

# The Top Ten reasons for geoscientists and doctors to talk to each other

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Who am I?



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- Adventures in GIS: IHGCs 1 & 2



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- Revelations: health & geoscience professionals have lots in common



# Who am I?

- Adventures in GIS: IHGCs 1 & 2
- Revelations: health & geoscience professionals have lots in common
- (Also, they like pretty pictures)



# Who are you?

- Geoscientists?
- Health scientists?
- Maybe some of both?



# What is the meaning of life?

*Hint: Deep Thought*



42





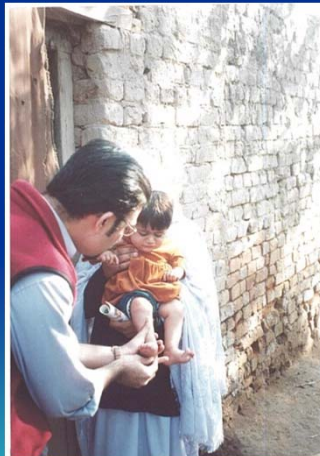
1.

We will not spend much time  
convincing each other that we are here  
to make the world a better place.

By corollary, that our work should help  
those most in need.



## 2. Big problems need big solutions



The moral test of government is how it treats those  
who are in the dawn of life, the children;  
those who are in the twilight of life, the aged;  
and those in the shadows of life,  
the sick, the needy and the handicapped.



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*-Sen. Hubert Humphrey Building, Washington DC, 11/4/77*  
(Current home of the Center for Medicare & Medicaid  
Services)



### 3. Big solutions need many sources of knowledge

[http://www.ted.com/index.php/talks/hans\\_rosling\\_shows\\_the\\_best\\_stats\\_you\\_ve\\_ever\\_seen.html](http://www.ted.com/index.php/talks/hans_rosling_shows_the_best_stats_you_ve_ever_seen.html)

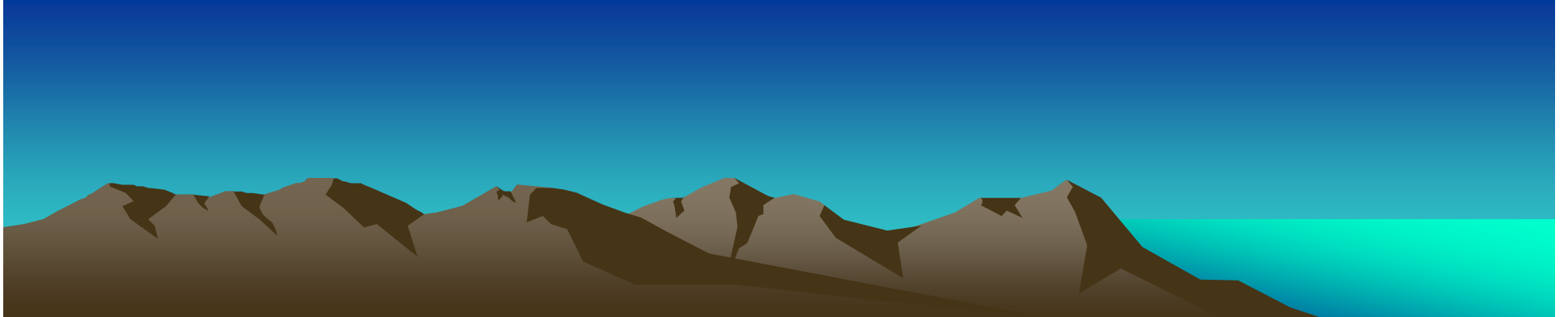
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4.

