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Global tobacco prevention and control in relation to a cardiovascular health promotion and disease prevention framework: A narrative review

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Abstract

The purpose of this review is to emphasize the role of tobacco prevention and control in cardiovascular health (CVH) promotion and cardiovascular disease (CVD) prevention, including the importance of these endpoints for measuring the full impact of tobacco-related policies, programs, and practices. In this review, we describe an overview of tobacco control interventions that have led to substantial declines in tobacco use and the relationship between these declines with CVH and CVD. We review interventions that have had success in high-income countries (HICs) as well as those that are gaining traction in low- and middle-income countries (LMICs). We emphasize the challenges to comprehensive tobacco prevention and control strategies faced by LMICs, and highlight the special role of cardiovascular health professionals in achieving CVH promotion and CVD prevention endpoints through tobacco control. Tobacco prevention and control strategies have a strong scientific basis, yet a distinct gap remains between this evidence and implementation of tobacco control policies, particularly in LMICs. Health professionals can contribute to tobacco control efforts, especially through patient-level clinical interventions, when supported by a health care system and government that recognize and support tobacco control as a critical strategy for CVH promotion and CVD prevention. Understanding, supporting, and applying current and evolving policies, programs, and practices in tobacco prevention and control is the province of all health professionals, especially those concerned with CVH promotion and CVD prevention. A new tobacco control roadmap from the World Heart Federation provides a strong impetus to the needed interdisciplinary collaboration.

Keywords

Tobacco control; Smoking cessation; Cardiovascular diseases; Health personnel; Global health

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1. Introduction

Cardiovascular disease (CVD) is the leading cause of death worldwide (WHO, 2012), and is especially prevalent in low- and middle-income countries (LMICs) where over 80% of CVD deaths occur (Hoyert and Zu, 2012). Comprehensive tobacco control is a critical global public health strategy for cardiovascular health (CVH) promotion and CVD prevention. Four fundamental strategies are distinguished in a CVH/CVD framework: 1) preserving CVH/low CVD risk; 2) controlling increased CVD risk; 3) detecting and treating acute CVD events; and 4) reducing disability and risk of recurrent CVD events. Tobacco control within each of these domains requires a different approach, with tobacco prevention being a key component for maintaining ideal CVH and tobacco cessation being a key component for restoring ideal CVH, controlling increased CVD risk, and treating individuals who have survived CVD events (Fig. 1).

Here, we consider the role of comprehensive tobacco prevention and control within this CVH promotion and CVD prevention framework. We conducted an expert review using electronic databases (e.g., PubMed), manual searches of peer-reviewed journals most likely to publish global tobacco control research or commentaries (e.g., *Tobacco Control*, *Global Heart*), and reference lists of included articles, policy reports, and treatment practice guidelines. To better inform cardiovascular health professionals unfamiliar with tobacco prevention and control strategies, we review recent developments in this arena and the current state of global tobacco prevention and control. We include strategies that have led to the declines in tobacco use in high-income countries (HICs) and those that are gaining traction in LMICs, as well as topical challenges to global tobacco control in the context of CVH promotion and CVD prevention. We then describe the possible role of cardiovascular health professionals within the larger global tobacco control movement. We conclude with a focus on the tobacco endgame as a critical component of global CVH promotion and CVD prevention.

2. Viewing tobacco control from the perspective of CVH promotion and CVD prevention

A priority for global CVH promotion and CVD prevention should be to end the tobacco epidemic through comprehensive, integrated, and coordinated tobacco prevention and control strategies (Reddy et al., 2012). The World Bank (1999) estimated that cumulative tobacco-attributable deaths through year 2050 would number 520 million with then-current prevention and intervention efforts, but could be reduced to 500 million if initiation rates were reduced by 50%, or to 340 million if adult consumption rates were reduced by 50%.

