Semenza  
ECDC

[ecdc.europa.eu](http://ecdc.europa.eu)

# Selected studies of communicable disease inequalities



Member State	Social Determinants associated with:
Austria	Vaccination coverage against tick-borne encephalitis (TBE).
Belgium	Infection with HIV-1.
Bulgaria	Misconceptions about HIV transmission, and other STIs.
Czech Repub.	<i>H. pylori</i> infection
Denmark	Risk of hospitalization for infectious diseases
Estonia	Syphilis incidence
France	TB at hospitals and prevention units
Germany	<i>H. pylori</i> seroprevalence rates
Greece	Incidence of gonorrhoea, syphilis and chancroids
Hungary	Epstein-Barr virus positive patients
Ireland	Clusters of TB
Italy	Perinatal hepatitis B screening.

[ecdc.europa.eu](http://ecdc.europa.eu)

# Selected studies of communicable disease inequalities

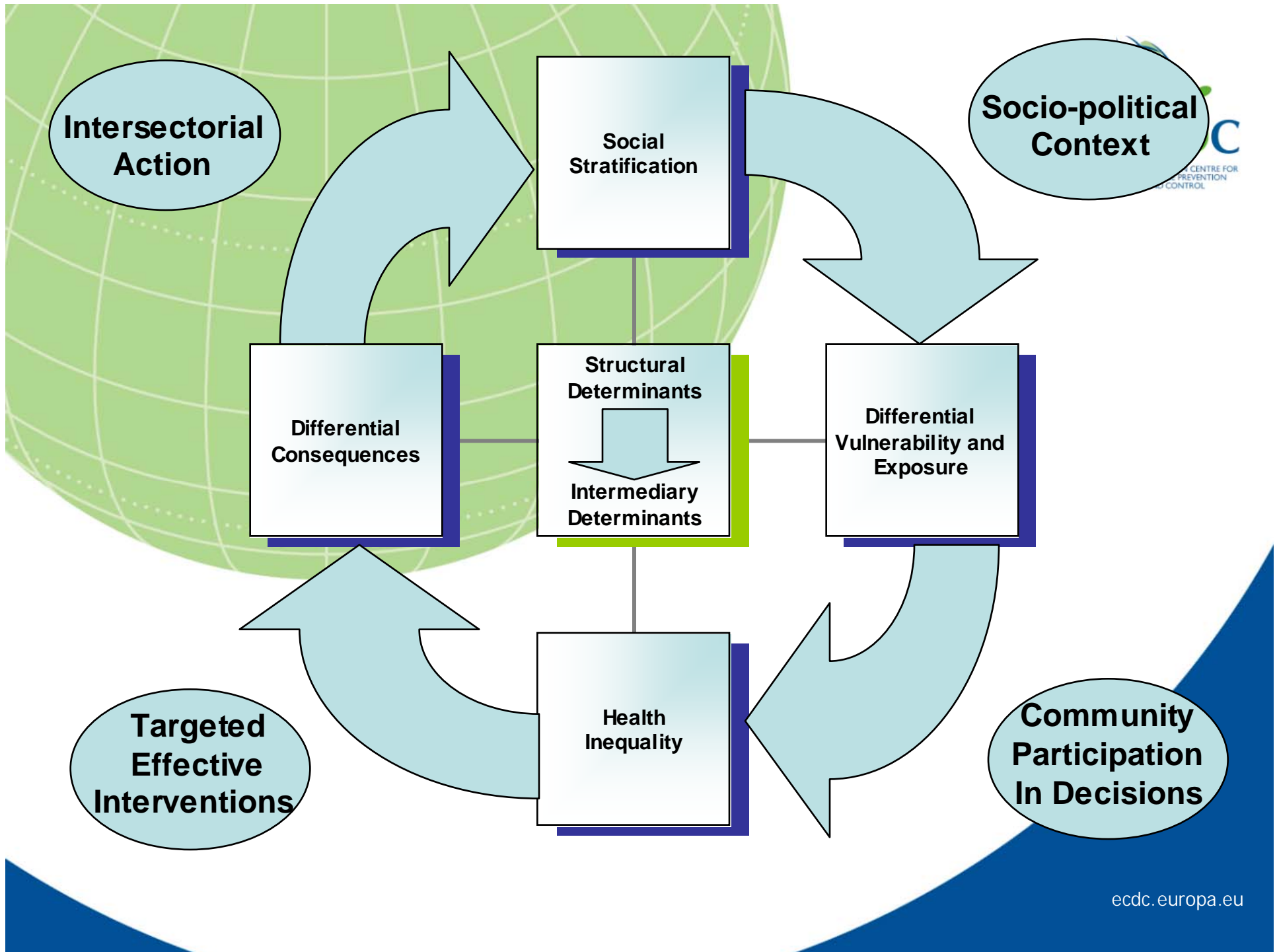


Member State	Social Determinants associated with:
Latvia	Prevalence of gonorrhoea, active syphilis, bacterial vaginosis, trichomoniasis and ectoparasites
Lithuania	Exposure to HPV.
Luxemburg	Hepatitis A virus seroprevalence
Netherlands	Rubella outbreak
Norway	anti-Hep C virus
Poland	Human papilloma virus (HPV) infections
Portugal	Hepatitis A infection
Romania	Pediatric HIV infections
Serbia	Increase of trichinellosis infections.
Slovenia	Multidrug-resistant TB (MDRTB)
Spain	Infectious disease mortality
Sweden	Positive serology for <i>H. pylori</i> and <i>Chl. pneumoniae</i>
UK	Meningococcal disease

