Environmental Health: the geographies of human heath

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Most people conceive of 'environmental health' as Council Environmental Health Officers completing food hygiene inspections dressed in a white coat and wearing a white trilby. And yet there is more to environmental health. Given it arose from the mid-19th century's public health revolution, it can legitimately be considered 'environmental public health'. Here I use 'environmental health' to illustrate how where and how you live can potentially determine your health, and what can/could be done about it within the overall framework of sustainable development (Landon, 2006).

Let us consider 'health'. It is more than a freedom from disease and injury and is about how we live, our choices, our lifestyle and the ability to make choices. The World Health Organization's (WHO) 1946 definition is helpful: '*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*'. Next we consider 'environment'. Allegedly, Albert Einstein once defined the 'environment' as "*everything that isn't me*". This is wrong as Einstein ignores humans and our part in the environment. Thus, I touch on the physical environmental media (land, water and air) plus our urban (man-made) environment.

As defined by the UK's Health Development Agency (HDA, 2002) (now National Institute of Health and Care Excellence), we can consider environmental health as the mitigation and control of stressors on human health. These are defined as chemical (e.g. asbestos), biological (e.g. viruses, bacteria), physical (e.g. heat, cold), social (e.g. isolation), and psychosocial (e.g. fear of crime) stressors on health: see Figure 1. Stressors vary dependent on where we live.
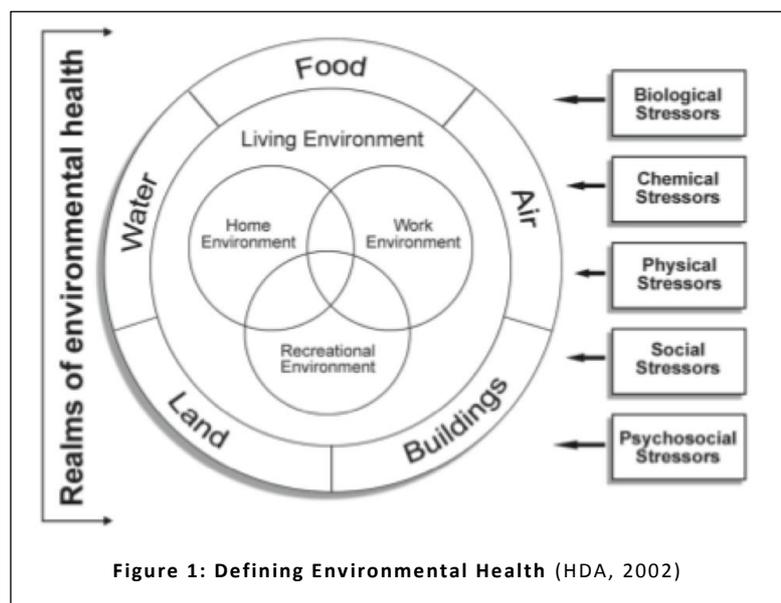

Figure 1: Defining Environmental Health (HDA, 2002)

Water – essential for life but …

Two key factors affect water: its quality and its scarcity. As at 2012, 748 million people rely on unimproved – unsustainable – water supplies mostly across Africa, South and Middle America and South Asia (WHO,

2015). Unsurprisingly, the UK has 100% access to sustainable water resources whilst in contrast Ethopia has a mere 13% of their population with the same access (see http://gamapserver.who.int/gho/interactive_charts/mdg7/atlas.html?indicator=i0).

Quality is a secondary issue to actually not having sufficient water in the first place. With a similar spatial spread as access to sustainable water, similar areas around the globe are affected by fundamental lack of water (see http://news.bbc.co.uk/1/hi/sci/tech/5269296.stm). Fundamentally scarcity is driven by two issues: the amount of water in the environment and a state's or community's economic ability to access it for their population. Water scarcity means more than just not enough water to drink. Focusing on biological stressors, it facilitates poor health through infection spread.

The Bradley-Feachem Classification of Water-Related Infections includes four pathways for disease to spread related to the quality of water and its scarcity (Institute of Medicine, 2009):

1) **Waterborne diseases** - infections spread via the faecal-oral route where water/food is infected with pathogenic organisms. It includes diarrhoeal diseases (survivable in the UK but the second biggest cause of mortality in children under 5 (WHO, 2013)), cholera and hepatitis.

2) **Water washed** – lack of water leads to poor hygiene and exacerbates skin and eye infections e.g. scabies, trachoma and conjunctivitis.

3) **Water based**: where the parasite uses water as a vehicle for infection of humans e.g. schistosomiasis

4) **Water related vectors**: where an insect uses water to breed e.g. mosquitos carrying Plasmodium protozoans that cause Malaria - a tropical disease commonly associated with areas with poor water sustainability. Malarial spread can be seen at http://gamapserver.who.int/mapLibrary/app/searchResults.aspx.

