

## Editorial

## Interventions to Reduce Tobacco-Related Health Disparities

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The science of tobacco-related health disparities has come a long way since the release of the 1998 Report of the Surgeon General, “Tobacco Use Among US Racial/Ethnic Minority Groups”.<sup>1</sup> In that report, there was a small section devoted to “tobacco control and education efforts of smokers from four racial/ethnic minority groups.” A major conclusion in the 1998 report was that prevention and cessation efforts in racial/ethnic communities are limited by underdeveloped tobacco control infrastructures and low levels of resources for research, program development, and program dissemination. This report inspired a number of national, regional, and local initiatives by funding agencies, health departments, and individuals to begin to address some of the concerns.

Once such effort that began in 2003 was the Tobacco Research Network on Disparities (TReND), a research network funded by the National Cancer Institute and the American Legacy Foundation to advance the science of health disparities, translate scientific knowledge into practice, and inform public policy. TReND discussed multiple strategies to increase the visibility and value of the science of tobacco-related health disparities since many minority racial/ethnic smokers, low socioeconomic status (SES) smokers, sexual minority smokers, and the intersection of these groups experienced disparities across the tobacco use and disease continuum. P. Fagan, PhD, MPH, and D. Vallone, PhD, MPH, co-chaired this network, which had a limited funding lifespan. TReND wanted to integrate the science of tobacco-related disparities into infrastructures that had long-standing commitment, resources, and a constituency that had the skills and talents to advance this important area of science. After much discussion, TReND approached the Society for Research on Nicotine & Tobacco (SRNT) and explored opportunities to strengthen the infrastructure in SRNT as a strategy to advance the science of tobacco-related health disparities from the molecular to the policy levels.

In 2006, Drs P. Fagan and D. Vallone, co-chairs for TReND and members of SRNT, presented the idea of forming a SRNT Tobacco and Health Disparities (TRHD) Committee to then President, Ellen Gritz, PhD. The idea to form a committee within SRNT was discussed during the 12th annual meeting held February 15–18 2006 in Orlando, Florida. Following this meeting, Drs D. Vallone and P. Fagan submitted a formal proposal to the SRNT Board to revise the SRNT Special Populations Subcommittee. The previous Special

Populations Subcommittee hosted a workshop at the 2004 SRNT 10th annual meeting in Scottsdale, Arizona, but since that time the activities were primarily focused on the diversity scholarships led by former subcommittee chairs including Drs Edward Singleton, Linda Pederson, and Philip Gardiner. Dr Gritz received board approval for the formation of the TRHD Committee in the spring of 2006.

As founders of the revised Committee, Drs P. Fagan and D. Vallone were charged with forming a stable infrastructure for the committee, which including developing the goals, objectives, and strategic plan; securing resources; organizing symposia; continuing the diversity scholarship; diversifying the membership; increasing the submission of manuscripts to *Nicotine & Tobacco Research*; participating on the program planning committee; and facilitating communications and collaborations across other committees. Drs P. Fagan and Dennis Trinidad served as first co-chairs of the newly approved committee from 2006–2008 and led participatory efforts among SRNT members to develop the strategic plan, established an Advisory Committee, and provided leadership to the Committee that was detailed in the formal proposal submitted to SRNT in 2006.

The goals, which were developed through a participatory strategic process, were to: (1) advance tobacco-related health disparities research; (2) engage researchers of diverse backgrounds, expertise, and levels of experience in collaborative disparities-related research efforts and promote networking among SRNT members working in the field of tobacco-related health disparities; (3) provide guidance to the SRNT Board and committees as necessary to inform issues related to tobacco-related health disparities; and (4) educate the research community on the importance of identifying and addressing tobacco-related health disparities. In 2011 the Committee was changed to a Network as part of overall strategic planning efforts of the SRNT. Since the inception of the revised and revived Network, Drs K. S. Okuyemi, Jack Burkhalter, Lisa Sanderson Cox, Steven Fu, Patricia Nez Henderson, and Joanne D’Silva, have also served as co-chairs of the Network. These pioneers along with numerous TRHD Advisory Committee members, SRNT past presidents, past funders such as the National Cancer Institute, American Legacy Foundation, California’s Tobacco-Related Disease Research Program, and ClearWay Minnesota helped to sustain an integrated network within SRNT.