# Interventions



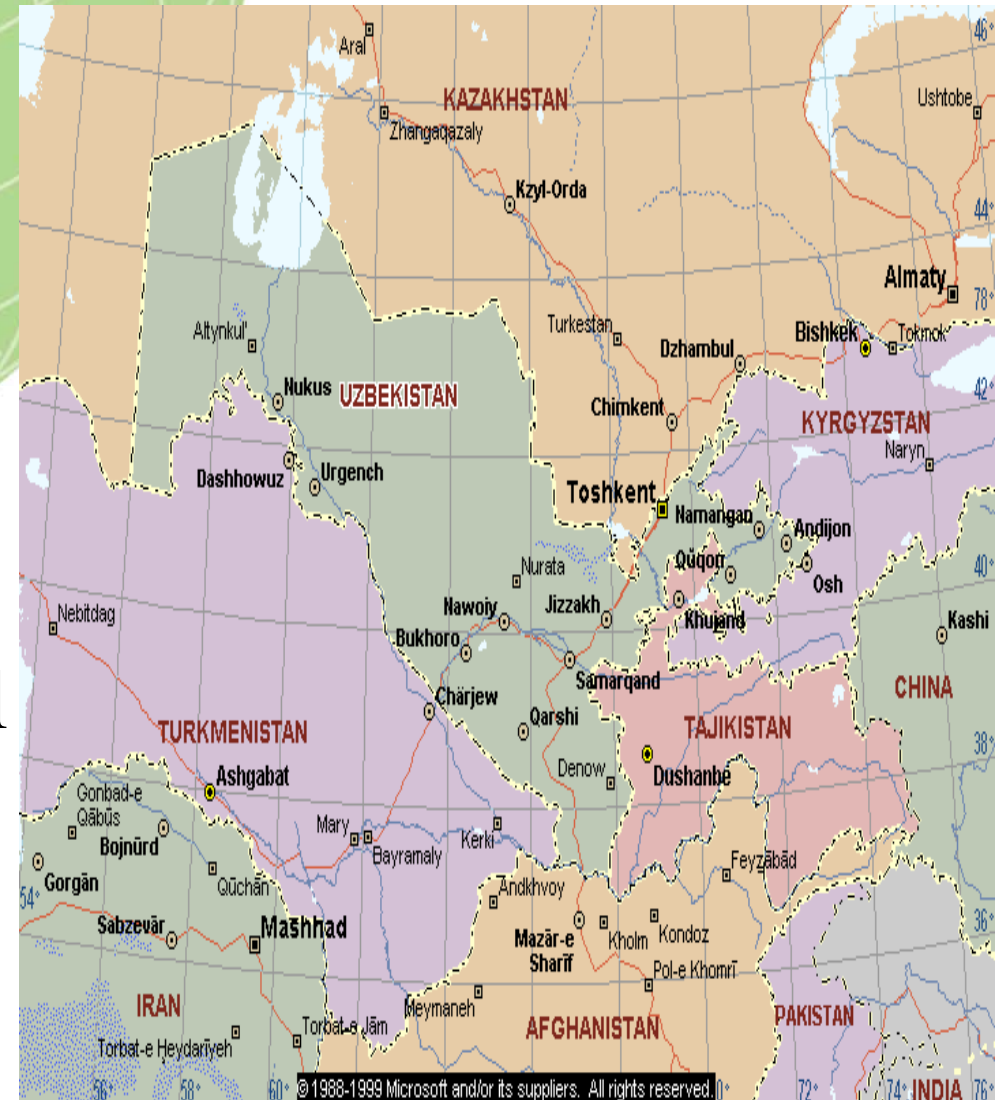
- The key to successful interventions is that fiscal and regulatory incentives must simultaneously and sustainably support behavior change, so that the healthiest option is also the cheapest and easiest.



# Case Study 1: Intersectorial Intervention



- Sanitary-Epidemiologic Services of Nukus in Uzbekistan
- Centers for Disease Control & Prevention (CDC)
- Agency for International Development (USAID)
- Engineering firm





