Children's Health and the Impact of Climate Change

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Speaker Introduction

- Dr. Cathy Woodward has more than 20 years of experience as a nurse practitioner in pediatric critical care. She has daily experience interpreting pediatric chest X-rays. She is a professor of pediatrics at UT Health San Antonio. She has a DNP from Case Western Reserve and her post master’s certificate in PNP acute care from Duke University.

Disclosures

In the interest of full disclosure I have to tell you that you’ll be working long, hard hours for half the pay you deserve.

Learning Objectives

- Discuss the impact of climate change on the health of children.
- List the expected changes in the health of children should climate change continue.
- Discuss the possible steps PNP’s can take to mitigate the impact of climate change on children.

Scientists: Climate change accelerating

NYT Article appearing in San Antonio Express News Dec 4, 2019

Facebook is not a scientific source of information......
Again: Facebook is not a scientific source of information.

A little science lesson for the #IDIOTS at the global warming conference.

Ice Berg
Ocean

WHO are the EXPERTS?

- The Intergovernmental Panel on Climate Change
  The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.

- U.S. National Academy of Sciences

- American Meteorological Society

- American Physical Society

Climate Change – What is happening?

Effects that scientists had predicted in the past would result from global climate change are now occurring: loss of sea ice, accelerated sea level rise and longer, more intense heat waves.

Examples of Effects

- Heat Waves in Europe – Summer 2019
- Extreme rainfall in Texas during Tropical Storm Imelda – Sept 2019
- Devastating fires in California – 2018-2019

Just the Facts (from NASA):

- The planet's average surface temperature has risen about 1.62 degrees Fahrenheit (0.9 degrees Celsius) since the late 19th century, a change driven largely by increased carbon dioxide and other human-made emissions.

- Most of the warming occurred in the past 35 years, with the five warmest years on record taking place since 2010. Not only was 2016 the warmest year on record, but eight of the 12 months that make up the year — from January through September, with the exception of June — were the warmest on record for those respective months.
What's in a degree?

WHY is this happening now?

PHILOSOPHICAL MAGAZINE
AND JOURNAL OF SCIENCE

Arthur Schlesinger

The Greenhouse Gases

Methane (CH₄)
Nitrous Oxide (N₂O)
Carbon Dioxide (CO₂)
Sulphur Hexafluoride (SF₆)

Maybe we haven't been paying attention?

WHAT is happening now?

CO₂ levels

Science Fair
Children's Health and the Impact of Climate Change

Climate-sensitive Determinants of Health
- Children are particularly vulnerable
  - because of their potentially greater exposures.
  - greater sensitivity to certain exposures
  - dependence on caregivers for appropriate preparedness and response.

These factors can interact with poverty, race, and class to increase risk further

Health Concerns for Children due to Climate Change
- Vector borne illnesses
- Infectious Respiratory illness
- Allergic Disease
- Heat related illnesses
- Food and Water insecurity
- Trauma due to extreme weather events

Vector, Rodent, Tick- Borne Illnesses
- Increase tick populations and the incidence of lyme disease
- Increase rodent-borne outbreaks of Hantavirus – associated with climate events like El Nino.
- Vectors for dengue fever, malaria, Zika and other immuring diseases are present in many regions of the United States

Sickles County Women die of Hantavirus
Deaths by Hantavirus
- Updated 11:28 a.m. MT June 25, 2019
Hantavirus

- Spread by airborne or direct contact with infected urine, feces or saliva droppings of deer mice (cotton and rice rats in some parts of SE US, white footed mouse in NE US)
- NO person-to-person transmission in US. Not transmitted by pets.
- Prevention is best — CDC has some recommendations for cleaning out sheds, barns, or any rodent-infested areas.

Hantavirus Pulmonary Syndrome

- Early Symptoms
  - Fever
  - Headaches
  - Muscle aches
  - Stomach problems
  - Diarrhea
  - Chills
- Late Symptoms
  - Lungs fill with fluid
  - Shortness of breath
- Treatment is symptomatic — Dx by serologic test for viral antigens

Dengue Fever

- Spread by mosquitoes — 3-14 days after exposure
  - Fever, muscle aches, headache, N/V
  - PCR testing for dengue

Preventing Vector-Borne Illness in Kids

- Use insect repellent containing one of the following:
  - DEET — Not in infants < 2 mos of age.
  - Picaridin (known as KBR 3023 and Icaridin outside the US)
  - IR3535
  - Oil of lemon eucalyptus (OLE) (NOT IN Children < 3 years)
  - Para-methane-diol (PMD) (NOT IN Children < 3 years)
  - 2-undecanone
- APPLY Sunscreen first THEN insect Repellent
- Do not apply insect repellent to a child’s hands, eyes, mouth, cuts, or irritated skin.

What to Recommend for your Patients

- https://www.epa.gov/insect-repellents/find-repellent-right-you

Food-, Water-Borne Illnesses

- Salmonella — a linear relationship with ambient temperature
  - Diarrhea, fever and stomach cramps — 2019 outbreak
- E coli — related to romaine lettuce.
  - Severe cramps, diarrhea, vomiting, fever
Preventing Infections

- Washing hands
- Wash fruits and vegetables under running water
- Cook ground meat and pork to at least 160 degrees
- Avoid unpasteurized dairy and juices
- Avoid swallowing water when swimming....

Infectious Respiratory Illnesses

- Changes in temperature, precipitation, relative humidity, and air pollution influence viral activity and transmission
- EXAMPLE
  - The RSV season appears to be shorter as temperature increases. (Ends sooner)
  - Avian Flu expanding to previously unaffected areas.

Allergic Disease — aeroallergens

- More allergens — related to longer growing season and wetter climate
  - Molds
  - Pollen — trees to pollinate earlier and for longer times, more ragweed (loves CO2).
- Asthma patients — be prepared, if they are seasonal related symptoms — start nasal steroids sooner in season. Sick plans in effect sooner.

Heat Related Illnesses

- Heat Exhaustion
- Heat Stroke

Food and Water Insecurity

- Global vegetable and legume production could fall by 35 percent by 2100 due to water scarcity and increased salinity and ozone.
- U.S. production of corn, much of which is used to feed livestock and make biofuel, could be cut in half by a 4°C increase in global temperatures — which could happen by 2100.
- According to a 2011 National Academy of Sciences report, for every degree Celsius that the global thermostat rises, there will be a 5 to 15 percent decrease in overall crop production.
Direct and Indirect affects on Children

- Extreme Weather Events
- Injury and death from cyclones, tornados, hurricanes, tsunamis, wildfires
- Crop loss from devastating floods, wind events, fires
- Thermal stress from extreme heat
- Mental health post event

What Works to Protect Children?

Zhiwei Xu,1 Perry E. Sheffield,2 Wenchao Hu,3 Hong Su,4 Weidong Yu,1 Xin Qiu,1 and Shifa Tong2*. Climate Change and Children’s Health—A Call for Research on What Works to Protect Children Into J. Environ Res. Public Health. 2012 Sep; 9(9): 3298–3316.

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