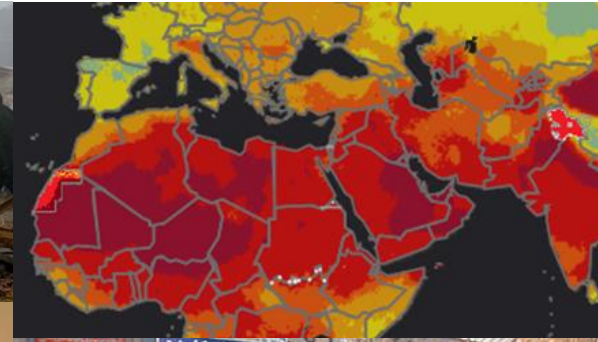


Airborne Particulate Matter and Health in the Eastern Mediterranean Region

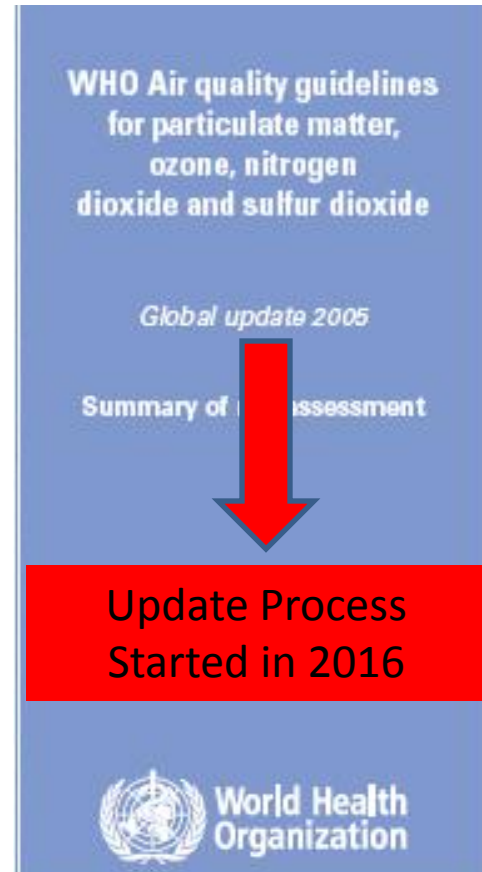
5th International Workshop on Sand and Dust Storms: Dust Sources and their Impacts in Middle East), Istanbul, Turkey, 23-25 October 2017



By Mazen Malkawi

Health Impacts of Airborne Particulate Matter (PM)