July - September, 1989

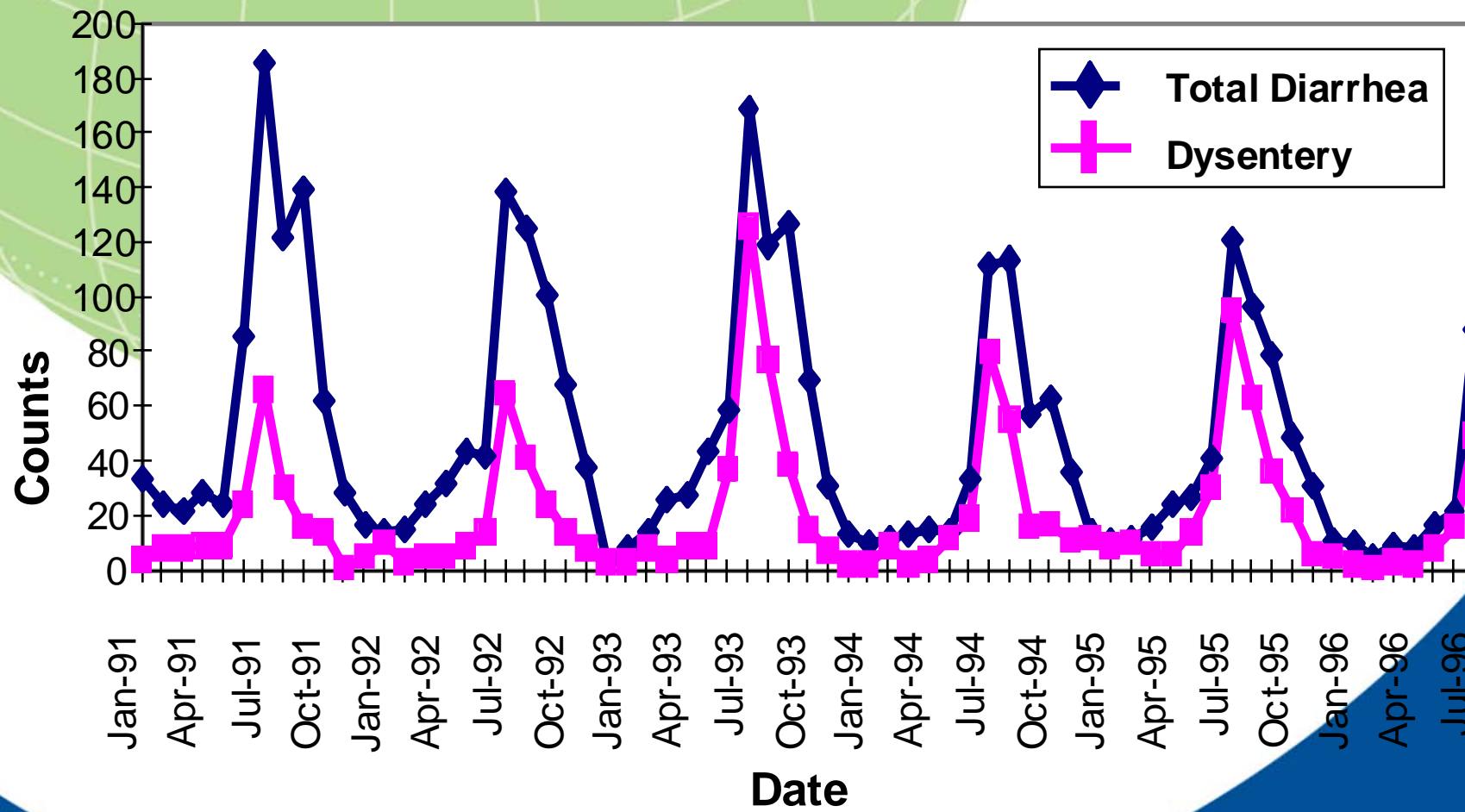


August 12, 2003

# Surveillance Data: Diarrhea and Dysentery

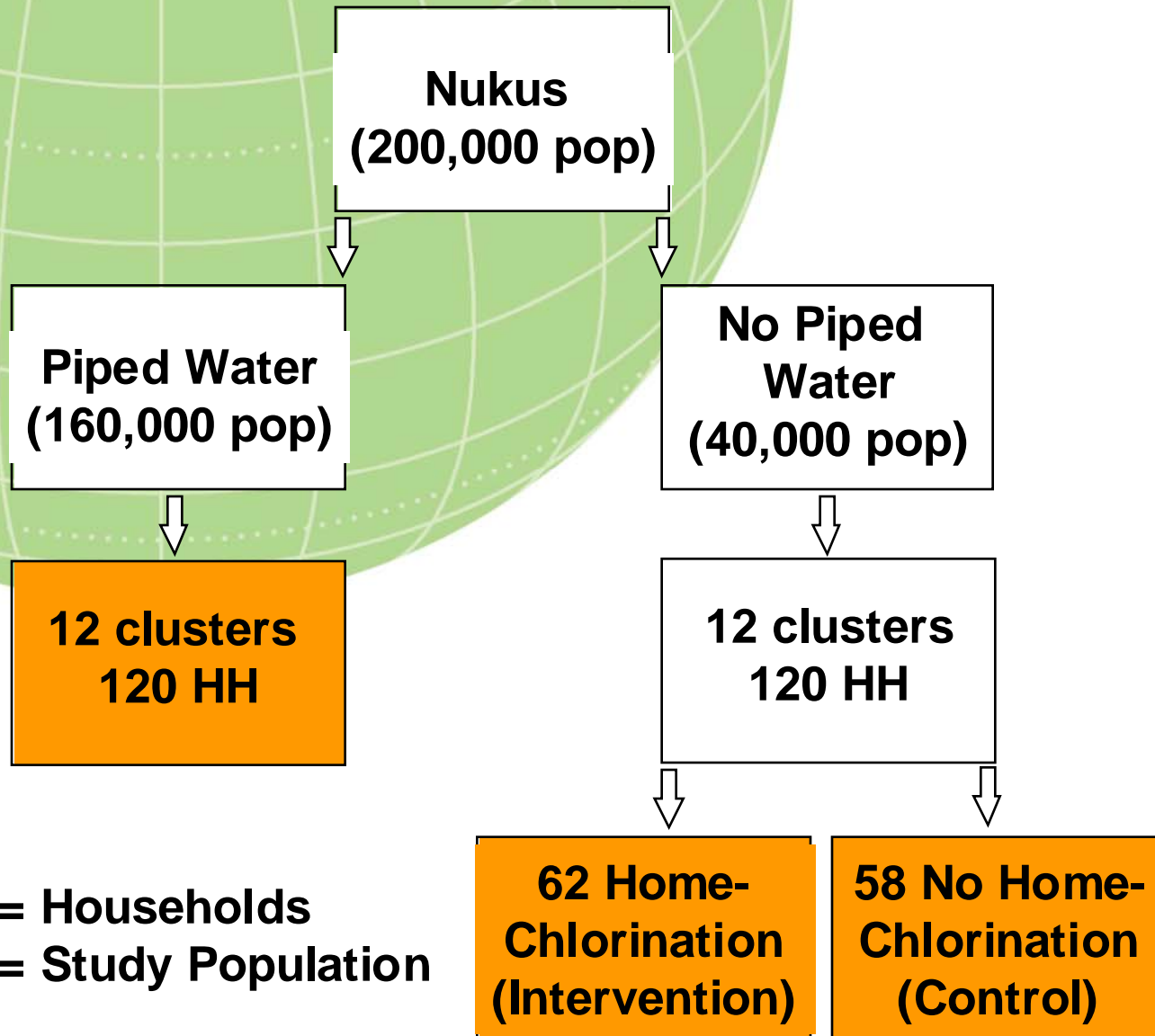


Counts reported by SES by month, Nukus 1991-1996





# Randomized Intervention Trial

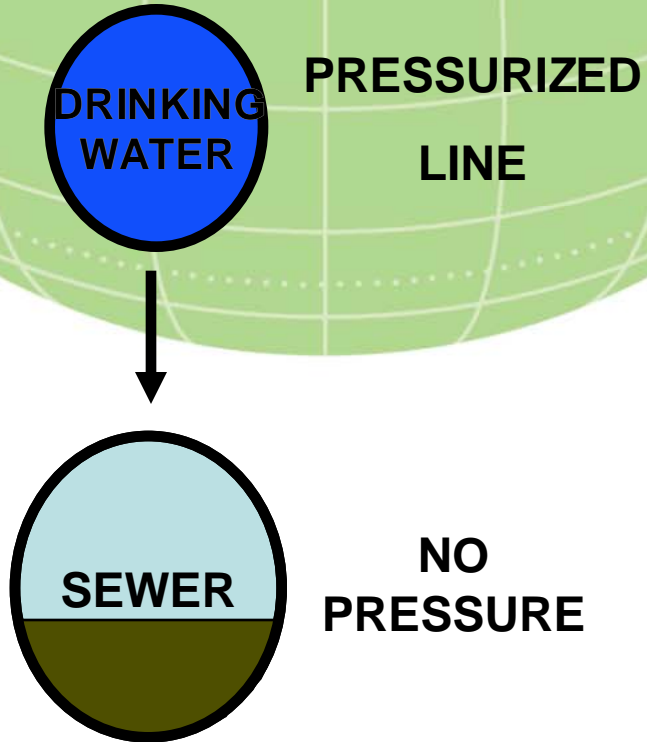


Semenza, J.C., et al., Am J of Tropical Medicine and Hygiene, (1998) 59(6):941-946.

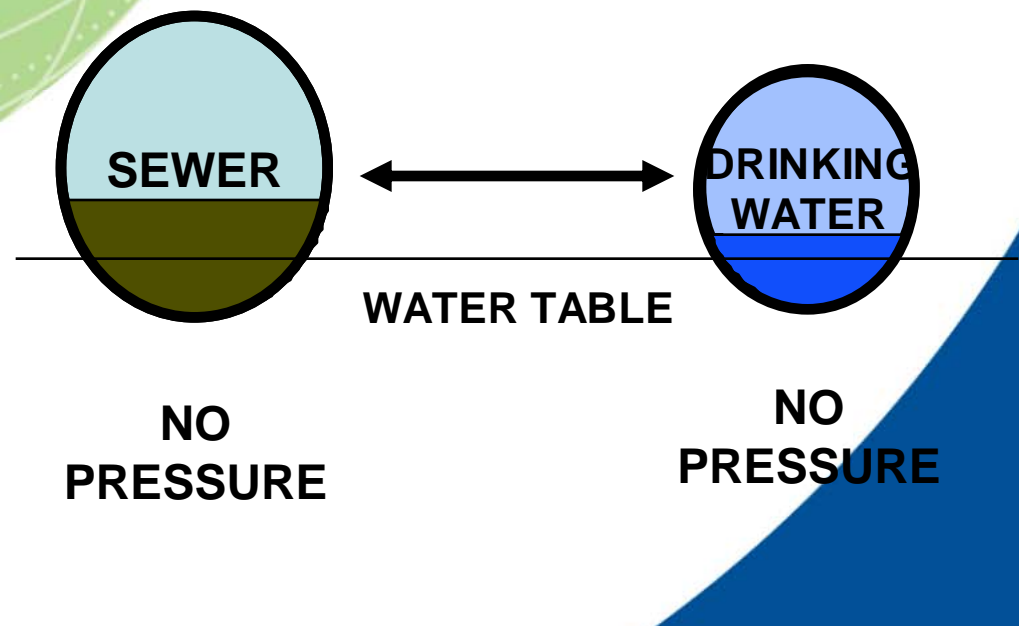


# Cross-Connection

## Ideal Situation



## Nukus



# Case Study 2: Evidence-based Interventions



- City Government Intervention to Provide Social Support
- Prevention efforts tailored to populations at risk
- Comprehensive heat emergency response plan

# KILLER HEAT WAVES

Scientists study Chicago's summer tragedy, say danger is widespread

NEW YORK TIMES

**C**hicago — A team of investigators from the Centers for Disease Control and Prevention, using computers and shoe leather, has been following a trail of mass death for the last three months.

But the trail, instead of winding through a remote village or a distant rain forest haunted by an exotic plague, has snaked through the brick and concrete valleys of Chicago.

The team has been studying the living and the dead to determine why at least 500 people, and perhaps more than 700, perished in a short but brutal invasion of high heat and humidity in July, one of the deadliest periods in the history of a city that has stubbornly survived snowstorms, fires, gangsters and skyscraper-bending winds.

"It was an extraordinary event," Dr. Joel Selanikio, a member of the federal team, said of the heat wave and its victims. "Routinely there are very hot summers in Chicago, but you don't have 600 people die. We're trying to find out what made this distinct."

Indeed, health experts say, the staggering number of deaths is finally drawing the nation's attention to their long-ignored warnings: Heat is a health hazard that is deadlier than most people realize, and many cities are inadequately prepared to fight it.

The centers' investigators estimate that heat has killed more than 5,000 Americans in the last 15 years, and they expect that figure to rise as they re-examine deaths originally attributed to natural causes.

In the past three months, Chicago has been transformed into a sprawling laboratory for the study of this health threat. Investigators examining the heat-related deaths in that period — now put at 536 to 733 — are focusing on several areas where the city's emergency system may have fallen short.

The criteria of a heat-related death include a body temperature of 105 degrees or



A nurse gives water to a woman who managed to reach a Chicago cooling center in July. The heat-related deaths of hundreds of people stunned the city.

Associated Press

# THE ATLANTA CONSTITUTION

MONDAY, JULY 17, 1995 • 50 CENTS

HOME EDITION

OLYMPIC TIMEPIECE



## Toll may hit 300 in Chicago heat

Scores of victims elsewhere in U.S.