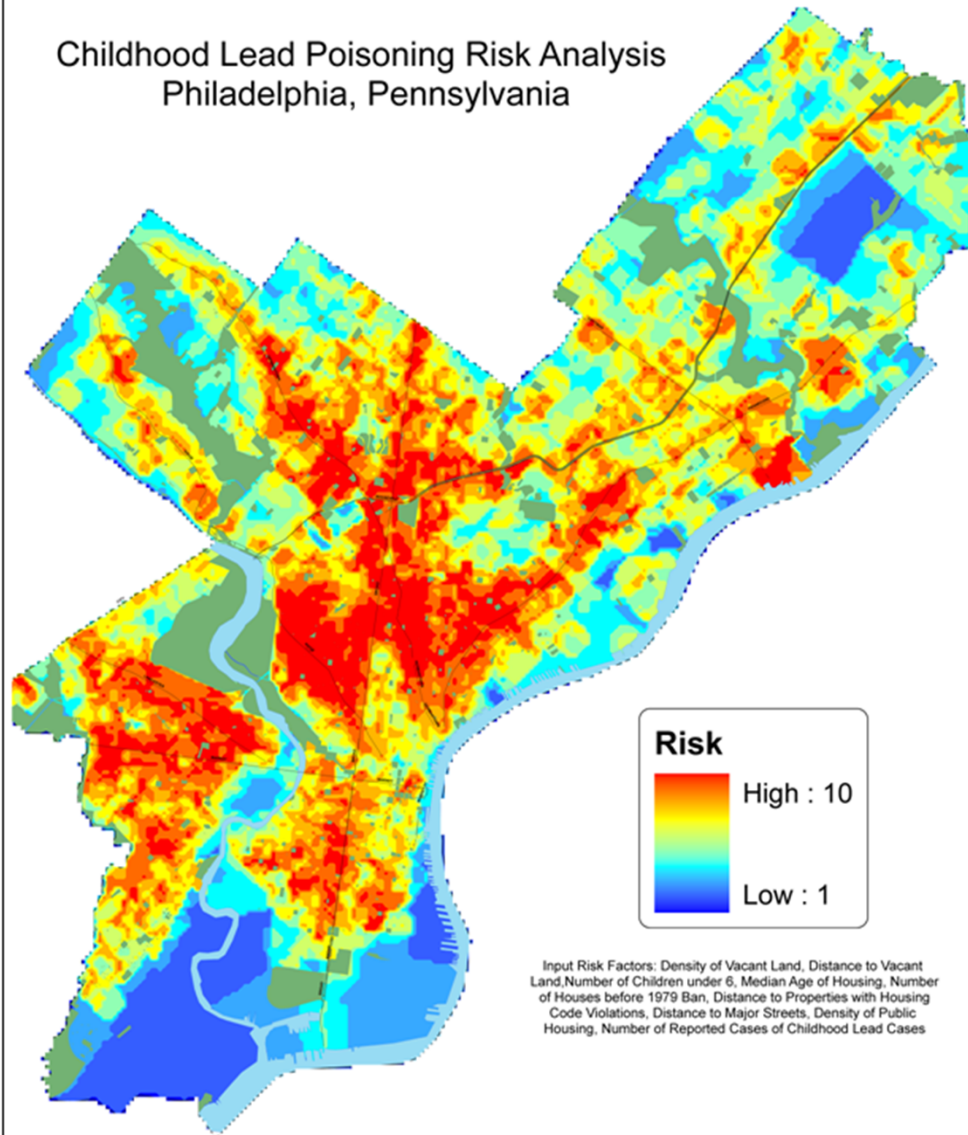
Data are increasingly agnostic to  
which group originated them