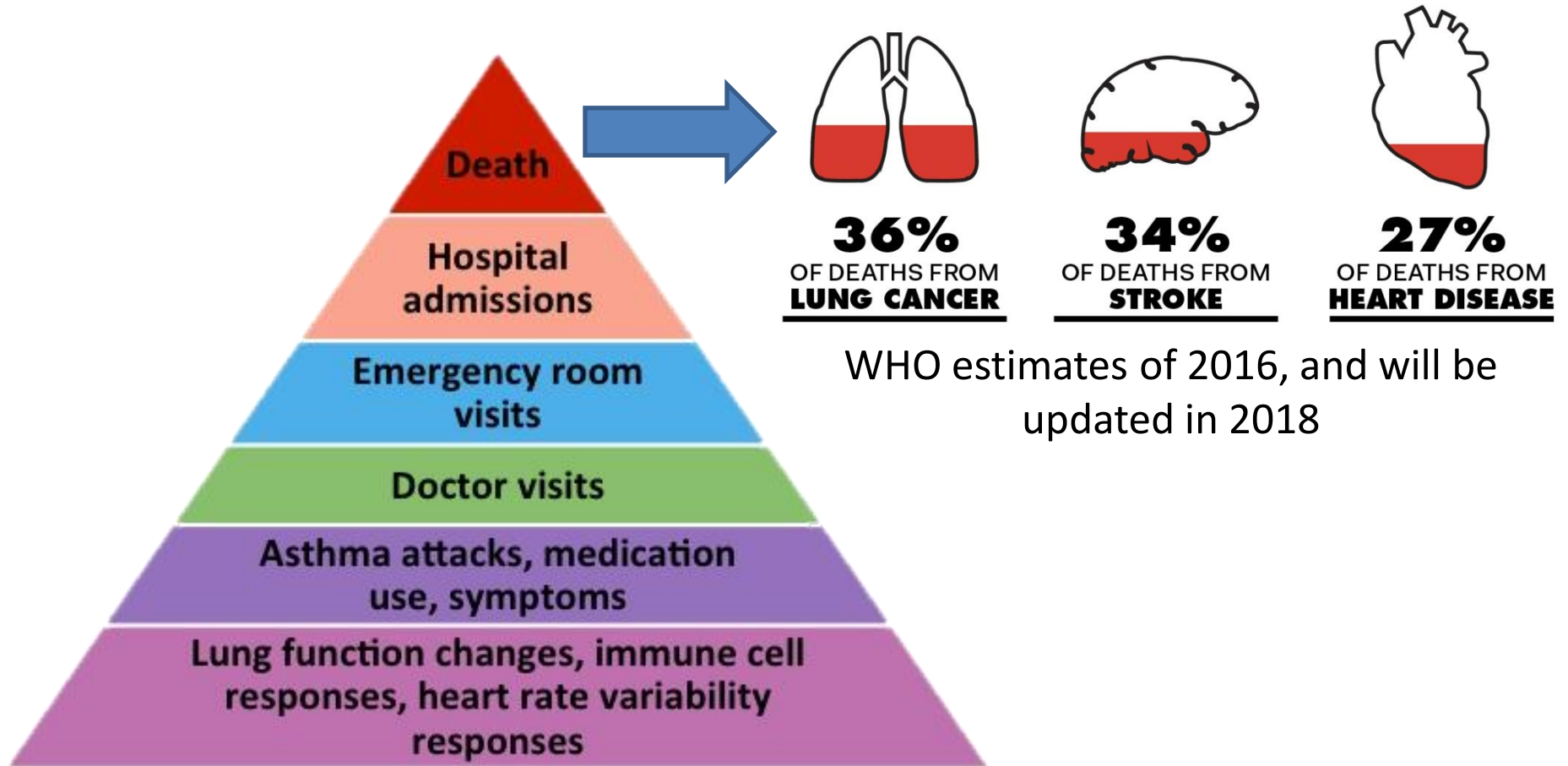
- The evidence on public health impact of PM is **consistent in showing adverse health effects at exposures that are currently experienced** in all countries of the World.
- The range of health effects is broad, but are predominantly to the **respiratory and cardiovascular** systems.
- All population is affected. The risk for various outcomes has been shown to increase with exposure and there is **little evidence to suggest a threshold below which no adverse health effects would be anticipated** (e.g. in June 2017 a 60 M cohort study shows there was significant evidence of adverse effects related to exposure to PM_{2.5} at concentrations below current US national standards).



Air pollution with particulate matter is a major risk to public health in the Region

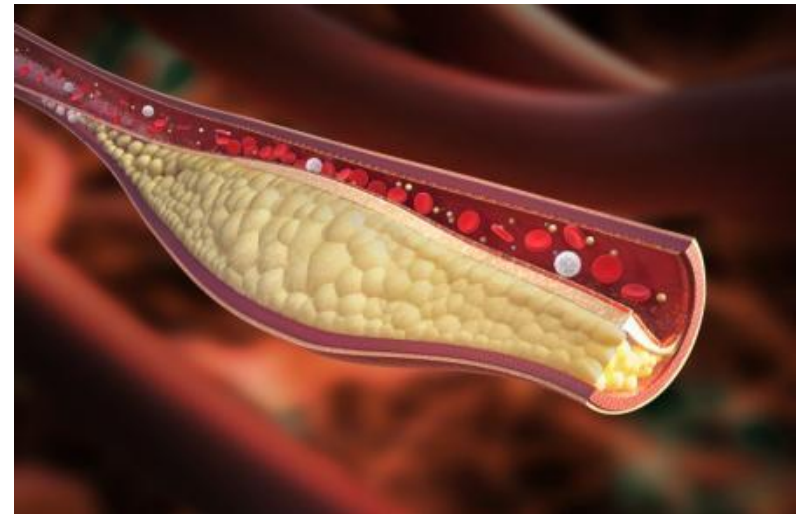
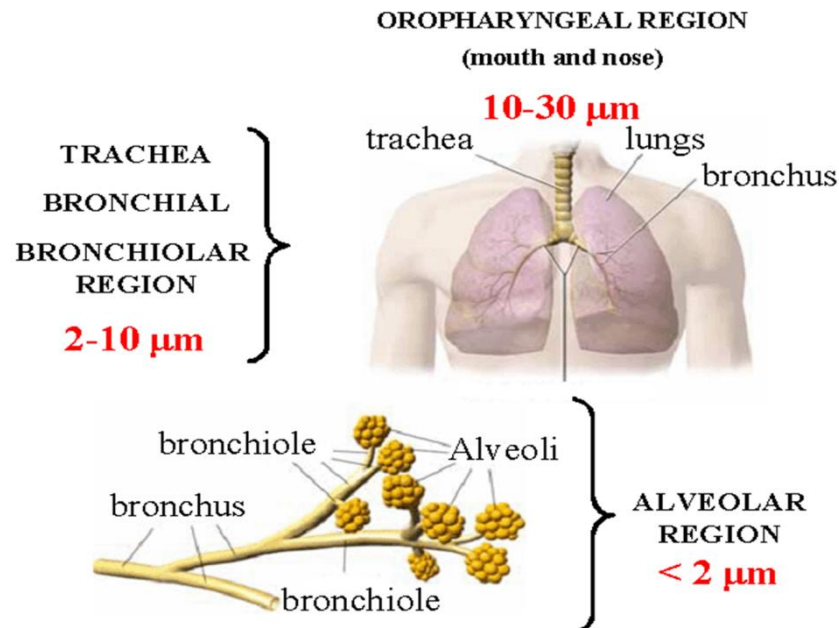
- Air pollution is arising at an alarming rates:
 - The annual average concentration of particulate matter of 10 microns (PM10) in EM is the **highest in the world** = 238 $\mu\text{g}/\text{m}^3$ (**12 times** the WHO recommended level)
 - the annual average concentration of particulate matter of 2.5 microns (PM2.5) in EM countries is **2-11 times the** WHO recommended level.
- Air pollution with particulate matter is killing more than **200,000 people annually in our Region.**
- Although source apportionment studies are very limited, the available ones show that **50% of airborne PM is dust**