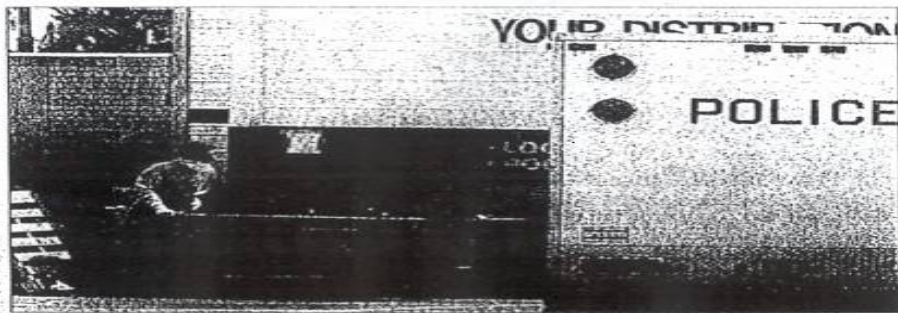
# Chicago Tribune

Monday, July 17, 1995

# Chicago Tribune

Thursday, July 20, 1995

## Heat now being counted in bodies, not degrees



Autopsy technicians move bodies Sunday from refrigerated trucks into the Cook County medical examiner's office.

Death toll of 116 could double; most area victims are elderly



## City deaths in heat wave triple normal

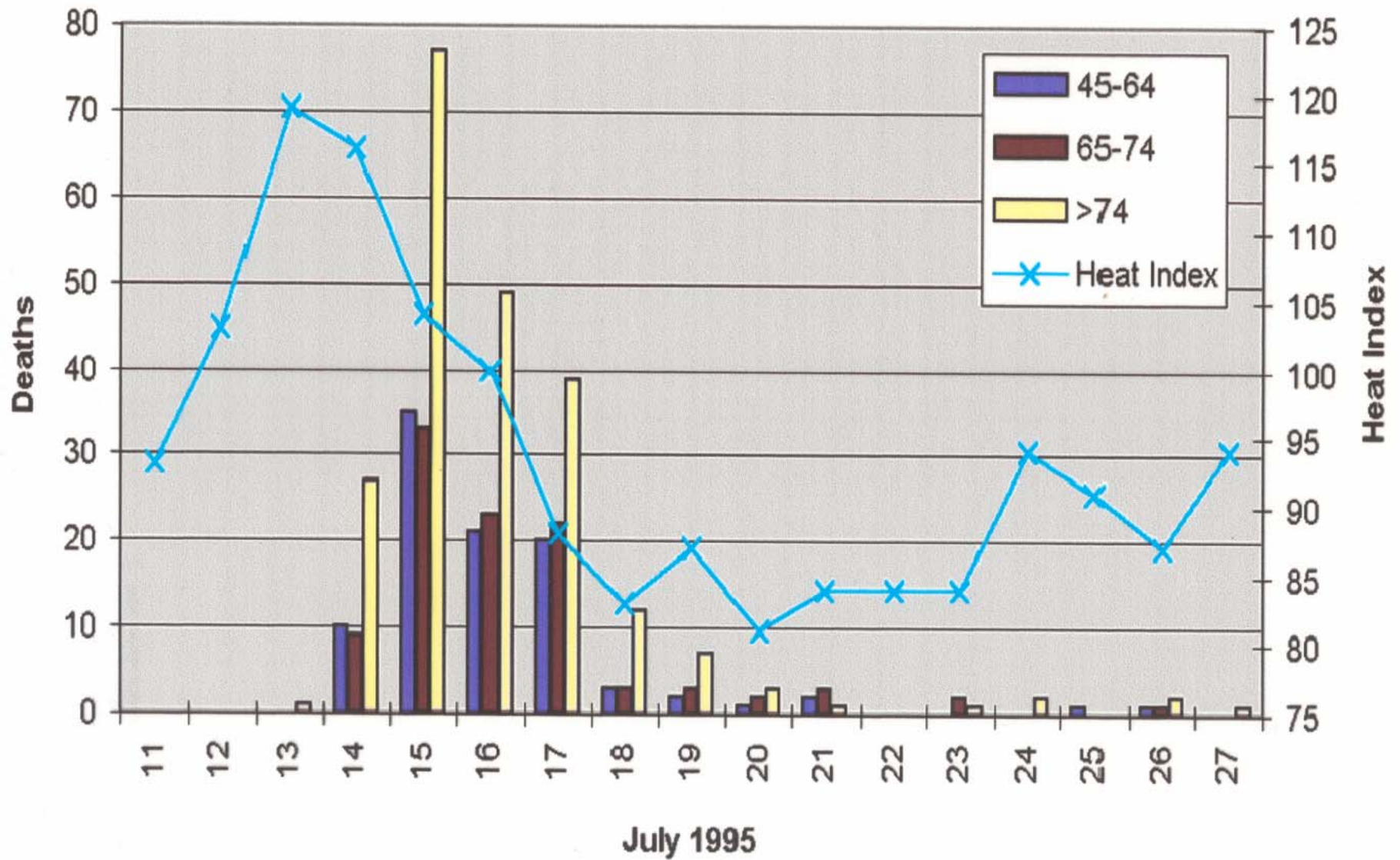
Toll now at 436 and still rising

■ A heat-warning system may curb death tolls. Page 7.

survived if not for the heat wave." Despite criticism, including comments from Mayor Richard Daley on Wednesday that Tennessee was "courageous as best

By Joel Rubin and Sherman Stein Times Staff Writers

## ME Heat-Related Mortality by Age Chicago, July 11-27, 1995



# Social Isolation



Semenza, J.C., et al., *New England Journal of Medicine* (1996) 335(2):84-90.

# National Report

The New York Times

## U.S. Agents in Chicago Track a Subtle Health Hazard: Heat

By DON TERRY

CHICAGO, Oct. 3 — Using computers and shoe leather, a team of investigators from the Centers for Disease Control and Prevention has been following a trail of mass death for the last three months. The trail winds not through a distant rain forest haunted by an exotic plague but the brick and concrete valleys of this city.

The team has been studying the living and the dead of Chicago to determine why at least 500 people, perhaps more than 700, perished in a short but brutal invasion of high heat and humidity in July, one of the deadliest periods in the history of a city that has survived snow storms, fires, gangsters and skyscraper-bending winds.

