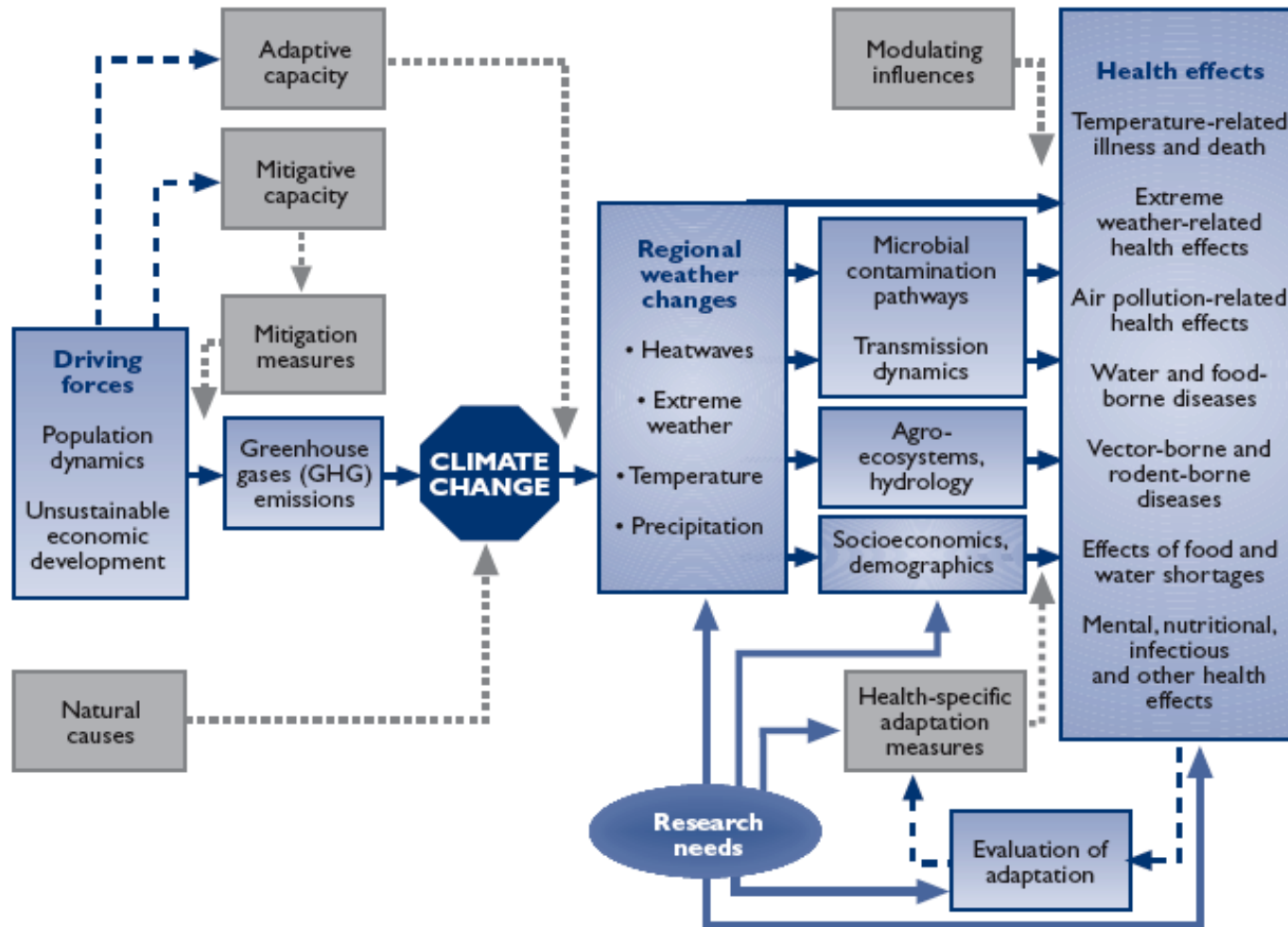


Health Impacts of and Responses to Climate Change

Kristie L. Ebi, Ph.D., MPH










Pathways by Which Climate Change May Affect Human Health



Health Impacts Depend on Multiple Factors

- **Geographic factors:**
 - Baseline climate
 - Abundance of natural resources (i.e. soil, fresh water supplies)
 - Elevation
- **Biological sensitivity:**
 - Developmental stage
 - Pre-existing medical conditions and/or acquired factors (i.e. immunity)
 - Genetic factors
- **Socioeconomic factors:**
 - May increase likelihood of exposure to harmful agents/high risk residences
 - Associated with underlying diseases that mediate risk
 - Affect ability to adapt or respond