Pyramid of health effects due to exposure to PM



Health effects: The two myths

- **Myth 1: Dust particles are large and can not reach the lungs**
 - About 50% of PM are larger than $10\ \mu\text{m}$ (**non-inhalable**)
 - About 45% of PM are coarse between 2 and $10\ \mu\text{m}$ (**inhalable**)
 - About 5% of PM are fine less than $2\ \mu\text{m}$ (**penetrate deeply**)



Myth 2: Dust composition is similar to that of natural soil, therefore is not toxic:

– Airborne PM is a mixture:

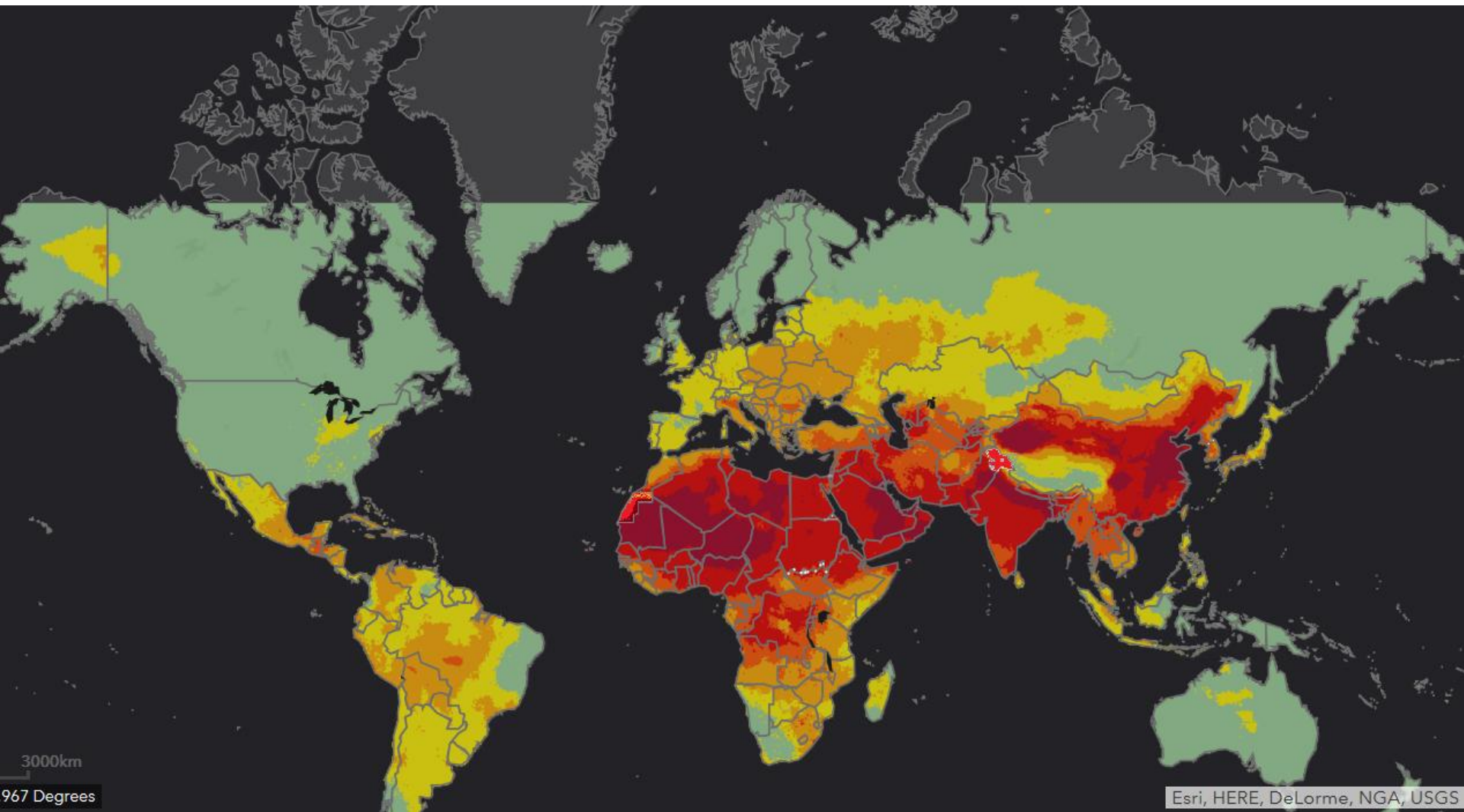
- Minerals (e.g., SiO_2 , Al_2O_3 , CaO)
- Metals (e.g., Fe)
- **Bio-aerosols**
- **(e.g., pollen, fungi, bacteria)**
- **Anthropogenic pollutants**