*And will be utilized for increasingly  
interdisciplinary purposes*



# GIS

## Childhood Lead Poisoning Risk Analysis Philadelphia, Pennsylvania



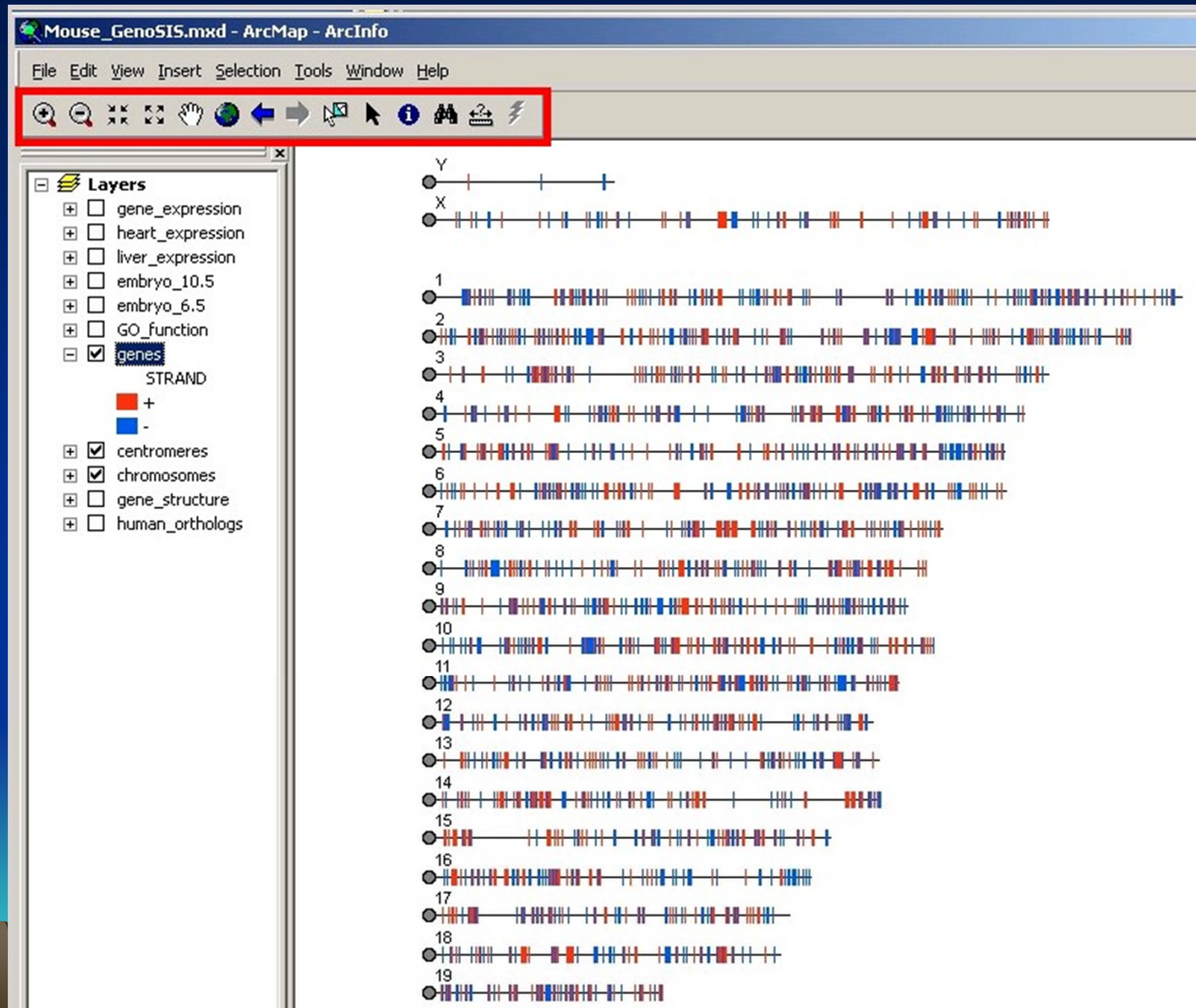
N Source: Multiple City of Philadelphia, 2004

0 0.5 1 2 3 4 Miles

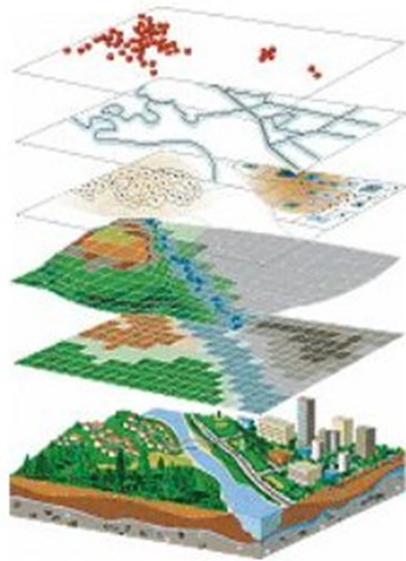




# GIS, too







Buildings

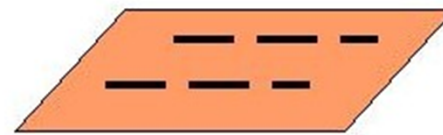
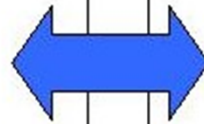
Roads, rivers