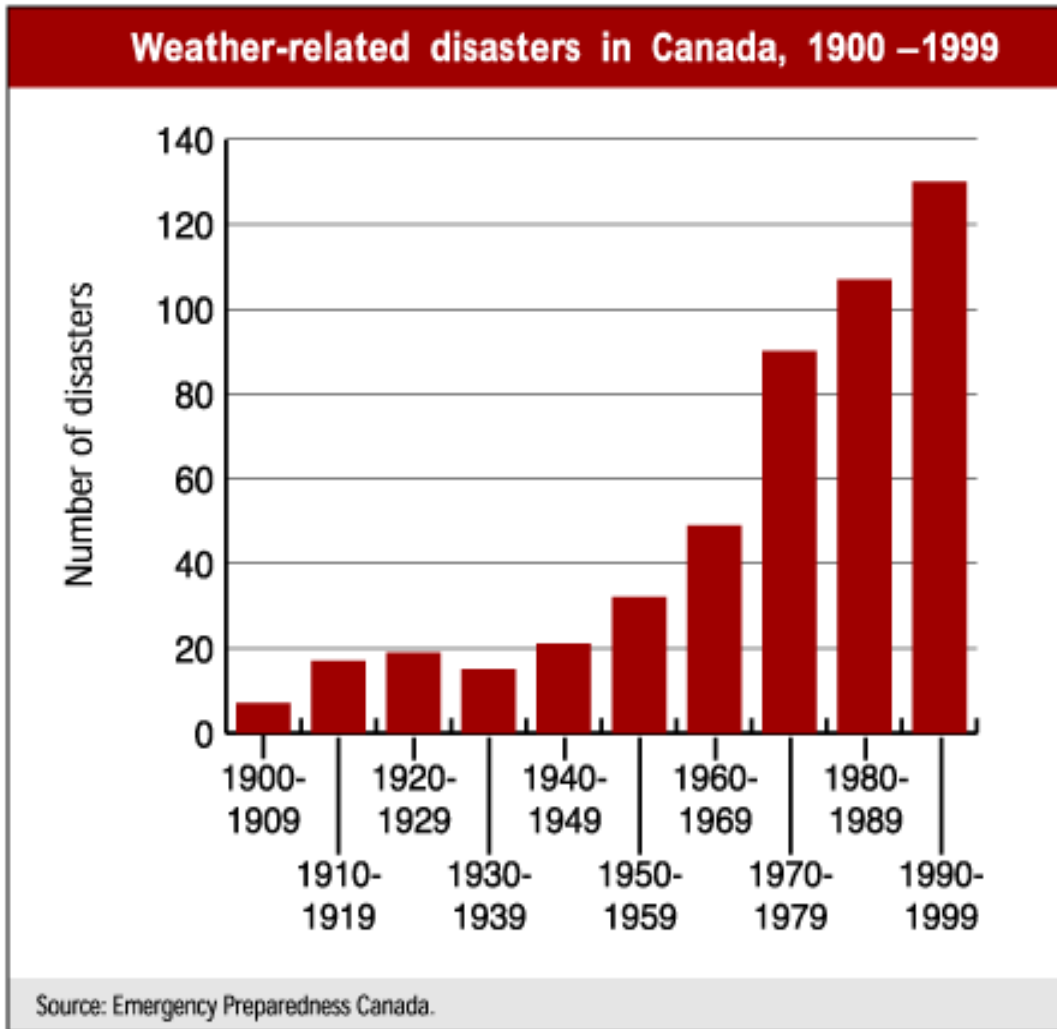
Direction and Magnitude of Climate Change Health Impacts

	Negative Impact	Positive Impact
Very High Confidence <i>Malaria: Contraction and expansion, changes in transmission season</i>		
High Confidence <i>Increase in malnutrition</i>		
<i>Increase in the number of people suffering from deaths, disease and injuries from extreme weather events</i>		
<i>Increase in the frequency of cardio-respiratory diseases from changes in air quality</i>		
<i>Change in the range of infectious disease vectors</i>		
<i>Reduction of cold-related deaths</i>		
Medium Confidence <i>Increase in the burden of diarrheal diseases</i>		