Health professionals greatly contribute to CVD prevention by providing appropriate care for patients who use tobacco products. In the U.S., seven pharmacotherapies are approved for the treatment of tobacco use: nicotine replacement therapies (NRTs; patch, gum, lozenge, inhaler, and nasal spray) and non-NRT medications (bupropion and varenicline) (Cahill et al., 2013). Few randomized controlled trials of smoking cessation pharmacotherapies have been conducted in LMICs. Moreover, pharmacotherapy can be costly, less likely to be covered by insurance, and not as easily accessible in LMICs (Kishore et al., 2010). Cytisine,

a natural compound with neurochemical properties similar to varenicline, shows promise as affordable and effective pharmaco-therapy options in LMICs (Hajek et al., 2013; West et al., 2015). In LMICs, health professionals should also note smokers' use of alternative tobacco products, as use of these products may interfere with smoking cessation treatment adherence and abstinence. For example, waterpipe use predicted lower adherence to nicotine patch use in Syria (Ben Taleb et al., 2015).

Health professionals' advice to quit smoking can be a powerful motivator for smoking patients (Stead et al., 2013b), especially when delivered during hospitalization (Rigotti et al., 2012). Smokers who are advised to quit by a health care provider are 50% more likely to make a quit attempt (Davila et al., 2009). However, only about half of smoking patients in the U.S. report being advised to quit (CDC, 2007; Kruger et al., 2012). Encouraging health professionals to speak with patients about quitting, and facilitating access to evidence-based treatments, could increase the rate of quit attempts and successful cessation (McAfee, 2013). Globally, the cost of clinical interventions is significantly less than expenditures associated with continued tobacco use (Chen et al., 2012; John et al., 2009; Samet, 2010).

Unfortunately, individual-level interventions alone do not address the greater tobacco epidemic, nor will they be sufficient to achieve the ultimate goal of a tobacco-free world. Comprehensive tobacco control comprises a multi-pronged approach that involves public health science, policy, and clinical practice devoted to cigarette smoking and other tobacco use prevention and cessation. *Primordial strategies* for tobacco control aim to prevent tobacco use initiation, particularly among children and adolescents, to promote CVH. Every day, nearly 100,000 children transition to regular smoking – 14,000–15,000 children per day in HICs and 68,000–84,000 in LMICs (The World Bank, 1999). *Remedial strategies* focus on smoking cessation at both the individual and population levels to control increased CVD risk and prevent recurrent CVD, as smoking cessation is beneficial at every age (Jha et al., 2013). Under these policies, primordial and remedial tobacco control strategies can both have major public health impacts: the first, to achieve ultimate success in eliminating the tobacco epidemic and promoting CVH; the second, to prevent tobacco-attributable deaths from CVD while reinforcing primordial strategies to end the tobacco epidemic (Fig. 1).

3. Developing and implementing the Framework Convention on Tobacco Control (FCTC)

The Framework Convention for Tobacco Control (FCTC) represents a comprehensive approach to global tobacco control, and is the successful amalgamation of several international human rights proposals to address the global epidemic of tobacco use (WHO, 2003). With membership comprising 168 Signatories and 180 Parties,¹ the FCTC is the most widely endorsed treaty in United Nations history. In 2008, the WHO summarized global tobacco control efforts under the FCTC in six strategies (MPOWER; WHO, 2008): Monitor implemented policies, Protect individuals from secondhand smoke, Offer cessation assistance, Warn about the health consequences of tobacco, Enforce bans on marketing, and

¹These data are as of 4 March 2015, and last checked on 3 March 2016. For more information on FCTC Signatures and Ratification, please visit: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=IX-4&chapter=9&lang=en.

Raise taxes and prices on tobacco products. To support implementation of MPOWER, Bloomberg Philanthropies provided a six-year \$375 million dollar initiative for the WHO's international efforts in 15 LMICs as part of the Tobacco Free Initiative (WHO, 2006, 2013b). By 2014, >2.8 billion people were newly protected by at least one, well-implemented MPOWER strategy (WHO, 2015).