"It was an extraordinary event," said Dr. Joel Selanikio, a member of the Federal team. "Routinely, there are very hot summers in Chicago, but you don't have 600 people die. We're trying to find out what made this distinct."

Indeed, health experts say, the staggering number of deaths is finally drawing the nation's attention to their long-ignored warnings: Heat is a public health hazard that is deadlier than most people realize, and many cities are inadequately prepared to fight it.

The centers' investigators estimate that heat has killed more than 5,000 Americans in the last 15 years, and they expect that figure to rise as they re-examine deaths originally attributed to natural causes.

In the last three months, Chicago has been transformed into a sprawling laboratory for the study of this health threat. Investigators examining the heat-related deaths here in



Federal health agents are in Chicago trying to determine the contributing factors to the more than 500 deaths related to the heat in July. Coffins containing the bodies of unclaimed victims were loaded on a truck by a Cook County morgue worker this summer for a mass burial.



# Heat Wave Emergency Response Plan



- Meteorological measurements and monitoring
- Organize participating organizations
- Action plan and outreach during a heat wave
- Inactivate and evaluate response plan after heat wave

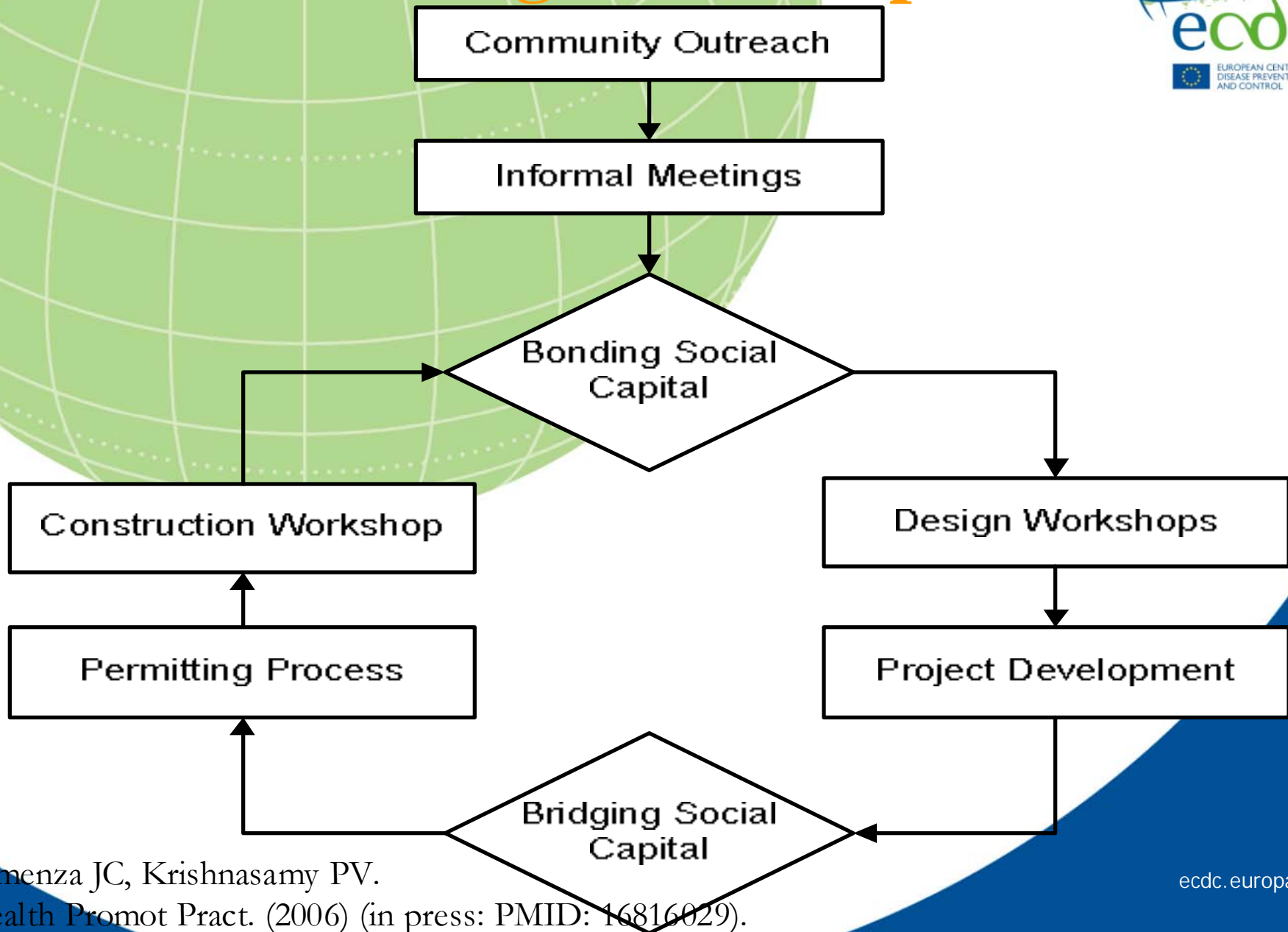
Semenza, J.C. Case Studies: Effecting Change through Improving the Macrosocial Environment. Springer Media Publishing New York, NY. Sandro Galea, editor. (in press).

[ecdc.europa.eu](http://ecdc.europa.eu)

# Case Study 3: Community-based Interventions



# Building Social Capital



Semenza JC, Krishnasamy PV.  
Health Promot Pract. (2006) (in press: PMID: 16816029).

