



Global standards for global health in a globalized economy!

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The global health community is dedicated to end unnecessary, preventable and treatable inequities in the global health status (Koplan et al. 2009). Its research community provides the scientific evidence needed for policy making toward this goal. An overwhelming global scientific literature leaves no doubts: anthropogenic air pollution is one of the major causes of morbidities and premature death on the globe, with 7 million deaths attributable to indoor and/or outdoor air pollution; this risk factor ranks third after high blood pressure—which, in part, is also a consequence of air pollution—and smoking (WHO 2014; Fuks et al. 2014). Using the Global Burden of Disease (GBD) website (GBD 2010) the years of lives lost (YLL) due to air pollution—defined as the sum of household pollution, ambient air pollution, and ozone—add up to ~174 Million YLL every year. This environmental factor ranks second after the 200 Mio YLL attributed to dietary risks. It is followed by the impact of high blood pressure (167 Mio YLL) and smoking (138 Mio YLL). The contribution of air pollution is the sum of ~100 Mio YLL attributed to household air pollution due to biomass combustion and 74 Mio YLL due to ambient air pollution. The latter is very similar to the global 76 Mio YLL attributed to malaria, which is still the fifth-ranked disease after ischemic heart diseases, lower respiratory diseases, stroke, and diarrheal diseases (Wang

et al. 2012). Whereas air pollution research has been primarily driven by projects conducted in wealthier Western countries, studies emerging from low and middle income countries not only confirm adverse findings in general terms but show that air pollution is much worse in those countries (Brauer et al. 2012).

Global health is not only about understanding the causes of health and disparities in health of people worldwide, but also about providing solutions to these challenges (Koplan et al. 2009). In case of air pollution, the good news is that it is an unnecessary, largely preventable and treatable inequity. Indeed, most Western countries experienced substantial improvements in air quality over the past 40 years and seminal studies conducted over decades confirm direct health benefits of clean air policies (Brauer et al. 2012). Those policies are driven by the WHO Guidelines for Clean Air, which are based on the global scientific literature, and are set to protect people's health (WHO 2006). A recent review on behalf of the European Union reaffirms that those targets are supported by more recent research and that the upcoming revision of the WHO air quality guidelines may, if anything, call for tighter targets (Héroux et al. 2015). As of May 26, 2015, the WHO Assembly adopted its first international resolution aimed at clean skies among its 194 member states (WHO 2015).

Thus, the question emerges: where do member states stay in setting clean air standards? The answer is sobering. Many governments all across the globe continue to ignore the science-based call for clean air. Instead of setting national air quality standard goals to protect peoples' health—and thus to reduce the enormous costs related to the air pollution attributable burden of disease—the advice of biased stakeholders count more strongly than the science-based guidelines of WHO and the health needs of the people. This results in inconsistent policy making and the

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continued promotion of increasing environmental inequity instead of the move toward equal rights to live in an environment that supports good health. Whereas research tackles the question of inequity of exposure to air pollution within cities and countries (Benmarhnia et al. 2014), policy discrepancies between countries are not much discussed. Table 1 exemplifies the result of the inconsistencies and ignorance of policy makers showing current air quality standards set for particulate matter up to 10 and up to 2.5 μm in aerodynamic diameter (PM10 and PM2.5). The vast majority of countries fail to comply with the values proposed by WHO. The situation is particularly odd in the European Union (EU). Land mark studies funded by the EU confirm the evidence of adverse effects of ambient air pollution even among people with home outdoor concentrations below the current guideline values set by WHO (Beelen et al. 2014). In line with this evidence, EU has set a range of rather pro-active standards to control emissions (e.g., the Euro VI regulations) and the EU Commission considers even more rigorous standards (ERS 2015). However, EU policy makers fail to set science-based ambient air quality standards to protect public health. As shown in Table 1, the PM10 annual mean standard is set twice as high as the one proposed by WHO; thus, the EU Commission accepts a very large—though preventable—burden of death and disease. They ignore that air quality standards are a major incentive to invest in solutions. Air quality standards provide targets for all national and local authorities who are in charge of clean air management plans. Those plans are indeed tailored to reach compliance with those standards. Authorities across Europe clearly lack incentives to comply with the air quality targets proposed by WHO.