Land parcels

Elevation data

Satellite image data

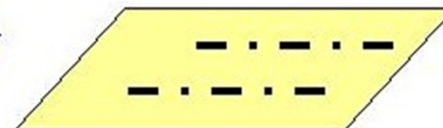
Underlying geographic space



Conserved regions



Expression levels



Genes



Chromosome space

<http://www.gis.com/whatisgis/whyusegis.html>

Health problems which keep us busy  
*(and which need us to talk more)*



# 5.

- Heart Disease And Stroke
  - More than 7 million deaths a year
  - Effects of the built environment
  - Effects of the natural environment



# 5.

- Heart Disease And Stroke
  - Effects of the built environment:
    - Exercise, food deserts, diet quality, access to care



# 5.

- Heart Disease And Stroke
  - Effects of the natural environment



# 5.

- Heart Disease And Stroke
  - Effects of the natural environment :
    - Air Pollution; link to asthma & smoking



# 5.

- Heart Disease And Stroke
  - Effects of the natural environment :



# 5.



- Heart Disease And Stroke
  - *Rhodnius prolixus*, the triatomine bug transmitting *T. cruzi*, causing Chagas disease
  - 11 M people worldwide have Chagas
  - Leading cause of heart disease in Latin America
  - Newly deforested areas esp. near the Amazon at high risk



# 6.

- Lung disease
  - More than 7 million deaths a year
  - Lifestyle or Environment?



# 6.

- Lung disease
  - Tobacco -- COPD, lung cancer
  - Genetics + ?-- Asthma
  - Environment -- ?



# 6.

- Lung disease
  - Tobacco -- COPD, lung cancer
  - Genetics + ?-- Asthma
  - Environment -- asbestosis, silicosis, environmental toxins, acid rain, radon



# 7.

- Diarrheal disease
  - More than 2 million deaths a year



# 7.

- Diarrheal disease
  - More than 2 million deaths a year
  - Structural reasons: Water & Sanitation



# 7.

- Diarrheal disease
  - More than 2 million deaths a year
  - Structural reasons: Water & Sanitation
  - Environmental reasons: Floods, climate change, natural disasters



8.

- HIV/ AIDS



8.

- HIV/ AIDS
  - [Really?]





8.

- HIV/ AIDS
  - More than 2 million deaths a year



8.

- HIV/ AIDS
  - More than 2 million deaths a year
  - AIDS deaths usually caused by a secondary condition



