

Session 5 - Oral Presentation Abstracts – Thursday 4th (am)

OR33 – Alex Stewart: Decisions, Decisions, Decisions: The Health Effects Of Measuring Geochemical Concentrations.

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As, Cd, Cu, Cr, Fe Hg, Ni, Pb, U, Zn are all found in metalliferous dust and all can have adverse health effects. Much is known about the health effect of metals in particles (and other toxins), with good scientific summaries available, e.g. from Public Health England (www.gov.uk/government/collections/chemical-hazards-compendium) and the US based Agency for Toxic Substances and Disease Registry (www.atsdr.cdc.gov/substances/indexAZ.asp#A). For example, there is an known epidemiological association between exposure to particles and mortality and morbidity in lung cancer and cardiovascular diseases. The generation of reactive oxygen species (ROS) in biological tissues via Fenton-type reactions is one likely mechanism. However, the actual mechanisms often remain unclear.

There is an urgent need to go beyond characterisation and description of environmental toxins (of all kinds, not just elements) and try to determine the causal relationships between the various environmental, personal/social and economic influences and health. Such influences operate on scales ranging from the individual (e.g. sex, age, genetics) to the international (war, trade, global corporations, weather, pollution) in complex mixes. Successfully addressing these challenges will require an understanding and development of:

- the influence that society, history, culture, religion, and the environment might have on risk behaviours and care seeking behaviour,
- culturally sensitive, community-centred approaches to data collection and data sharing to enable better prediction, prevention and management of related diseases,
- international and multi-professional collaborations, in which SEGH is a leader through its mentoring and fellowship programmes, and annual conferences,
- and suitable and available funding, e.g. though the UK Global Challenges Research Fund.

Furthermore, we need to consider the future: people live longer in mining areas, with new dusts being generated from new developments; what other dust sources may compound this? Geochemists should incorporate wide thinking about outcomes from assessments, including, but not limited to, health effects, into their routine approach to dusts or other environmental issues. Integrated, multi-professional collaborative groups are key to this, reducing the stress of working beyond one's professional knowledge, thus improving geochemists' own health!