– Partial Toxicity of this mixture is not well understood. WHO is currently reviewing the available evidence

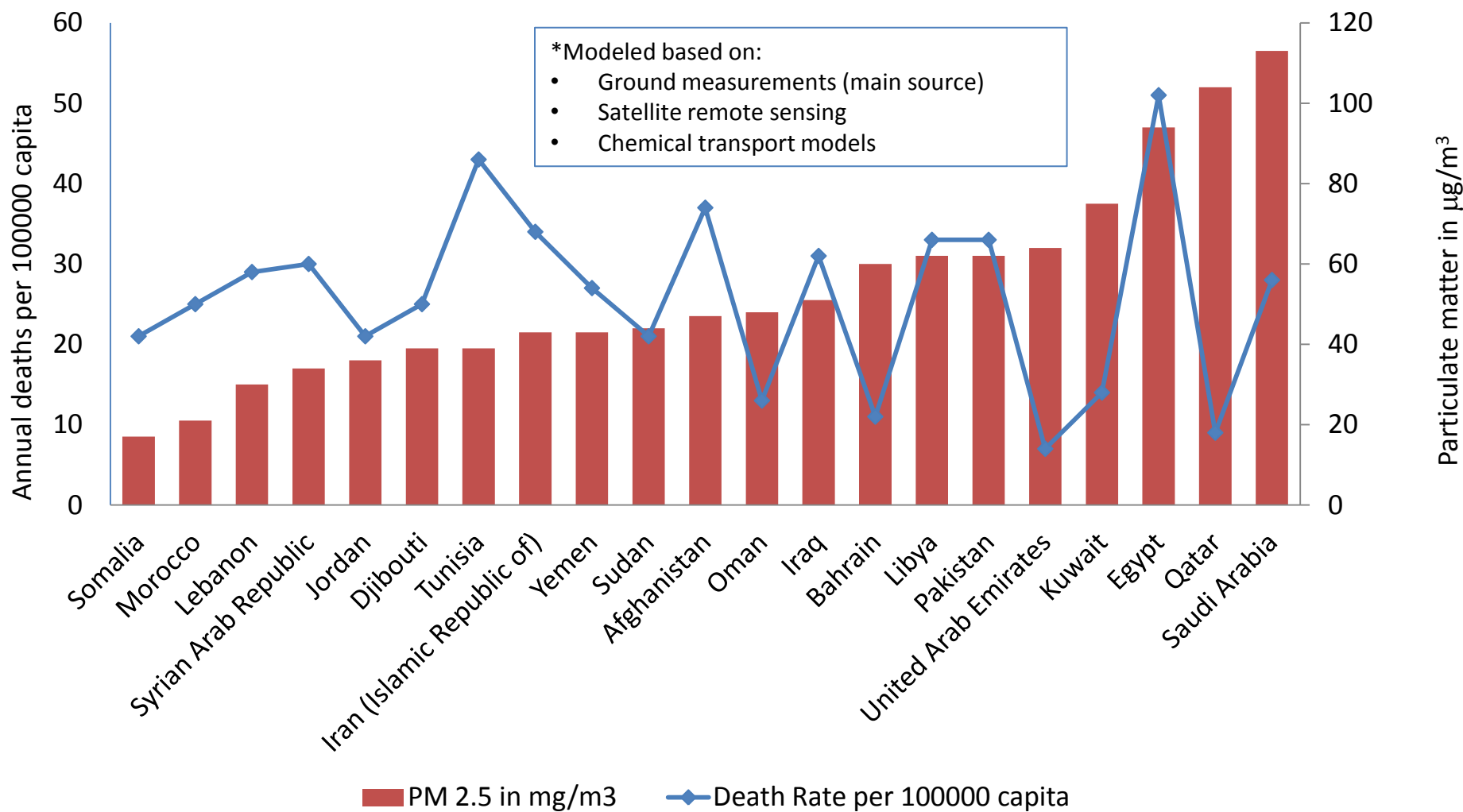
Ambient (outdoor) air pollution in the Region