The tobacco control activities put forth by the FCTC are directly relevant to strategies for improving CVH and preventing CVD (Fig. 1). Primordial tobacco control, such as reducing sales to minors, is especially effective for preventing initiation of tobacco use and promoting CVH. Remedial tobacco control, including tobacco content regulation and clinical interventions for tobacco cessation, is designed to reduce CVD risk in adult smokers. Implementation of MPOWER policies reduced the number of smokers globally by 15 million in 2010, with a corresponding 7.5 million tobacco-attributable deaths averted (Levy et al., 2013).

4. Successes in global tobacco control: “best buys”

To enact cost-effective interventions against noncommunicable diseases (NCDs) globally, the WHO Global Burden of Disease project proposed a list of “best buy” policies – strategies that require relatively low investment for their great projected impact and support both primordial and remedial tobacco control (WHO, 2011b; World Economic Forum and the Harvard School of Public Health, 2011). This list of best buys was adopted by the WHO as priority interventions for FCTC signatories.

4.1. Tobacco prices and taxes

The most effective strategy for reducing tobacco uptake and promoting tobacco cessation is to increase the price of tobacco products (Savendoff and Alwaygn, 2015; WHO, 2015). Each 10% increase in the price of cigarettes is associated with 2–8% reductions in tobacco use in both HICs and LMICs (IARC, 2011). And yet, despite the efficacy of taxation as a tobacco control strategy in LMICs, the taxes placed on tobacco products in LMICs are less than half those in HICs (Jha, 2012; Jha and Peto, 2014). It is estimated that, if LMICs were to triple their excise taxes on tobacco products, they could achieve a 33% reduction in the prevalence of smoking (Jha and Peto, 2014), which would significantly decrease rates of tobacco-attributable CVD in these areas. In addition, raising taxes can increase revenues to fund other tobacco control activities, particularly in LMICs (Savendoff and Alwaygn, 2015).

4.2. Tobacco package labels

Text and pictorial warnings on tobacco packages increase population awareness of the negative health consequences of tobacco use (Hammond, 2009). In a clinical trial, smokers randomized to have pictorial warnings on their cigarette packs had higher quit rates compared to those randomized to text-only warnings (Brewer et al., 2016). Plain packaging, which removes company branding and employs standard packaging and lettering, effectively strips tobacco companies of their proprietary marketing. From limited evidence, plain packaging appears to increase the salience of health warnings and decrease the appeal of cigarettes, particularly in LMICs (Hughes et al., 2016; Munafo et al., 2011; Stead et al.,

2013a). Plain packaging was first implemented in Australia in 2012, is scheduled to be implemented in Ireland and England in 2016, and is under consideration in 10 other countries. Population studies in Australia show that introduction of plain packaging was associated with significantly reduced appeal of cigarette packs and increased motivation to quit smoking among both adolescents and adults (Wakefield et al., 2015; White et al., 2015).

4.3. Smoke-free policies and legislation

Second-hand smoke is responsible for >600,000 deaths per year worldwide (Fichtenberg and Glantz, 2002; USDHHS, 2006). Secondhand smoke exposure affects many of the same pathophysiological pathways (e.g., inflammation, endothelial dysfunction) that cause CVD as mainstream tobacco smoke (Institute of Medicine Committee on Secondhand Smoke Exposure and Acute Coronary Events, 2010). Creating smoke-free workplaces is associated with approximately 4% reductions in tobacco use rates, and smokers who continued smoking reduced their consumption by 3 cigarettes per day on average – modest but meaningful effects (Fichtenberg and Glantz, 2002). More broadly, smoke-free legislation promotes denormalization of cigarettes by limiting their presence in public places. Further, it has been found to be associated with: reduced use of tobacco products among adolescents (Farrelly et al., 2013; Shang, 2015); 8–25% lower risk of CVD (Meyers et al., 2009); and an overall 13% reduction in rates of acute MI (OR: 0.87, 95% CI: 0.84–0.91) (Lin et al., 2013). A systematic review and meta-analysis found greater reductions in hospitalization rates for CVD with comprehensive versus partial smoke-free air laws around the world (for comprehensive laws, RR: 0.86, 95% CI: 0.83–0.89; for partial laws, RR: 0.92, 95% CI: 0.85–0.98) (Jones et al., 2014).