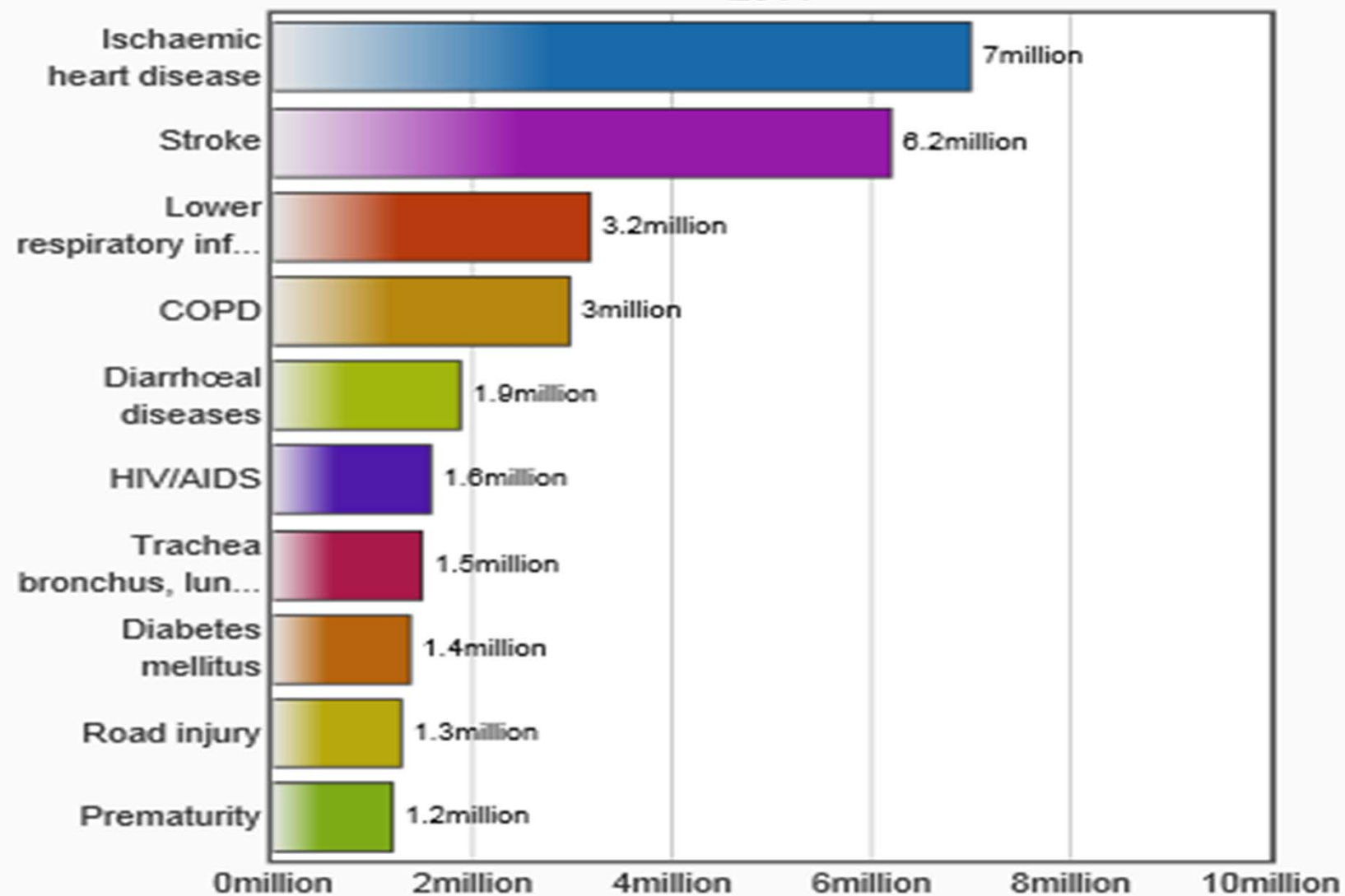
8.

- HIV/ AIDS
  - More than 2 million deaths a year
  - AIDS deaths usually caused by a secondary condition
  - Usually a respiratory or diarrheal disease



