Global tobacco inequalities: a new frontier

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Published online: 26 February 2012
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Tobacco use is the single most important cause of premature death and disability. By the year 2030, smoking will account for approximately one-third of global deaths and approximately 80% of these deaths are likely to occur in lower and middle-income countries (LMIC). [1–3] Approximately six million people die each year, including about 600,000 deaths among non-smokers who are exposed to secondhand smoke [1]. Nearly 80% of smokers in the world have their first smoking experience before age 18 and inexpensive access to tobacco products remains a widespread problem. The prevalence of tobacco smoking has fallen among persons with

more formal education in high-income countries. This trend was first observed among men and has been accelerated by public health interventions to control tobacco use in the United States and other countries [4]. However, the smoking epidemic has not declined in low and middle-income countries and the disparity in deaths between high and LMIC is expected to increase in the next few decades. The smoking epidemic is shifting to LMIC with steady increases in cigarette consumption, especially among men (approx. 50%), whereas a smaller proportion of women (9%) smoke worldwide. Furthermore, prevalence of secondhand smoke exposure is high among women and children in low-income households [5], service and manual labor workplaces [6], and in LMIC such as Cambodia, China, the Philippines and Vietnam, where the prevalence of smoking among men is extremely high [7].

The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) was WHO's first global treaty and was designed to address the growing global epidemic of tobacco, the course of which is predictable. Assessment of the phases can facilitate the determination of appropriate public policies and anti-smoking interventions. The smoking epidemic has been described in the context of the epidemiologic stages based on prevalence, smoking consumption, and mortality attributable to tobacco use that lead to four stages of the cigarette epidemic [8]. Smoking prevalence among adults becomes a powerful indicator of the course of the smoking epidemic, and differences by sex can mark the different stages of the epidemic. Stage I is characterized by relatively low prevalence for both men and women. Greater smoking prevalence marks stage II, the peak stage of the epidemic, with rates ranging from 40 to 60%. Stage III is initiation of the epidemic's decline, particularly among men even as prevalence among women is increasing. Finally, stage IV is marked by a steady decline in smoking

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prevalence among both men and women. The stages of the smoking epidemic do not account for the lag in the increase in prevalence among women or for the fact that tobacco use and lung cancer are still increasing among women globally. Interestingly, social class and race/ethnicity are not mentioned as contributing factors when defining the stages of the epidemic or evaluating smoking prevalence.

Social epidemiologists have analyzed health outcomes by socioeconomic position (SEP) for decades, and have consistently shown that poor and less educated persons bear more of the burden of disease and death and have worse outcomes for similar conditions [9]. Tobacco use requires disposable income that poor people in LMIC could be allocating to beneficial goods and services. For example, tobacco accounts for 2.8% of average household total expenditure in poor countries, such as Bangladesh, and 15% of total household expenditure among the lowest income groups in Indonesia [1]. In the early stages of the tobacco epidemic, men of higher SEP reduce their use of tobacco first, just as persons from lower SEP begin to take up more tobacco use. These trends have emerged across the globe, particularly in middle-income countries [10].

In LMIC, the prevalence of smoking varies widely with major differences by gender in most regions. In East and South Asia, North Africa and the Middle East, men smoke much more than women [1], and it is possible that more traditional gender expectations and cultural norms about women may delay the uptake of tobacco use among women [11–13]. In these regions, men are clearly in stage II of the epidemic whereas women remain in stage I although use of smokeless tobacco is quite common in South Asia and more prevalent among persons of lower SEP. In Latin America the gender gap in smoking is much narrower but remains significant. In fact, prevalence of smoking among women in Southern Cone countries exceeds that of men in the US [1]. Latin America is closest to representing the phases of stages I, II, and III in different countries by gender. Sub-Saharan African countries maintain low smoking prevalence among men and very low smoking prevalence among women and are closest to being at stage I of any region. Although detailed behavioral data are limited, a greater proportion of current smokers from LMIC compared with high-income countries are non-daily smokers [1].

The effect of race/ethnicity on global tobacco use remains unclear. This may, in part, be because of the overwhelming importance of SEP as a social determinant of health, but also may reflect the limited diversity of race and ethnic groups in many countries. Increased internal migration and immigration from surrounding countries will lead to a greater focus on examining the role of racial/ethnic diversity within middle and low-income countries. Recognition of race/ethnicity as a central explanatory variable independent of, but associated with SEP in determining health attitudes, beliefs,

behavior and disease outcomes is a new research topic in global health. In addition, little attention has been devoted to under-represented or hard-to-reach populations within countries in standard epidemiological and surveillance studies.