4.4. Mass media marketing

Anti-smoking messaging via mass media has growing potential in this digital age of widespread media coverage. For example, researchers in the U.S. found that adolescents exposed to the anti-smoking messages of the National Truth Campaign had 20% lower risk of smoking initiation (HR: 0.80, 95% CI: 0.71–0.91) (Farrelly et al., 2009). For adults, campaigns that emphasize the health consequences of tobacco use and disparage the tobacco industry are associated with more negative attitudes about tobacco use (Durkin et al., 2012; Klesges et al., 2009). Mass media campaigns may have an even greater effect in LMICs, given their effectiveness among lower literacy populations (Durkin et al., 2012; Mullin et al., 2011).

In sum, effective tobacco control strategies have been established on the basis of a large body of research, including economic analysis. However, their implementation is seriously lagging, especially in LMICs.

5. Recent and ongoing challenges and opportunities in global tobacco control

5.1. Barriers to tobacco control implementation in LMICs

Although tobacco control policies have led to significant and often swift reductions in population smoking rates, and corresponding declines in CVD, there are important barriers

to implementation of tobacco control policies in LMICs. Tobacco control research and policy are strategically interdependent (Mackay, 2013), however, there is often a lag in the process of policy research, implementation, evaluation, and optimization (FCTC Article 20; Gupta et al., 2012; Warner and Tam, 2012). To address this concern, the journal *Tobacco Regulatory Science* debuted in April 2015, to provide a place to publish research and evaluations concerning efficacy and effectiveness of tobacco control policies (Leischow et al., 2015).

The science-policy gap in LMICs is only partly due to economic conditions (Oldenburg and Absetz, 2011). A systematic review identified five primary challenges to tobacco control implementation in LMICs: 1) information dissemination to the public regarding the health consequences of tobacco use; 2) tobacco companies taking advantage of trade disputes to establish and grow their market; 3) smuggling of tobacco products to increase sales and profits; 4) preventing tobacco taxes and smoke-free legislation through sponsored research and misinformation; and 5) competing interests and incentives within governments (Bump and Reich, 2013). Further research is needed to overcome these barriers.

5.2. The tobacco industry as a disease ‘vector’

The tobacco industry continues to fight public health efforts in the face of overwhelming evidence of the negative health consequences of tobacco use (Gilmore et al., 2015; Powers et al., 2004). The industry invests billions of dollars in marketing each year and has used deception in many forms to promote smoking initiation among youth and to maintain a high prevalence of tobacco use. For example, tobacco industry documents have revealed the industry’s efforts to pursue endorsement deals and contracts in Hollywood (Lum et al., 2008; Mekemson and Glantz, 2002) in order to capitalize on known associations between smoking in movies and uptake of cigarette smoking among youth (Charlesworth and Glantz, 2005). In recent years, these efforts have focused increasingly on LMICs (Henriksen, 2012; Wadland et al., 2011; WHO, 2011c). This record of behavior led to characterization of the tobacco industry as a disease “vector” – the mechanism by which the toxic exposure to tobacco is transmitted to its victim, the global population (Gilmore, 2012; Lee et al., 2012). Examples of toxic exposure include tobacco-oriented international trade and investment agreements, hostile litigation, and illicit trade of tobacco (e.g., smuggling), by which the tobacco industry attempts to prevent or dismantle public health policy efforts (e.g., graphic warning labels) and to leverage their resources to build up and exploit markets in vulnerable populations, especially in LMICs (Gilmore et al., 2015; Savell et al., 2014).

An important step in combating the tobacco industry as a disease vector is to denormalize the industry by informing the public of its manipulative behavior and harmful influence (Gilmore et al., 2015). FCTC Article 5.3 details specific strategies to combat the industry, such as prohibiting industry contributions to events, activities, or individuals that would promote tobacco products (WHO, 2013c), banning point-of-sale advertising (i.e., promotional material placed near a check-out counter) directed to adolescents (Levy et al., 2015; Scheffels and Lavik, 2012), and implementing plain packaging and graphic labels on cigarette packages (Hammond and Parkinson, 2009) to limit the scope of tobacco industry

marketing. Much work is needed in these areas to achieve a level of tobacco control to combat the industry's growing influence in LMICs.