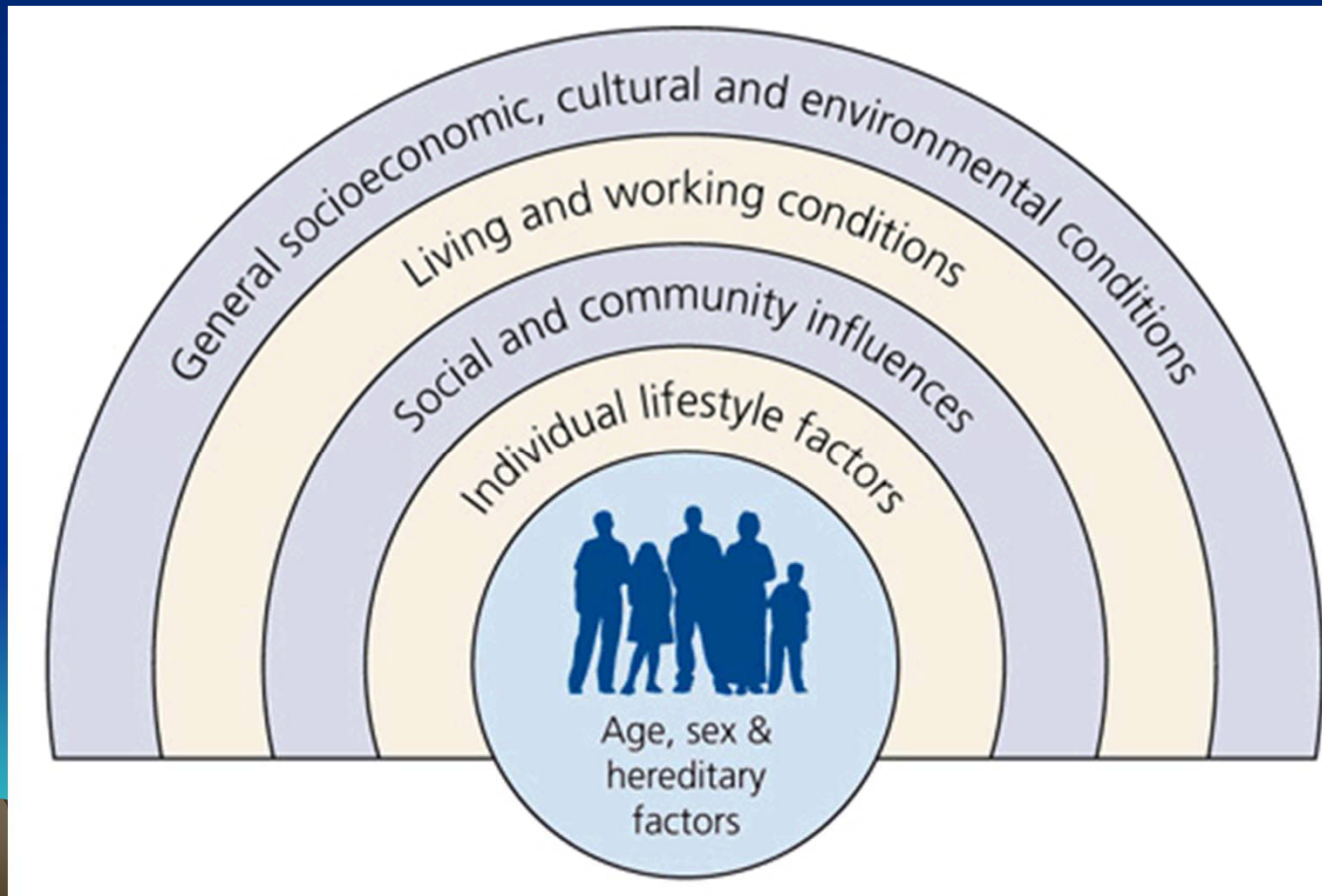
## The 10 leading causes of death in the world