[ecdc.europa.eu](http://ecdc.europa.eu)



Copyright 2007, Jan C. Semenza, Jan.Semenza@ecdc.eu.int



[ecdc.europa.eu](http://ecdc.europa.eu)

# Multivariate Results



	Hoetelling's Trace	F	P	N
<b>Sense of community</b>	<b>0.09</b>	<b>3.97</b>	<b>&lt;0.001</b>	<b>260</b>
<b>Social interaction</b>	<b>0.04</b>	<b>2.29</b>	<b>0.06</b>	<b>261</b>
<b>Perceived NH control</b>	<b>0.02</b>	<b>0.84</b>	<b>0.52</b>	<b>262</b>
<b>NH participation</b>	<b>0.01</b>	<b>0.34</b>	<b>0.85</b>	<b>241</b>
<b>Social capital</b>	<b>0.15</b>	<b>1.71</b>	<b>0.04</b>	<b>229</b>
<b>Mental health</b>	<b>0.09</b>	<b>1.95</b>	<b>0.03</b>	<b>250</b>

Semenza JC, et al., J Urban Health. (2007) 84(1):8-20.

[ecdc.europa.eu](http://ecdc.europa.eu)

# Case Study 4: Socio-political Context: Swedish National Public Health Objectives



- *1. Participation and influence in society*
- *2. Economic and social security*
- *3. Secure and favorable conditions during childhood and adolescence*
- *4. Healthier work life*
- *5. Healthy and safe environments and products*
- *6. Health and medical care that actively promotes good health*
- *7. Effective protection against communicable diseases*
- *8. Safe sex and good reproductive health*
- *9. Increased physical activity*
- *10. Good eating habits and safe food*
- *11. Reduced use of tobacco and alcohol, a society free from illicit drugs and doping, and a reduction in the harmful effects of excessive gambling*

[ecdc.europa.eu](http://ecdc.europa.eu)

Semenza, J.C. Springer Media Publishing New York, NY. Sandro Galea, editor. (in press).



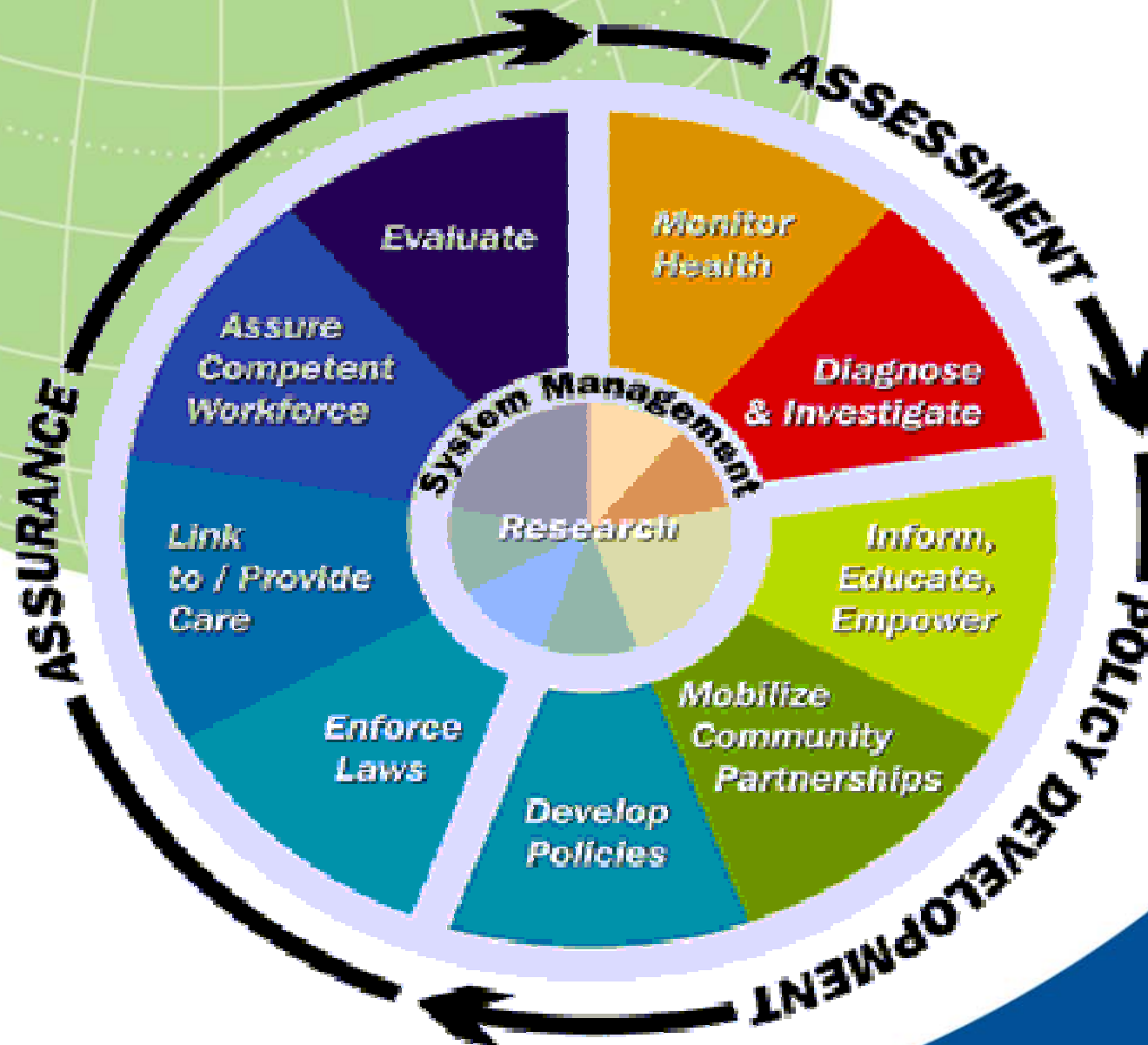
# ECDC Workshop on Infectious Diseases and Social Determinants

**Stockholm, 26th & 27th of April 2007**

[ecdc.europa.eu](http://ecdc.europa.eu)



# Essential Public Health Services



# Essential Public Health Services



- Assess the strengths, weaknesses, opportunities and threats to essential public health services in relation to social determinants of health:
  - Assessment/Surveillance
  - Policy development
  - Assurance
  - Research

# Intervening on Inequalities in Infections



- **Infectious disease surveillance:**
  - monitor health indicators in sub-populations; collect socio-demographic variables from disadvantaged groups; analyse sub-group strata.
- **Outbreak investigation:**
  - diagnose and investigate health problems in sub-populations; respond effectively and rapidly, including contact tracing.
- **Inform, educate, empower:**
  - provide culturally sensitive health education and health promotion.
- **Mobilize community partnerships:**
  - engage community leaders; reach out to stakeholders; connect different sectors and agencies.
- **Develop policies:**
  - create guidelines and plans to advance health in marginalized groups.