5.3. Alternative “safer” nicotine and tobacco products

It is well established that there is no safe cigarette (NCI, 2001; USDHHS, 1964). Accordingly, tobacco control policies ban the use of misleading branding practices (e.g., “mild,” “light,” and “low-tar”) around the world (Elton-Marshall et al., 2010; Siahpush et al., 2011). In some countries, there is evidence of harm reduction, as opposed to harm elimination by total tobacco cessation, when smokeless tobacco products (e.g., snus, snuff, dissolvable tobacco) are used in place of cigarettes (Gartner et al., 2007). However, while switching to smokeless tobacco decreases risk of developing certain NCDs (e.g., lung cancer), it may increase risk for others (e.g., oral cancer) (Gray and Hecht, 2010); moreover, a national study of U.S. smokers found that using smokeless tobacco products was not associated with smoking cessation (Popova and Ling, 2013). Therefore, there may be no net harm reduction from smokeless tobacco products.

Additional tobacco products that are used primarily in Eastern LMICs include bidis, supari, betel quid, gutka, and pan masala (Mahapatra et al., 2015). These products present unique challenges for tobacco control. Bidis, for example, tend to be smoked outdoors and therefore are less accountable under smoke-free legislation, and their packaging is not conducive to graphic warnings (Kumar et al., 2012b). Gutka and pan masala were legally banned in India in 2012, but tobacco vendor awareness of and compliance with the legislation is low (estimated 25–50%) (Pimple et al., 2014). Waterpipes, which originated in Indonesia but have recently gained popularity in HICs, are largely exempt from existing smoke-free legislation through legislative loopholes (e.g., hookah lounges are classified as retail shops rather than bars/restaurants) or vague phrasing (e.g., no clear definition of “smoking”) (Maziak, 2012; Noonan, 2010).

Use of any of these alternative tobacco products conveys increased risk for NCDs, including CVD (Mahapatra et al., 2015; Maziak, 2012; Rahman and Fukui, 2000; Rastogi et al., 2005). Despite known health consequences, these products are not yet consistently regulated. They should be closely monitored and treated legally equivalent to cigarettes to prevent these products from fueling a new global epidemic of their own (O'Connor, 2012).

Electronic nicotine delivery systems (ENDS, e-cigarettes) were patented in China in 2003. Since their introduction to the U.S. in 2007, ENDS use has climbed rapidly. Between 2013 and 2014, ever-ENDS use increased three-fold among U.S. middle school students (from 1.1% to 3.9%) and high school students (from 4.5% to 13.4%), surpassing cigarettes and becoming the most used tobacco product among adolescents (CDC, 2015). Cigarette smoking and ENDS use are highly related among adolescents and young adults (Agarwal and Loukas, 2015; Warner, 2016). Though a causal relationship has not been established, use of ENDS among adolescents is associated with use of combustible tobacco products within the next year (Leventhal et al., 2015). With growing evidence that nicotine use is a gateway to future marijuana and cocaine use, some are concerned that the uptake of these purely nicotine-delivery systems among youth may increase addiction rates to other substances in the younger generation (Kandel and Kandel, 2014).