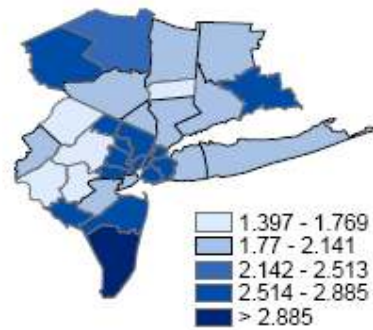


McGheehin

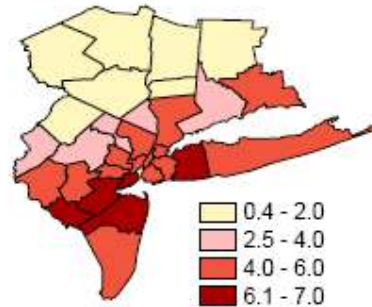
Extreme Weather



Projected Ozone-Related Deaths, NY Metro Area, 2050s vs 1990s

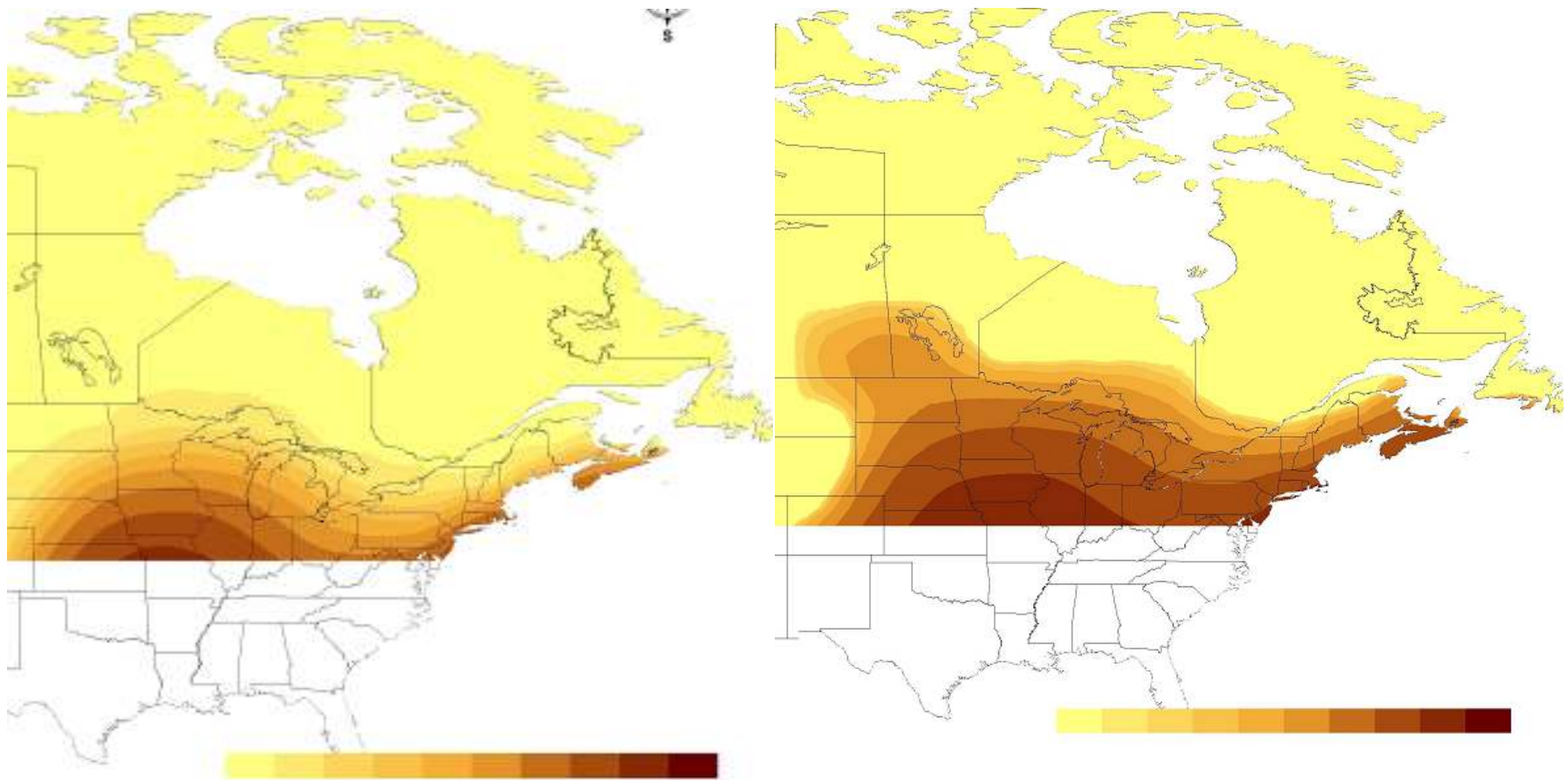


Baseline Daily Mortality Rate per 100,000



