Health and Dust

Understanding Dust from a Health Perspective

- The health focus is on what is in the air that can damage human health
- There are a lot of components of the air which can be a threat to health; most of them are the result of anthropogenic activities and can be termed *air pollutants*
- A ubiquitous air pollutant is particulate matter, whose sources can come from combustion processes (mostly anthropogenic) and natural sources
- Dust is a natural component, but can come from anthropogenic sources as well, adding a non-natural component to the atmosphere.
- Desert dust characteristics can be modified from its source to receptor area
- In effect, dust can be a natural and anthropogenic threat to health but also something which is critical to the global ecology

Human exposure to dust

- Dust's influence on air quality is a complex issue
- Dust can :
  1. Increase particulate matter ambient concentration
  2. Carry anthropogenic pollutants
  3. Carry microorganisms and toxic biogenic allergens

- Current scientific evidence on the health effects of desert dust remains unclear due mainly to methodological issues (e.g., including inconsistent identification / characterization of dust event)

Challenges (1/2)

- Health effects are the changes in health status resulting from exposure to a given risk factor :
  - Short term effects – acute impacts on health after an immediate exposure
  - Long term effects – chronic health effect after a cumulative exposure

- There is currently no studies on the long-term effects of dust on health

Challenges (2/2)

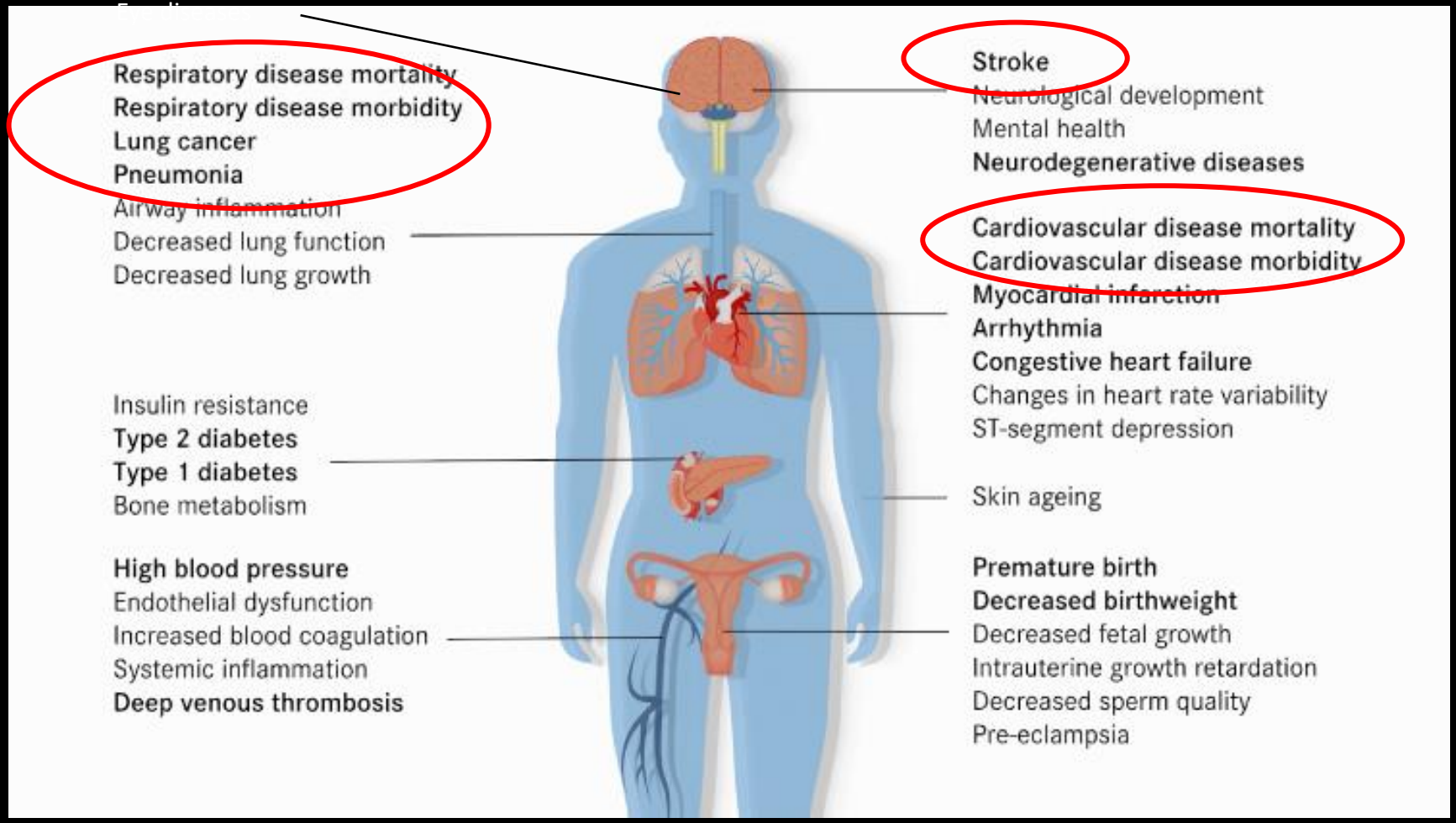
- Particulate matter's impact on health is currently characterized by its mass, not by its composition. The smaller the particles, the more damage they have on health.

- While causality is established for particulate matter of different size ($PM_{2.5}$, PM_{10}) and selected health outcomes, there is little information on the effects of specific PM component. It is not yet possible to differentiate specific effects of PM mainly consisting of dust or of anthropogenic origin only (e.g., traffic or fossil fuel combustion).

- This is a challenge, as there can be other factors (e.g., other air pollutant, pre-existing health conditions) which can affect outcomes following exposure to mineral dust

Health effects of Particulate Matter

(Almost) every organ is affected



Adapted from George D. Thurston et al. Eur Respir J 2017;49:1600419

What is the current scientific evidence on the effect of dust on health?

- **Inconsistent results** according the way of assessing the health effects of dust and the geographical area
- Overall, **effects of dust** events as binary exposure (mainly conducted in Eastern Asia) and as effect modifier (in Europe) show an **increase of risk for cardiovascular mortality and for respiratory and child asthma morbidity**
- Studies considering **local and natural sources of PM show different effects** in Eastern Asia and Europe

Improving the Understanding of the Impacts of Dust on Health

Recently released

WHO Global Air Quality Guidelines

Defines parameters for assessing the presence of mineral dust in the air

In development

WHO/WMO Report on Desert Dust and Health

Will provide consolidated insight into the epidemiology, weather, clinical and risk management aspects of mineral dust and health

- Maintain suitable air quality management and dust forecasting programmes
- Maintain air quality monitoring programmes and reporting procedures
- Conduct epidemiological studies and research activities aimed at better understanding toxicity
- Implement wind erosion control through the carefully planned expansion of green spaces.

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Pierpaolo MUDU, Sophie Gumy and Mazen Malkawi, World Health Organization

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