The long-term health consequences of ENDS use are unknown. Short-term studies show similar, if less severe, effects on the lungs compared to traditional cigarettes (Schweitzer et al., 2015; Vardavas et al., 2012). A meta-analysis found that adult smokers who use ENDS are 28% less likely to quit smoking than those not using ENDS (OR: 0.72, 95% CI: 0.57–0.91) (Kalkhoran and Glantz, 2016). This outcome may depend in part on the ENDS design, where smokers who use “open” devices (i.e., refillable “tank” systems) are more likely to quit smoking than users of “closed” devices (i.e., prefilled cartridges, “cigalikes”) (Chen et al., 2016). Furthermore, most ENDS users appear to be dual users (CDC, 2013; King et al., 2013), with use of ENDS serving to “bridge” between opportunities to smoke cigarettes, thereby sustaining tobacco dependence (Bell and Keane, 2012; O’Connor, 2012). Because continuing to smoke even 1–4 cigarettes per day is associated with nearly 300% greater risk of death due to ischemic heart disease versus non-smoking (Bjartveit and Tverdal, 2005), smokers who use ENDS to reduce but not abstain from cigarettes may remain at significant CVD risk.

At the population and policy level, tobacco control advocates are concerned that ENDS threaten tobacco control efforts (Fairchild et al., 2014). ENDS can thwart tobacco control policies, including smoke-free legislation, advertising and promotion restrictions, and taxation. At the sixth session of the Conference of the Parties to the FCTC, the Parties “agreed to disagree” in the debate between the treatment benefit versus harm of ENDS by focusing on four regulatory objectives: 1) preventing uptake of ENDS among nonsmokers, 2) minimizing health risks of ENDS, 3) prohibiting false or deceptive promotion of ENDS, and 4) limiting the industry’s involvement in tobacco control efforts (Russell et al., 2016).

5.4. Harnessing mobile technology, Internet access, and social media for tobacco control

New technologies offer opportunities to influence smoking behavior by facilitating widespread delivery of tobacco cessation treatment. Mobile-based health interventions (i.e., quitlines, text messaging services, and smartphone apps) hold great potential to provide low-cost tobacco treatment to the three-quarters of the global population carrying mobile phones (The World Bank, 2012), though research using technology for tobacco cessation remains in its infancy in HICs (Ubhi et al., 2016) and is essentially nonexistent in LMICs.

The Internet offers many options for providing information and support for tobacco cessation. However, the tobacco industry has also taken advantage of this minimally regulated, inexpensive domain to exploit loopholes in tobacco control policies (Cohen et al., 2001; Hoek, 2004), including: cigarette sales to minors, as individuals online can more easily thwart efforts at age verification (Ribisl, 2012); discounts and coupons offered by online vendors to evade excise taxes (Kim et al., 2006); advertising and promotion via the Internet, where the tobacco industry has increased spending in recent years (Hrywna et al., 2007; Jenssen et al., 2009; U.S. Federal Trade Commission, 2009); and normalization of tobacco products using positive promotion via multiple, simultaneous channels (Nagler and Viswanath, 2013).

Social media have also facilitated tobacco product promotion, particularly among youth. However, several potential approaches to tobacco control via social media could be considered. Proliferation of tobacco control messages on the Internet could promote tobacco

industry denormalization and encourage tobacco cessation (Zhu et al., 2012). Social network websites can connect individuals on a potentially global scale – anti-tobacco messages could be posted as “pages” on Facebook, videos on YouTube, “tags” on Tumblr, or “tweets” on Twitter (Freeman and Chapman, 2007, 2010). Social media promote a sense of community (Cobb et al., 2010), and these channels can facilitate tobacco control campaigns and tobacco cessation (Hefler et al., 2012).

6. Ending the tobacco epidemic

Discussion of the “tobacco problem,” as termed by the Institute of Medicine, has now advanced to “ending the epidemic” (USDHHS, 2010). Since the first U.S. Surgeon General’s Report in 1964, an estimated 8 million lives and 157 million life-years have been saved as a result of tobacco control efforts (Holford et al., 2014). Although the proportion of the population who are smoking has decreased significantly, with the growing global population the actual number of current daily smokers has increased (Ng et al., 2014), highlighting the need to persist in the development and optimization of interventions targeting tobacco cessation.