The Tobacco Research Network on Disparities (TReND), supported by the National Cancer Institute and the Legacy Foundation, elected to develop this special issue to increase understanding of how global tobacco inequalities affect low and middle-income countries. This effort grew out of the 2008 World Conference on Tobacco in Mumbai, India, that included a TReND-sponsored symposium on global tobacco inequalities. Since 2004 TReND has conducted research with the purposes of increasing understanding of and addressing tobacco-related health disparities by advancing the science, translating that scientific knowledge into practice, and informing public policy (www.tobaccodisparities.org). TReND is designed to stimulate new studies, challenge existing attitudes, and address significant gaps in research on understudied and under-served populations. This special issue, “Research to Reduce Global Tobacco Inequalities” in *Cancer Causes and Control* represents expansion of our efforts to the global stage. Papers in this special issue report results from studies in middle and low-income countries in Africa, Asia, and Latin America, often in collaboration with scientists from high-income countries. The focus remains on the effect of SEP and some studies acknowledge the distinct but related importance of race/ethnicity in affecting tobacco-use behavior.

The paper by Harper and McKinnon [14] assesses socioeconomic inequalities in tobacco in different global regions. Although these analyses from such a “big picture” perspective offer limited granularity of these complex issues, the authors take advantage of epidemiological survey studies from 50 countries in 2002–2003 and evaluate asset-based wealth. Men with a higher SEP were less likely to be smokers in all regions, although in some countries more advantaged men continue to be the group with the highest smoking prevalence. For poor women, prevalence of smoking was highest in middle and high-income countries of Europe. There is still an opportunity to prevent progression of tobacco use in Sub-Saharan Africa and among most women in Asia.

Defining trajectories of smoking among adolescents by use of regional studies is critical to developing targeted intervention for the youth at highest risk. Data from California showed that risk based on both experimentation and willingness to consider smoking in the future may be applicable in low and middle-income countries [15]. Studies from South Africa and Argentina reveal the contributions of regional tobacco use patterns. Gilreath et al. [16] showed that school norms and individual norms affected youth tobacco use and are potentially modifiable by individual and system-

level intervention in South Africa. In addition, youth with established social networks among smokers and who are prone to academic failure are also at increased risk of smoking, as has been found in high-income countries. In a cohort study from Jujuy, Argentina, Alderete et al. [17] highlight the importance of measuring race/ethnicity in a middle-income country in explaining predictors of tobacco initiation. Reported racial discrimination against minority Amazonian indigenous youth was associated with increased smoking after adjusting for other factors previously associated with smoking [17].

The critical importance of health communication and mass media-based intervention and basic communications research has been demonstrated in studies from Nigeria and Mexico. In a country with low overall smoking prevalence, Tafawa et al. [18] report that men with greater exposure to pro-tobacco mass media through radio were more likely to use smokeless tobacco or to smoke than men with no radio exposure. Thus, in an era of mobile devices in all parts of the world, radio remains influential. The two related studies from Mexico found that graphic pictorial health warnings that included diseased organs or tobacco victims had a greater impact on participants than symbolic representations or testimonials [19, 20]. Furthermore, these effects may be magnified among persons from less advantaged SEP. This study adds new evidence that the use of the graphic health images can be of central importance in tobacco-control intervention in low and middle-income countries.

High levels of smokeless tobacco use in many forms is found among South Asians, particularly among those of lower SEP. Turk et al. [21] evaluated the effectiveness of media intervention in reducing use of all forms of smokeless products. They incorporated testimonials from a surgeon and patients with tobacco-related disease to emphasize the disfiguring and disabling effects of tobacco-related cancers. Although effectiveness as measured by self-reported exposure to the campaign may be confounded by self-selection, benefits were demonstrated for more vulnerable groups, suggesting an important means of future intervention. This type of public health intervention can also serve to garner public support for tobacco control, and in turn, help enact policy changes [22]. Smokeless tobacco use has been associated with the development of oral, pharyngeal, and upper digestive tract cancers and the well-designed case control study by Gajalakshmi et al. [23] conclusively showed a fivefold increase in mortality from oral cancers among tobacco chewers compared to never chewers, and with a strong and inverse association with SEP [23]. They also provide further evidence that tobacco chewing is a major cause of disease and disability in South Asia by demonstrating the increased mortality risk from upper airway, digestive tract, and cervical cancers, and an increased risk of heart attacks.