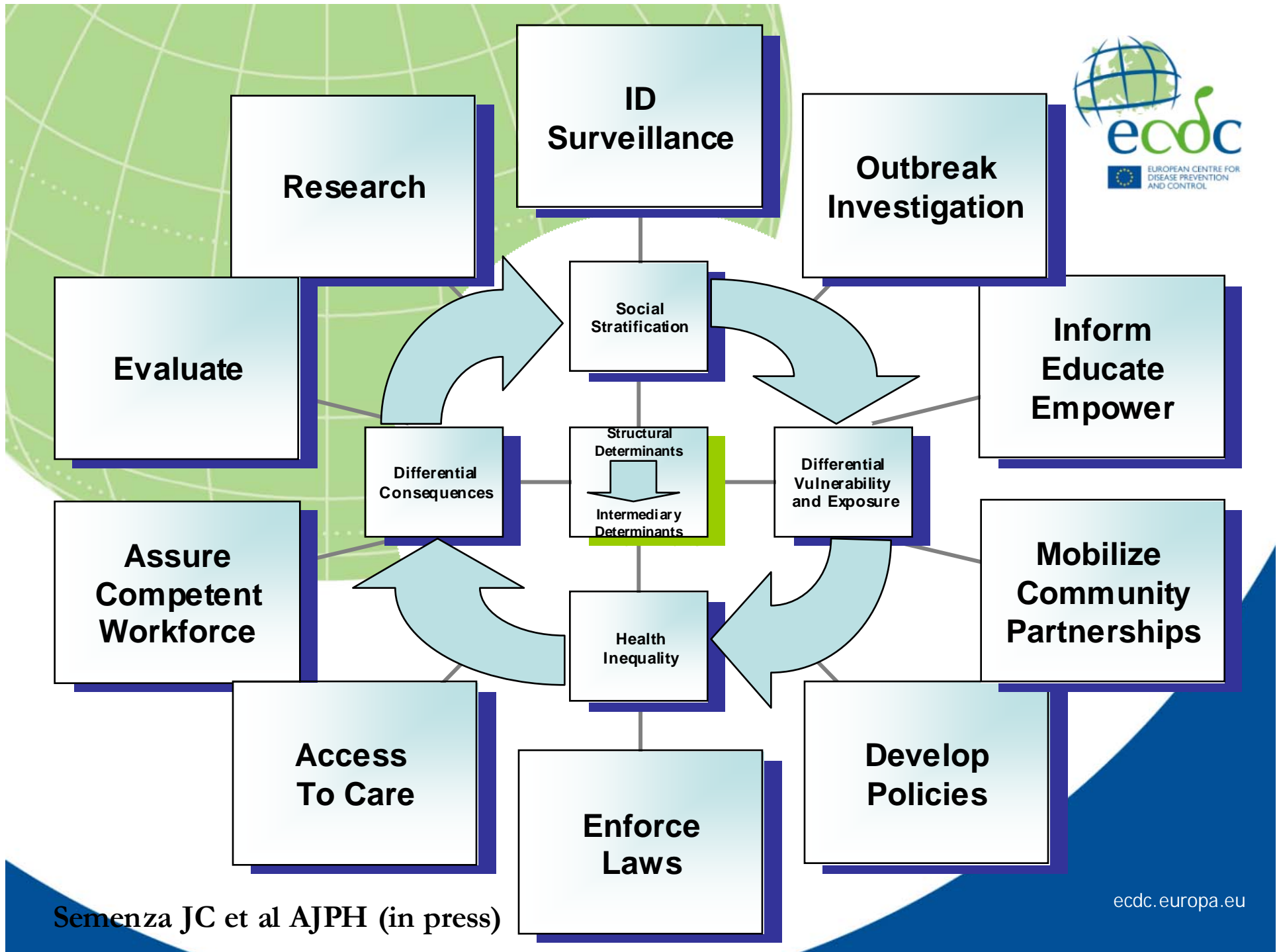
[ecdc.europa.eu](http://ecdc.europa.eu)

# Intervening on Inequalities in Infections



- **Enforce laws:**
  - implement regulations to minimize differential vulnerability and harmful exposures; protect health and ensure safety.
- **Access to care:**
  - link marginalized groups to health services irrespective of social standing; assure provision of health care when otherwise unavailable; e.g. ID screening should not be linked to migration status as high-risk groups will be lost to follow-up.
- **Assure competent workforce:**
  - hire minority public health practitioners; train health care workforce; conduct outreach and sensitivity training to overcome cultural barriers.
- **Evaluate:**
  - assess interventions in marginalized groups; evaluate effectiveness, accessibility, and quality of public health services for sub-populations.
- **Research:**
  - promote studies of sub-populations; develop innovative solutions to health problems of disadvantaged groups.

[ecdc.europa.eu](http://ecdc.europa.eu)



Semenza JC et al AJPH (in press)

# Summary



- Social determinants are the fundamental causes of disease worldwide.
- If we are to reduce systemic health inequities and eradicate disease, we must intervene in the macro-level causes.
- Acting upon social determinants entails the age-old predicament of public health: how to take decisive action despite the lack of definite data.



## Conclusion

A variety of tactics should reflect the many different possible approaches to tackling the social determinants within each country's own political, historic, cultural, and social context.

[Jan.Semenza@ecdc.eu.int](mailto:Jan.Semenza@ecdc.eu.int)

[ecdc.europa.eu](http://ecdc.europa.eu)