Implementation of the above tobacco control strategies will necessarily create greater demand for cessation support (Raw et al., 2016). However, there appears to be little importance placed on providing cessation services, and implementation of cessation services is much lower in LMICs compared to HICs (Pine-Abata et al., 2013a). We support the position that many of the tenets of tobacco control could be promoted by health professionals in LMICs by providing widespread clinical cessation services and becoming advocates for tobacco control policies (Kumar et al., 2012a). To be successful, particularly in LMICs, this movement would require equipping health professionals with the necessary training to engage in comprehensive tobacco control efforts, addressing limitations to tobacco control within the health care system, and increasing government support for cost-effective distribution of tobacco cessation treatment. Unfortunately, many system-level barriers prevent successful adoption of tobacco control policies for offering cessation assistance (Samb et al., 2010).

6.1. Health care system barriers to tobacco control

In LMICs, tobacco cessation services are not readily available in primary care or other general medical settings (Sivadasan Pillai and Ganapathi, 2012). Many tobacco cessation services are housed in tertiary care settings, which severely limits access to these tobacco services by the general public. In other cases, tobacco cessation assistance is offered through psychiatric or mental health services, which many tobacco users in LMICs may not wish to access due to stigma and taboo associated with receiving mental health treatment (Sivadasan Pillai and Ganapathi, 2012). These limitations could be addressed if expertise in tobacco cessation treatment were more widely available. Intervention at the level of primary care could reverse the current upward trend of tobacco use in LMICs (IOM, 2010).

Reflecting these challenges, an analysis of Global Adult Tobacco Survey data collected from 16 LMICs found that only between 4% and 27% of smokers reported utilization of smoking cessation services (Wang et al., 2015). In the large majority of the LMICs surveyed,

cessation counseling services were more likely to be used than pharmacotherapy, which was likely related to the higher costs and lower rates of insurance coverage of smoking cessation pharmacotherapy in those countries (Wang et al., 2015). These findings indicate that strengthening these services is a key component to smokers in LMICs receiving cessation assistance.

There is a pressing need to address tobacco use and treatment in the medical and nursing school curricula in LMICs to equip all health professionals with the necessary skills to motivate and support tobacco quit attempts (Richmond et al., 1998). In 2013, approximately 20% of countries, the majority of which were LMICs, did not have a tobacco cessation training program for health professionals, and over 50% of those who did have at least one training program reported difficulties with funding stability for the program(s) (Kruse et al., 2015). Simply increasing health professionals' knowledge and the rate of tobacco use screening is a critical first step for health professionals in LMICs (Shelley et al., 2014; Yan et al., 2008). More advanced strategies may involve active learning techniques, such as use of standardized patients, to increase health professionals' confidence in performing behavioral cessation counseling (Wadland et al., 2011; Walsh et al., 2007).

Another barrier to tobacco treatment delivery in LMICs may be the high rates of tobacco use among health professionals. As recently as 2010, smoking rates among students in the health professions exceeded 40% in 13 countries (Eriksen et al., 2012). Physicians who smoke, compared to physicians who have never smoked, are less likely to offer smoking cessation advice or assistance (Pipe et al., 2009). Strengthening tobacco control training and resources in the health care system could support health professionals to provide tobacco cessation interventions for patients.

6.2. Government support for tobacco cessation services

Despite the widespread acknowledgement of the importance of tobacco cessation, implementation of strategies to “offer help to quit tobacco use” was lowest (<20% of FCTC Parties) among the six core measures of MPOWER (WHO, 2013a). An assessment of progress related to tobacco control policies concerning tobacco dependence and cessation found that only 44% of the 121 respondent countries had national treatment guidelines (Pine-Abata et al., 2013b). When present, guideline components included: behavioral cessation counseling for patients (56%), cessation support for healthcare workers (46%), a national treatment strategy (44%), a government official responsible for tobacco use treatment (41%), telephone quitlines (36%), and a national network of support for tobacco treatment (17%) (Pine-Abata et al., 2013a). National telephone quitlines are an effective and cost-effective modality for providing tobacco cessation clinical interventions (Stead et al., 2013c; Tomson et al., 2004). There are strong correlations between quitline spending, both for services and promotion, and the reach of effective treatment (Saul et al., 2014). As of 2009, however, few LMICs had implemented national quitlines, and those that had done so did not achieve sufficient population coverage and were underutilized (Wang et al., 2015; WHO, 2011a).