2011



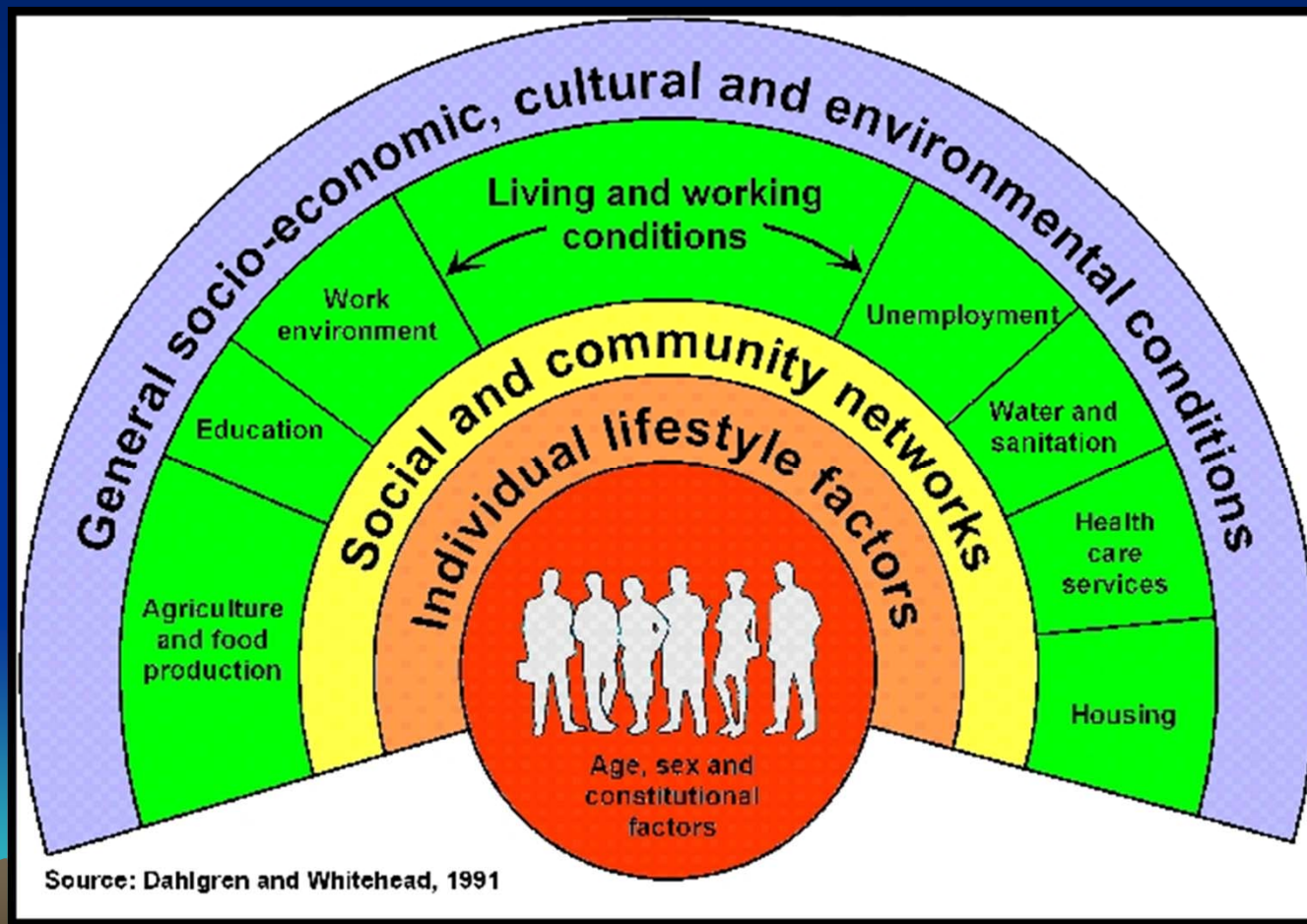
# 9.

- Back to foundations: Social Determinants of Health



# 9.

- Social Determinants of Health



9.

# The Case for foundational cooperation among scientists



9.

## The Case for foundational cooperation among scientists

“As resources will always be limited, these should be used in such a way as to equitably provide those health care forms which have been shown to be effective through appropriately designed assessments.”

*-Archie Cochrane*





# 9.

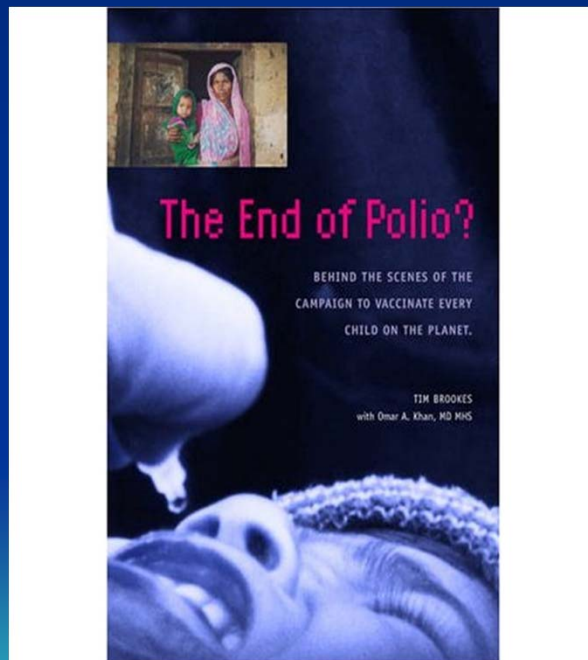
## The case for foundational cooperation among scientists

- School education & science curricula
- Evidence-based health care reform



10.

## The story of polio



- Exploring Polio

- Perhaps the last disease to be eradicated?
- What lessons are there for us?
- What does geoscience have to do with it?



