The Health and Mental Health Effects of Climate Change

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Disclosures

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The Effects are Biopsychosocial and Related to the Entire Process of Climate Change
Disasters

Heat waves
Wildfires
Storms
Floods
Droughts
Forced migrations
Threats to physical security, family security, food and clean water
Mental Health Effects of Disasters

Trauma related disorders
• In developing countries, PTSD rates after disaster 2.9% – 90% (Rataj et al 2016)
• 24% who applied for disaster assistance after CA wildfire had probable PTSD at 3 month F/U (Marshall et al, 2007)
• 30.3% PTSD in New Orleans metro area residents after hurricane, (Galea et al, 2007)
• 62% of evacuees from Hurricane Katrina met criteria for acute stress disorder (Mills et al, 2007)

Clinically significant anxiety, depression, also reported following disaster.
“Of the studies cited in this issue, several found no increases in suicide rates after disasters, particularly in the United States. According to studies in this issue, suicidal ideation, plans, and attempts are more likely to start to occur several months after a disaster, rather than immediately after it. Some studies found decreases in suicidal ideation, plans, and attempts in spite of increases in some mental disorders.”

Beyond Individual Disasters...

HEAT, CLIMATE EXTREMES, CHANGING PATTERNS OF DISEASE, AIR POLLUTION, “ECOANXIETY” AND “SOLASTALGIA”
Direct Heat Effects on Health

Heat stroke, dehydration, new onset renal failure
• Sweating less effective when humid
• Dilation of surface vessels not effective when external temperature high
• Urban areas (80% of US population) have up to 10 degrees higher temps

Complications of chronic illnesses – COPD, DM, CAD

Asthma - Extreme heat and extreme precipitation events associated with increased risk hospitalization (Soneja et al 2016)
Changing Patterns of Disease

Vector-borne diseases with altered transmission patterns, e.g. dengue, Lyme, West Nile virus
• Many disease vectors, e.g. mosquitos, tics, are cold-blooded

Harmful Algal Blooms - Ocean warming since 1982 has expanded the niche of toxic algal blooms (Gobler et al, 2017)
• E.g. paralytic shellfish poisoning (PSP), neurotoxic shellfish poisoning (NSP), amnesic shellfish poisoning (ASP)
Direct Effects of Temperature and Other Climate Variables on Psychiatric Illness – A Complex Picture

- Extremely high DTR (diurnal temperature range) associated with schizophrenia admissions (Zhao et al, 2016)

- Lowering barometric pressure aggravates depression-like behavior in rats (Mizoguchi et al, 2010)

- Weather conditions not linked to sad mood or DSM IV major depression (Huibers et al, 2009)

- Study looking at depression subtypes during an 8 yr. period in Barcelona Spain - significant weather links – supporting a climate (temp, sunlight, barometric pressure) rather than seasonal influence in specific subtypes. (Radua et al, 2010)
Suicide Studies

- Some conflicting results, but most studies report suicide rates higher during periods of high temperature, low rainfall, and more sunshine. (Fountoulakis et al, 2016, Ann Gen Psychiatry)

- Climate (specifically high temperature) effect on suicide rate stronger than effect of unemployment in Thessaloniki Greece 2000-2012 (Fountoulakis et al, 2016, J Affective Disorders)
Climate change is associated with collective violence, generally in combination with other causal factors, e.g. scarcities of cropland and other resources (Levy, et al., 2016; Zhang et al., 2007, 2007, 2011).

Heat is associated with interpersonal violence, (reviews – Anderson, 2001; Burke, 2015)
- Heat wave associated with 13% increase in assault injuries in Adalaide (Nitschke et al., 2007)
- Heat related retaliation in baseball (Larrick et al., 2011)
Air Pollution Effects

- Robust literature of cardiovascular morbidity and mortality especially from particulate matter (PM) - even at levels below international guidelines - even with short term exposure

- Comprehensive meta-analysis of 94 studies showed association between short term (7 day) levels of ambient PM and incidence of stroke (Shah et al, 2015)

- Global Burden of Disease Study 2013 found 29.2% of global stroke burden is attributable to air pollution. (Feigin et al, 2016)

  - Many lines of evidence for oxidative stress as mechanism

- Significant association between higher PM concentration and psychiatric hospitalization in Beijing (Gao et al, 2017)

- Multiple studies have found association of cognitive dysfunction, mild cognitive impairment and dementia with air pollution exposure. (Babadjouni et al 2017)
Climate Change and Air Pollution – Multiple Relationships

- Fine PM with higher temperatures further increases relative risk of admission for ischemic stroke. (Babadjouni et al, 2017)
- Heat increases ozone episodes. Increased summertime surface ozone projected in polluted regions over the coming decades, with the largest effects in urban areas. (Jacob & Winner, 2009)
  - Surface Ozone is a highly reactive oxidative gas associated with increased mortality and morbidity. (Nuvolone et al, 2017)
- Wildfires – associated with respiratory morbidity and all-cause mortality (Reid et al, 2016)

- *Therefore, cutting fossil fuel use can produce health co-benefits.*
Psychological Responses to Climate Change
“EcoAnxiety”

- Habitual ecological worry can be adaptive (Verplanken and Roy, 2013)
- Australian study of OCD patients, 28% of participants had OCD concerns directly related to climate change (Jones et al, 2012)
- Case report in Australia of climate change delusion. (Wolf & Salo, 2008)
- Qualitative study - fear and worry in Solomon Islands (Asugeni et al, 2015)
- Quantitative study of Australians documented significant distress over climate change. (Searle K. & Gow, K., 2010)
- Experiences of facing “Ecological Debt” (Randall, 2013)
Solastalgia

Coined by philosopher, Glenn Albrecht (1984)
*Latin word for comfort + Greek word for pain*

Distress when environment no longer affords the same solace

Nostalgia while still at home
Support for Solastalgia Concept

- Qualitative study of Great Lakes residents (Lertzman, 2010) identified “arrested mourning”
- Qualitative study of Australian family farmers (Ellis & Albrecht, 2017) identified cumulative and chronic forms of place-based-distress in this “emplaced” population
- Qualitative study of Australians in area changed by mining (Albrecht 2005)
- Quantitative study of Kentucky ED visits suggested greater risk of depressive and substance use disorders in areas with mountain top removal mining, controlling for other demographics (Canu & Jameson, 2017)
Climate Change Effects are Complexly Biopsychosocial - The Kind of Terrain Psychiatrists May Already Know

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