7. The Tobacco Endgame

Ending the Tobacco Epidemic (USDHHS, 2010) cited “a historical opportunity to rekindle the momentum of previous decades and achieve the vision of a society free from tobacco-related death and disease.” Four strategic actions were proposed: 1) strengthening implementation of evidence-based interventions and policies in states and communities; 2) changing social norms around tobacco use; 3) leveraging health and human service systems and resources to create a society free of tobacco-related disease and death; and 4) accelerating research to expand the science base and monitor progress. These actions require the “ideal policy environment” for tobacco control within each FCTC Party, as described by Cairney and Mamudu (2014): 1) each country’s department of health is responsible for tobacco control policies and monitoring; 2) tobacco control is presented as a solvable public health problem; 3) public health groups are included, while tobacco interest groups are excluded from tobacco control activities; 4) the environment itself begets policy implementation; and 5) scientific evidence for tobacco control policies is widely accepted by government entities.

Some researchers argue that bold new strategies are required to reduce and, ultimately, eliminate tobacco use and tobacco-related disease burden – for example, implementing policies that gradually reduce nicotine and addictive additives in tobacco products; raising the legal age of purchase and possession of tobacco products annually to create a smoke-free generation; and systematically limiting the tobacco industry’s production of tobacco products (McDaniel et al., 2015; Novotny, 2015).

8. Conclusion

The 20th anniversary issue of *Tobacco Control* included a critical appraisal of the relation between the tobacco control movement and prevention of NCDs (among which CVD predominates) (Wipfli and Samet, 2012). Integration and synergy of these efforts would be supported by a global commitment to the United Nations Sustainable Development Goal 3.4 to reduce mortality due to NCDs (and CVD in particular) by one third by the year 2030 (<http://www.un.org/sustainabledevelopment/health/>) and the WHO goal of a 25% reduction in the risk of deaths due to NCDs by 2025 (Kontis et al., 2014). Comprehensive tobacco control will be essential to achieving these goals (Kontis et al., 2014; Raw et al., 2016).

A significant development toward realizing a harmonization of tobacco control with NCD control was the adoption by the World Heart Federation (WHF) of its “Roadmap for Tobacco Control” in 2015 (Grainger Gasser et al., 2015). The Roadmap gives high prominence to tobacco control for achieving this goal and calls on many sectors of society to engage in its implementation. This global initiative brings tobacco control and CVH promotion/CVD prevention together under the aegis of the WHF and augurs a promising future for collaboration between the tobacco control and cardiovascular domains. (Further discussion on the integration of global tobacco control and NCD control is beyond the scope of this article; interested readers are referred to Additional Resources.²)

²Additional Resources:

Comprehensive tobacco control has improved and extended many lives over the past five decades, but many issues remain to be addressed to reach the ultimate goal: a tobacco-free world. Integration of primordial and remedial strategies for tobacco control promise to have a significant impact on CVH promotion and CVD prevention, particularly in LMICs. Policies such as tobacco control “best buys,” utilization of social media channels, and management of novel tobacco products are effective points of action. However, the importance of clinical interventions for tobacco control should not be overlooked. In the near future, greater reduction in CVD-related morbidity and mortality could be achieved through smoking cessation by providing health professionals with the appropriate skills and training in tobacco prevention and control, as well as supporting a health care system designed to promote the tobacco endgame as a critical strategy for global CVH promotion and CVD prevention.

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*These are "Best Buy" strategies that support both primordial and remedial tobacco control.
 CVH: cardiovascular health; CVD: cardiovascular disease; ENDS: electronic nicotine delivery systems.
 Source: Adapted from Darwin R. Labarthe, Epidemiology and Prevention of Cardiovascular Diseases: A Global Perspective, Sudbury, MA; Jones and Bartlett Publishers, LLC, 2011.

Fig. 1.
 Fundamental tobacco control strategies mapped onto cardiovascular health promotion and cardiovascular disease prevention.