



Food and Waterborne Disease

Potential impacts of climate change

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Food and waterborne disease

Foodborne disease

- ◆ Ingestion of pathogenic micro-organisms in foodstuffs, leading to infection
- ◆ Ingestion of toxins (formed in food by microbial growth)
- ◆ Main type of illness is gastroenteritis

Food and waterborne disease

Waterborne disease

- ◆ Ingestion of pathogenic micro-organisms in contaminated drinking water, leading to infection
- ◆ Mainly cause gastroenteritis
- ◆ Possible effects from algal toxins in water, but seldom high enough to cause direct effects in short term

Food and waterborne disease

- ◆ Enteric pathogens originate from human or animal faecal contamination
 - infection of humans or other hosts is part of normal life cycle of these organisms
 - may not cause illness in animal hosts
- ◆ Some opportunistic pathogens also of relevance
 - human infection not required for life cycle, organisms usually environmental in origin

Food and waterborne disease

- ◆ Gastroenteritis is the most common type of illness associated with food and waterborne pathogens
- ◆ Most cases are of short duration and do not require medical treatment
- ◆ More severe and potentially fatal illnesses may occur, especially in vulnerable groups
 - infants/young children, elderly, immunocompromised, those with underlying disease

Climate change - foodborne disease

- ◆ Enteric pathogens may be present in raw foodstuffs

Climate change - foodborne disease

- ◆ Pathogens may be introduced from environment or workers during processing, packaging, and food preparation
- ◆ If not destroyed/removed by subsequent food processing or cooking, illness may result when food is consumed

Climate change - foodborne disease

- ◆ Factors affecting carriage of pathogens by animals are not understood
- ◆ Not known whether climate change will affect the carriage rates in livestock or wild animals
- ◆ Hot, dry conditions generally decrease survival of pathogens in the environment

Climate change - foodborne disease

- ◆ Bacterial pathogens may grow in food depending on temperature, acidity/alkalinity, salt levels etc.
- ◆ Higher disease rates for these pathogens observed in summer, believed attributable to increased growth in non-refrigerated food
- ◆ More heat waves and higher ambient temperatures are likely to cause increased risks for these pathogens

Climate change - foodborne disease

- ◆ Seafood, especially shellfish, may pose increased risk if water quality deteriorates.
 - extreme rain events may cause sewage overflows, carrying enteric pathogens
 - increased prevalence of marine/estuarine algal blooms (and toxins)

April 2011, southern Tasmania,
warning against eating wild
oysters, scallops, mussels due to
algal toxins

Climate change - foodborne disease

- ◆ Mitigation measures
 - food safety messages, especially regarding importance of refrigeration
 - management of risks relating to seafood and water contamination

Climate change - waterborne disease

- ◆ More prolonged droughts
 - lower water levels in dams, water temperature and nutrient levels rise
 - risk of blue-green algal blooms increased
 - some blooms produce toxins, may also produce bad tastes and odour in water

Climate change - waterborne disease

- ◆ More prolonged droughts
 - increased frequency of blooms and changing patterns of blue-green algal species are being seen worldwide

Microcystis bloom in
Warragamba Dam,
Sydney in late 2007

Climate change - waterborne disease

- ◆ More intense rain events
 - large amounts of contamination entering water supply
 - risk of power outages, communications loss affecting remote control and monitoring equipment at water treatment plants
 - risk of sewage overflow or release

Climate change - waterborne disease

- ◆ More intense rain events
 - infection risks from contact with contaminated flood waters (gastroenteritis, wound infections)
 - increased risk of waterborne disease outbreaks if drinking water treatment cannot be adequately maintained
 - respiratory effects from mould growth in flooded homes

Climate change - waterborne disease

- ◆ Mitigation measures
 - risk assessment /risk management approach for drinking water supplies basis of Australian Drinking Water Guidelines since 1996
 - increased emphasis on real-time monitoring and management of water quality
 - anticipate and plan for extreme events in collaboration with health agencies

Climate change - waterborne disease

- ◆ Risks associated with human adaptation - increased use of “alternative” water supplies for non-potable purposes
- ◆ Small scale systems
 - rainwater – water collected from rooftops
 - greywater – water from laundry, shower, sinks (not toilet)

Climate change - waterborne disease

- ◆ Large scale systems
 - recycled water – water from highly treated sewage effluent
 - stormwater – water from roads, footpaths

Climate change - waterborne disease

- ◆ Potential for exposure to pathogens in these alternative water supplies
- ◆ Always some risk that water supplied to households will be consumed even if not intended for this purpose
- ◆ Home owners may also use water for non-approved purposes

Climate change - waterborne disease

- ◆ Mitigation measures
 - for centralised systems (recycled water), regulation using risk management approach
 - for individual systems, advice on safe use, possible regulation if water supplied to public, schools, hospitals etc.

Climate change – Effects on Foodborne and Waterborne disease

- ◆ Foodborne disease – possible increase in risk of gastroenteritis due to higher ambient temperatures
- ◆ Waterborne disease – increase in risks associated with extremes of weather (drought and intense rain events)
- ◆ Climate adaptation (changes in water types used) may also bring potential for new risks