- A bit about Polio

- Affects mostly children under 3 (50% of all cases)
- Can cause partial paralysis of legs; sometimes paralysis of respiratory muscles (life-threatening)
- Humans are the only reservoir for the poliovirus
- Transmission is usually fecal-oral through contaminated water
- No treatment



# Eradicating polio?

- In 1988, the World Health Assembly (WHA) - annual meeting of the Member States of the World Health Organization- voted to launch a global goal to eradicate polio
- As a result, the largest public health effort to date was put together: The Global Polio Eradication Initiative (GPEI)



# Polio vaccination

- 2 types: OPV- oral (live) ; IPV- injected (inactivated)
- Developed countries have switched to IPV
- Developing countries use OPV
  - easy to give (drops)
  - cheap (8 cents a dose)
  - Shedding of virus from immunized kids can immunize others



## And the geoscience part

- Needs high herd immunity



## And the geoscience part

- Needs high herd immunity
- Which needs access to people and their kids





## And the geoscience part

- Geography and Geology are not our friends here

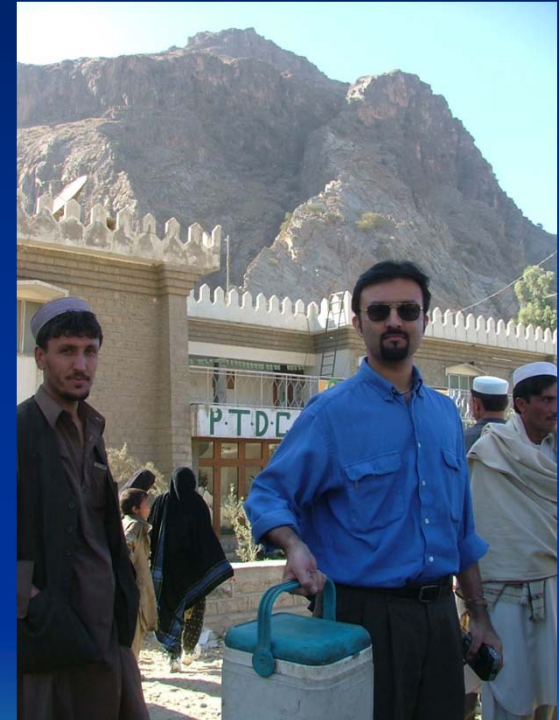
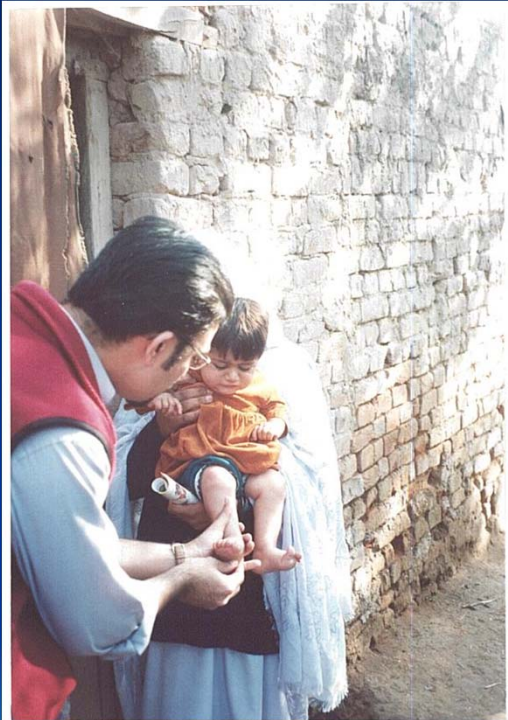


## And the geoscience part

- Geography and Geology are not our friends here
- Or are they?
- The 2006 earthquake was the way for the polio team to access the most remote areas of Pakistan & Afghanistan







## Links & References

- WHO Commission on Social Determinants of Health - final report:  
[http://www.who.int/social\\_determinants/thecommission/finalreport/en/index.htm](http://www.who.int/social_determinants/thecommission/finalreport/en/index.htm)
- CDC's Social Determinants of Health site:  
<http://www.cdc.gov/socialdeterminants/>
- CDC 2011 Health Disparities and Inequalities Report:  
<http://www.cdc.gov/mmwr/pdf/other/su6001.pdf>