Percent Increase in O₃-related Deaths

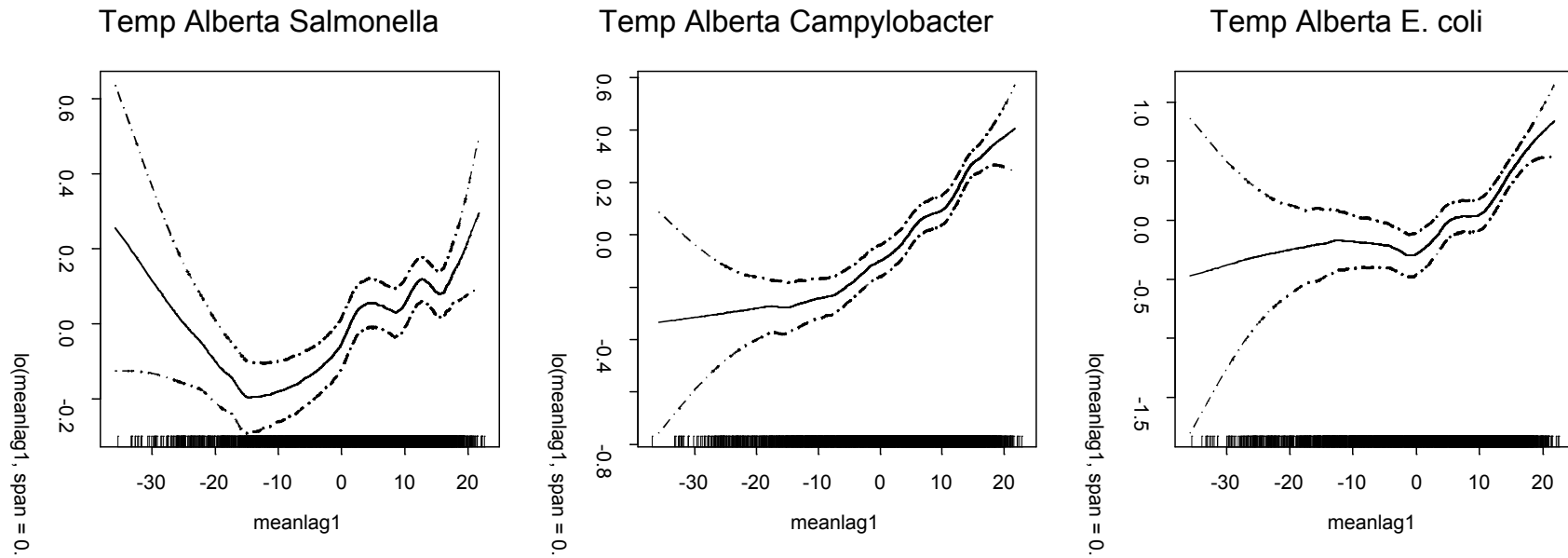
Distribution of Lyme Disease, 1991-2000 and 2020



0 1-46 47-90 91-159 160-266 267-433 434-694 695-1101 1102-1738 1739-2145
Tick abundance at model equilibrium