Sanitation is key to reducing waterborne disease. The UK first adopted widespread public sewerage systems in the 19th century. In contrast, as of 2012 the WHO identifies 2.5 billion people as having a lack of access to improved sanitation. Again, the WHO have an interactive tool to identify state by state the percentage of a state's population with improved sanitation (see http://gamapserver.who.int/gho/interactive_charts/mdg7/atlas.html?indicator=i5&date=2012).

Air is obviously another essential to human health although the quality of it differs relative to where we are. The UK's National Air Quality Strategy acknowledges that even with controls on chemical stressors in place, on average a UK resident will lose '*only*' five months from their life expectancy (DEFRA, 2007). Mortality is a feature of exposure to outside air pollution but the impact is uneven across the world. Deaths amongst children under 5 attributable to air pollution is recorded across the world but of critical note is

that the rate is higher in regions of Africa, Middle East and Asia relative to Europe and North America (see http://gamapserver.who.int/mapLibrary/app/searchResults.aspx.)

Chemical stressors in land pose a threat, both directly and indirectly, to our health. Children eating soil containing contaminants have a direct exposure on health (e.g. lead, a neurotoxin). Cultivation on contaminated soils can readily contaminate foodstuffs as they absorb the contaminants alongside nutrients. The UK controls the contamination of food and restricts sale where it is found to have toxicologically unsafe levels of one
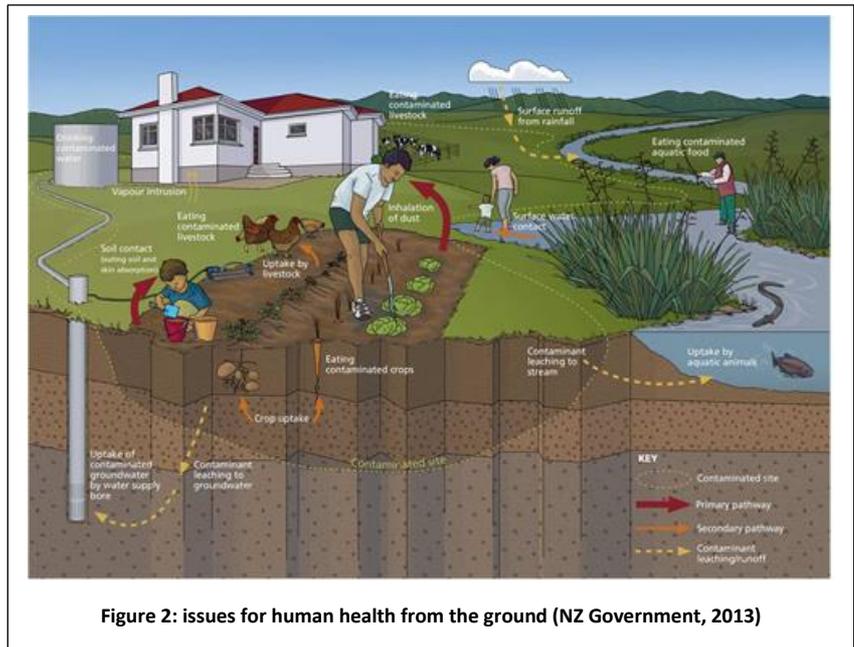

Figure 2: issues for human health from the ground (NZ Government, 2013)

chemical or another. Other countries do not always have these controls, especially where food is cultivated solely to support one's own family and no alternatives to what you grow is available. Figure 2 provides an indicative overview of how soils may impact on health.

Looking at urban environments; a simple Google search for of poor housing standards will provide contemporary and historical images of housing representing conditions in both the UK and internationaly. Presented with these images and asked to comment on what they see students comment about a lack of space, overcrowding, a lack of privacy, poor sanitation, disease spread, etc. They recognise the range of stressors, quite often focussing on the chemical, biological and physical stressors first, but getting them to imagine what living there is like engages them in thinking about psychosocial and social stressors too. Of course observations made are quite often related to expectations of the students from living in our developed country.

Underlying prevailing environmental conditions can lead to stressors on human health. Stressors on health may act singularly, e.g. exposure to a chemical or virus, but may also be in combination, for example if you are living in many parts of Africa and Asia, data indicates that numerous stressors are impacting on you whether that be water quality, water scarcity, malaria, access to sanitation, etc. We noted above that lifestyle is often a choice for health outcome but in many instances in these developing areas, choice is not present. Living with these conditions means that one simply survives with what one has, with no choices. Complicating matters further, medical services, so necessary to intervene where prevention, such as

managing the environmental conditions, have failed, are often poor or inaccessible to those affected with ill health. In short where you live will provide an impact on your health.

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