The evidence linking secondhand smoke exposure to tobacco-related morbidity and mortality has been the leading factor behind legislated mandates for clean indoor air which restrict tobacco use. In the US, secondhand smoke exposure has decreased significantly in the past 10 years in all segments of the population [24]. However, secondhand smoke exposure is still disproportionately higher among children aged 3–11, African Americans, and people living in poverty, even though exposure of these very groups was significantly reduced between 2000 and 2008 [24]. At the global level, FCTC has identified reduction of secondhand smoke exposure as a global priority through Article 8, which calls for each party to adopt and implement effective legislative, executive, administrative, and/or other measures to protect people from exposure to tobacco smoke in indoor workplaces, public transport, indoor public places, and, as appropriate, other public places. (<http://whqlibdoc.who.int/publications/2003/9241591013.pdf>).

Two papers assess exposure to second hand smoke exposure in Vietnam and China, both of which have ratified the FCTC. In Vietnam, Hoang et al. [25] found that two-thirds of non-smokers 15 years of age and older were exposed to SHS, and that this was disproportionately affecting women, for whom prevalence of smoking was much lower, ethnic minorities, and poor persons. On the basis of other data obtained by use of biochemical markers this exposure may be even higher among young children who may be highly exposed to tobacco through their parents. The study by Yao et al. [26] from rural China reported similar levels of SHS exposure with disparities defined by SEP for children and women. This study emphasizes that SHS exposure is a major contributor to the tobacco epidemic in both urban and rural areas of Eastern Asia. Additional studies are needed in this country to explore the effect smoke-free homes may have in reducing SHS exposure and increasing smoking cessation. Among Asian immigrants in California, evidence indicates that these efforts can be major motivating factors for men to quit smoking [27].

The perverse activity of the transnational tobacco industry (TTI) in promoting death and disability through the marketing of tobacco products globally has been well documented in high-income countries. Lee et al. [28] summarize the published literature on the activity of TTI in expanding to new markets using similar economic, political, and marketing strategies to promote brands, stifle public health efforts, and defend the economic interests of the “farmers and workers”. In other areas, TTI has actively interfered in litigation cases against the tobacco industry, created an anti FCTC campaign, and re-directed media advertising under “voluntary” guidelines in Argentina [29–31]. There are opportunities to both explore the documents library and conduct empirical research on how tobacco

control policy can be affected by TTI strategies in most LMIC.

In summary, this special issue reveals the need for global efforts to reduce the tobacco epidemic as a means of reducing the cancer and other chronic disease burden. The tobacco burden affects health, health care, social systems, productivity, and lives. If we do not act expeditiously, the six million lives lost each year will increase to eight million lives lost by 2030. These studies together are the starting point for more systematic development of regional epidemiology and tobacco-control interventions focused on low and middle income countries. As a group, these studies demonstrate that risk factors associated with tobacco use start very young with exposure either from direct consumption or indirectly through SHS. Moreover, social and cultural norms in school or outside influence the uptake of tobacco use. Media are major contributors to promoting and reducing tobacco use and communication and may also be used successfully to intervene both through graphic health warnings and mass media.

The thread running through these articles is the fundamental importance of SEP in both exposure to and use of tobacco. The articles clearly demonstrate the disproportionate burden faced by those from lower SEP even among LMIC, thus arguing for looking at the tobacco burden from the perspectives of class, race, and ethnicity. At the same time, the intervention described here offers an important means of actively halting the tobacco epidemic. There is also potential to reach many smokers through Internet-based interventions to promote behavioral change [32]. Clearly, reducing the tobacco burden calls for a comprehensive approach using many strategies, including policy, mass media, and taxation to reduce the rising burden associated with tobacco use.

The ratification of the FCTC on 27 February 2005 was the beginning of the first international legal instrument designed to promote multilateral cooperation and national action to reduce the spread of the global tobacco epidemic as a means of reducing the cancer and other chronic disease burden. Although ratification by national governments has been widespread, implementation of effective tobacco control measures has been more gradual. In the US, national ratification seems implausible even with a sympathetic administration, but local and regional tobacco-control measures have been critical. For example, Mexico City and Buenos Aires implemented stronger tobacco control measures than the national standards at the time. In addition, the Bloomberg Philanthropic Initiative to Reduce Tobacco has funded 15 low and middle-income countries to enable implementation of evidence-based practice to reduce tobacco use. The United Nations Report by the Secretary-General on the Prevention and Control of Non-communicable Diseases states that, “the greatest reductions in non-communicable diseases

will come from population-wide intervention to address the risk factors of tobacco use, unhealthy diet, lack of physical activity and harmful use of alcohol.” This report calls for full implementation of the FCTC. However, much more is needed to save millions of vulnerable lives across the globe. We invite other researchers, advocates, policy makers, and the entire global community to assist in efforts to reduce the burden of tobacco in low- and middle-income countries.

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