Ogden et al. *Int. J. Parasitol.* 2005, 2006

Temperature and Enteric Disease



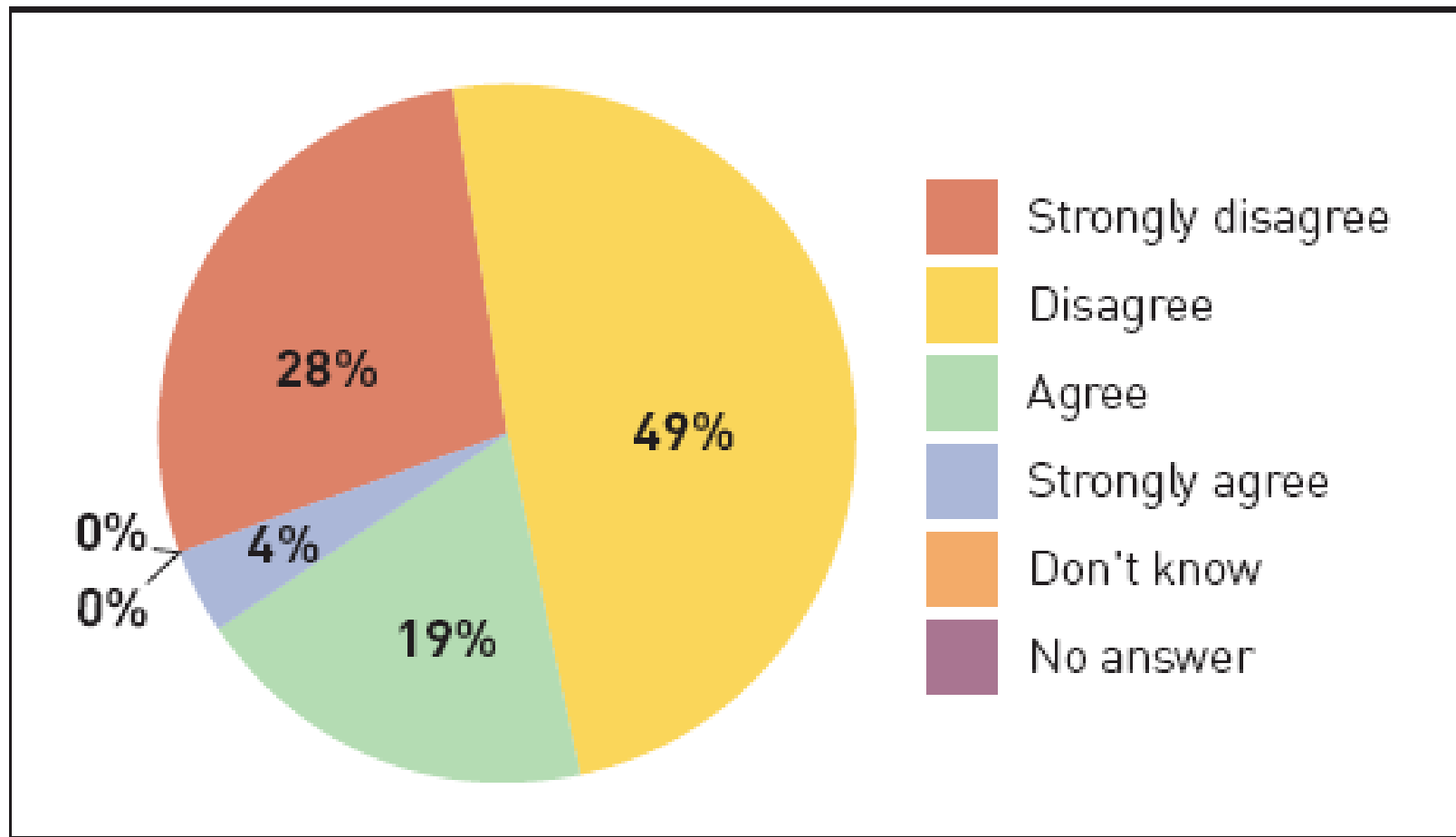
RR of *Salmonella* increased by 1.2% per degree above - 10 °C

RR of *Campylobacter* increased by 2.2% (4.5% in Newfoundland) per degree above - 10 °C

RR of *E. coli* increased by 6.0% per degree above - 10 °C

EDF/George Mason/NACCHO Survey of Public Health Directors

Department Has Expertise to Assess Health Risks?



Climate Change Impacts in 2030 under 750 ppm CO₂ Scenario (thousands of cases)

	Diarrheal Diseases	Malnutrition	Malaria
Total	4,513,981	46,352	408,227
Climate change impacts	131,980	4,673	21,787
% Increase	3	10	5

Thank-you

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