E-cigs & toxicology: nothing new under the Sun

Igor Burstyn, PhD
Drexel University School of Public Health
Board of Directors of CASAA
Basic idea

- Toxicology of emissions from e-cigs: we are not ignorant
- Rich experience with other sources of environmental & workplace emissions.
- There is no reason to assume precautionary posture that amounts to willful ignorance
“The dose makes the poison”

Paracelus, 1538
Specific response to question posed by workshop

- What are the identities, quantities and origins of the chemical constituents of the e-cigarette aerosols inhaled and exhaled aerosols by users?

% of exposure limit predicted: smoking machine experiments

In all walks of life, we only worry if bars reach as high as here
Specific response to question posed by workshop

- What are the identities, quantities and origins of the chemical constituents of the e-cigarette aerosols inhaled and exhaled aerosols by users?

% exposure limit predicted: from vapers

In all walks of life, we only worry if bars reach as high as here
Most important to remember

• We know a great deal about e-cigarettes!
• If they did not have word “cigarettes” in name of the product, nobody would be concerned:
  ... What’s in a name? that which we call a rose
  By any other name would smell as sweet ...

• It is not appropriate to regulate e-cigarettes as if we learnt nothing from environmental sciences since 16th century: scientists do not fear every chemical & neither should the public.
Q: What methods exist to measure chemicals in aerosols (including particle size distribution)?

A: There is wide range of established chemical assays because there is nothing novel about ingredients of e-cig emissions. The question about particles is irrelevant – particles are not generated in vaping, only droplets. Studies that report “particles” mistake them for droplets/mists that scatter light: it is an artifact of measurement device known to all experts in the field of environmental measurements.

Q: What are the quantitative and qualitative relationships between the chemical contents in e-liquids (e.g., nicotine, humectants, flavorings) and chemical constituents in aerosols inhaled by users?

A: New compounds are not generated during typical vaping: chemistry of e-liquids is an excellent predictor of chemistry of the aerosol.

Q: Given that the e-liquids and aerosols contain varying mixtures of toxicants, what comparative toxicity evaluations could be conducted between different e-cigarette products?

A: Methods exist and are used all over the World to evaluate hazard of complex mixtures. Threshold Limit Values or analogous exposure limits that are most well-developed in occupational health are most suitable since they are meant to protect average person, not as some incorrectly claimed, healthier-than-average/”resistant” persons.