- Data on PM is available for 82 cities from 15 EM countries (98% of the population of these cities breath air that does not meet the WHO recommended safe levels).
- Source apportionment studies are lacking in EMR,
However,
 - Up to 50% of the pollution is natural (dust and sea salt), epidemiologically natural dust may affect health same as other pollutants!
 - More than 50% is anthropogenic: from transport, power generation, industry, waste burning, etc.

Modeled PM2.5 (*WHO September 2016*)



Particulate matter air pollution* and attributable deaths in the EMR



Gaps and Challenges

- WHO/EMRO/CEHA systematically reviewed the available information on air quality and health in the region during the period 2000-2016. The following gaps were identified:
 - lack of available data and communication mechanisms;
 - poor commitment; and
 - poor coordination between the different related sectors.
- Analyses of the country profiles of policies and actions that effect air quality in the 22 countries of the Region, concluded that:
 - the lack of health based standards, policies and information in almost all countries of the region; and
 - air quality management actions and policies are still far below the levels that controls air pollution in the Region.



A regional plan of action for addressing air quality and health in the region (2017-21) was drafted **in May 2017** in consultation with experts from the Region.

Hopefully it will be endorsed by the WHO Regional Committee in **October 2017**.



Air pollution & desert and sand dust

- Large share of desert and sand dust in air pollution from particulate matter (PM) in some regions (Eastern Mediterranean, Africa and Asia)
- Desert and sand dust (DSD) is an issue among many countries, namely because of its source and trans boundary nature
- Current population exposure estimates of PM_{2.5} developed by WHO include DSD:
 - DSD accounted for in the burden of disease estimates from PM_{2.5}: controversy regarding its differential effects to health
 - **Next round of PM_{2.5} estimates should acknowledge DSD (ongoing, incl. collaboration with WMO)**



WHO Air Quality Guideline update

- Recognition of the importance of understanding the specific health effects of desert dust, and need for more evidence to support risk assessment;
- Process will provide a recommendation on the health effects of desert dust, whereas no quantitative guideline value will be developed;
- This recommendation will be relevant for countries to move towards mitigation and adaptation measures in relation to desert dust;
- WHO commissioned a systematic review on the health effects of desert and sand dust (ongoing)



WHO Global Platform on Air Quality and Health

- Regular consultations of key stakeholders in air pollution and health field since in 2014. 3rd meeting: 7-9 March 2017
- Main purpose: 1) Strengthening countries capacity to address AP and related health risks through enhanced estimates of air pollution exposure; 2) Identifying key issues
- A wide collaboration with international agencies including WMO, UNECE, UNEP, JRC, IIASA, World Bank, space research agencies (e.g. NASA, JAXA), as well as national agencies and research institutions (e.g. CAI, HEI)

**Health
impacts of
sand and
desert dust
is identified
as key
issue**

Recommendations of the DSD Working Group

- Need for desert dust assessment and forecasting (lead WMO SDS-WAS);
- Need for standardization of time-series studies on desert dust health effects
- Need to communicate health messages during dust episodes
- Identification of research gaps in the existing assessments (e.g. long term studies on DSD effects, effectiveness of exposure reduction measures)



3 GOOD HEALTH AND WELL-BEING



7 AFFORDABLE AND CLEAN ENERGY



11 SUSTAINABLE CITIES AND COMMUNITIES



13 CLIMATE ACTION



SAVE THE DATE!

ANNOUNCEMENT:

Global Conference on Air Quality and Health

WHEN:

October 30 – November 1, 2018

WHERE:

World Health Organization,
Geneva, Switzerland

WHY:

Member States, experts and key stakeholders will gather to review global progress on air quality and health and agree on further action as requested in WHA 68.8

For more information, please contact: ambientair@who.int



Thank you