From a global health perspective, the consequences of unequal standard setting are unacceptable. As shown in the global air quality models developed for the GBD (2010) project (Brauer et al. 2012), inequities in environmental policies lead to ever-increasing inequities in air quality. Indeed most of the regions in the world with the worst air quality in 1990 experienced a deterioration of air quality by 2010. Instead, global regions with better air quality in 1990 have seen further improvements due to the implementation of clean air policies to reach science-based air quality standards. The consequences of these trends can be seen in the comparison of the country-specific ranking of the risk factors that determine the national burden of disease (GBD 2010). The countries where air pollution (defined as the sum of household and ambient pollution—including ozone) has become the top leading cause of death are without exception countries in Asia (e.g., Afghanistan, Bangladesh, Laos, India) or Africa (Benin, Congo, Gambia, Ghana). Such trends are driven by the lack of governments to set adequate air quality standards and by globally active

Table 1 Current (August 2015) long-term (annual mean) Air Quality Standards set for ambient concentrations of particulate matter PM10 and/or PM2.5 in various countries [or states/cities (>)] across the world

Country or agency	PM ₁₀ $\mu\text{g m}^{-3}$	PM _{2.5} $\mu\text{g m}^{-3}$
Reference: WHO	20	10
Africa		
Kenya	50	35
South Africa	50	25
Tanzania	60–90	N/A
Central America		
Costa Rica	50	N/A
El Salvador	50	15
Jamaica	50	N/A
Nicaragua	50	N/A
Panama	50	N/A
Dominican Republic	50	15
North America		
Canada	N/A	10
>British Columbia	N/A	10
Mexico	40	12
Puerto Rico	N/A	15
USA	50	15
>California	20	12
South America		
>Buenos Aires	50	15
Bolivia	50	N/A
>La Paz	20	10
Brazil	50	N/A
Chile	50	20
Colombia	50	25
Ecuador	50	15
Peru	50	N/A
Venezuela	50	N/A
Asia/Oceania		
Australia	N/A	8
Bangladesh	50	15
China (residential areas)	100	N/A
Hong Kong SAR	55	N/A
India	60	40
Iran	20	10
Israel	50	25
Japan	N/A	15
Malaysia	50	N/A
Philippines	60	N/A
Republic of Korea	50	N/A
Singapore	N/A	15
South Korea	50	25
Sri Lanka	50	25
Taiwan	65	N/A

Table 1 continued

Country or agency	PM ₁₀ µg m ⁻³	PM _{2.5} µg m ⁻³
Thailand	50	25
Uzbekistan	50	N/A
Vietnam	50	25
Europe		
EU	40	25
Switzerland	20	10 under consideration
Turkey	60	N/A

Standards set in bold are within 20 % of the science-based values as proposed by WHO to protect public health

N/A or countries not listed: no policies could be identified. For other national air quality standards and for references to the National policies: see the website of the Swiss Tropical and Public Health Institute (<http://ludok.swisstoph.ch>)

companies who seek to profit from the policy vacuum in those countries through the outsourcing of polluting industries to countries with inadequate policies.

The globalized economy must be accompanied by globalized clean air policies. The science-based guideline values proposed by WHO are not negotiable. All countries should adopt those values as the unconditional targets for clean air policies. The current situation of a globalized economy combined with environmental policy making driven by lobbyist instead of the public health needs must be of particular concern for low and middle income countries (LMICs) where multinational companies capitalize on lax clean air regulations. LMIC economies cannot afford the large and costly burden of diseases due to poor air quality. Globally harmonized clean air policies will strongly contribute to ending the outsourcing of pollution from high to low income countries. It is—for example—unacceptable that cars sold in Europe must comply with Euro VI emission norms, whereas car makers (including Europeans) continue to put heavily polluting trucks and cars on the streets of countries with lax policies.

In sum, global health calls for globalized science-based clean air regulations; thus, all governments should adopt the WHO Guideline values as nationally binding clean air standards!

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