The TRHD Network served as model for revised structure of all networks in SRNT. Each SRNT network now has an Advisory Committee and structure of rotating leadership. All networks have annual meetings at the SRNT conferences, have visibility on the SRNT website, and receive phenomenal support from Executive Director Bruce Wheeler. The TRHD network has also engaged a wealth of young researchers in the field from diverse disciplines. In addition, the TRHD network took advantage of many opportunities, all of which cannot be captured here. Important benchmarks included stabilizing the diversity scholarship and hosting a networking breakfast/lunch to recognize the scholars and introduce them to senior members of SRNT. These efforts and the annual network meetings have increased the diversity of membership to SRNT. The TRHD Network hosted the first pre-conference workshop on the “Cultural Tailoring of Smoking Cessation Interventions for Minority Racial/Ethnic and Lesbian/Gay/Bisexual/Transgender Populations” in 2010 as follow-up to the 2008 Public Health Service Guidelines, *Treating Tobacco Use and Dependence: Clinical Practice Guidelines*<sup>2</sup> that recommended that there be further research on the effectiveness of culturally adapted versus generic interventions. SRNT has had taken a lead role in increasing the visibility, value for, and significance of tobacco and health disparities research worldwide.

It has now been 9 years since the inception of the revised TRHD Network and we celebrate our successes with the publication of this themed issue, *Interventions to Reduce Tobacco Related Health Disparities*, led by guest editors and two past chairs of the TRHD Network, Drs K. S. Okuyemi and P. Fagan as well as a longstanding member of the network, Dr L. R. Reitzel. This special issue takes us back to the conclusions in the 1998 Report of the Surgeon General<sup>1</sup> that stated that prevention and cessation programs are underdeveloped for minority racial/ethnic groups, and highlights interventions among groups at increased risk for tobacco-related health disparities as identified in the 2014 “Anniversary” Report of the Surgeon General, including low SES smokers and individuals with mental illness who smoke.<sup>3</sup> This special issue responds to these priority populations by highlighting the current state of the science in advancing interventions to reduce tobacco-related disparities in minority racial/ethnic, low SES, sexual minorities, the mentally ill, and the intersection of these groups. This special issue includes 20 papers with topics spanning reviews of strategies to reduce or eliminate tobacco-related health disparities to empirical interventions addressing cessation and other smoking-related outcomes among at-risk populations from communities in the United States and abroad, as summarized below.

Garrett and colleagues<sup>4</sup> set the stage for the special issue by providing an overview of how tobacco control policies and programs that are effective at a population level may inadvertently contribute to tobacco-related health disparities among some groups if the key social determinants of health are not considered in implementation. Specific recommendations are offered for achieving equity in impact and outcomes across diverse groups. Next, Gibson and colleagues<sup>5</sup> provide an example of such considerations in their evaluation of the effectiveness of graphic warning labels on cigarette packs relative to text-only warnings among the general population, blacks, Hispanics, and individuals of low education. Results supported the relative impact of graphic warning labels on factors associated with quitting intentions and behaviors among all groups, suggesting that graphic warning labels would not unintentionally exacerbate tobacco-related health disparities. Tong and colleagues<sup>6</sup> highlights the role of community partnerships in achieving the goal of eliminating tobacco-related disparities. Specifically, they describe the role of

the National Cancer Institute’s Community Networks Program in understanding and reducing tobacco disparities through a community-based participatory research, education, and training paradigm. Together, these three initial papers feature complementary pathways to guide future work—particularly policy and community-based participatory work—focused on the reduction, and ultimately the elimination, of tobacco-related health disparities.

The next several papers focus on interventions and their barriers among individuals with mental illness or comorbid substance use issues, among whom smoking prevalence is disproportionately high.<sup>7,8</sup> Quitlines are of interest as an intervention strategy among at-risk populations given their affordability to the consumer and their potential reach; however, their effectiveness among vulnerable population subgroups is under-investigated. Lukowski and colleagues<sup>9</sup> examined quitline outcomes by mental health status in six states, and reported that individuals with mental health conditions were as likely to complete a follow-up interview as those without mental illness. However, individuals who believed their mental health conditions would interfere with cessation were less likely to quit than their counterparts who did not share these beliefs. Griffin and colleagues<sup>10</sup> examined potential barriers to quitline use among methadone maintained, opioid dependent smokers. Their results highlight factors associated with a lack of quitline use to include inconsistent cell phone service and phone charging issues. Together, these studies highlight the promise of quitlines to affect disparities among individuals with mental health and substance abuse comorbidities, but emphasized the need to tailor treatment to address barriers in future quitline-based intervention studies.

The next few studies examine how mental illness and substance use comorbidities affect other cessation intervention modalities. First, Zawertailo and colleagues<sup>11</sup> examine how current depressive symptoms affect smoking status among smokers receiving cessation interventions within addictive treatment settings in Ontario, Canada, with null results suggesting that depressive symptoms do not represent a barrier to cessation success in these settings. Baker and colleagues<sup>12</sup> describe results of a healthy lifestyles intervention focused on reduction in cardiovascular risk factors for smokers with psychotic disorders, which yielded promising effects for smoking outcomes regardless of delivery mode (in person vs. by telephone). Miller and colleagues<sup>13</sup> reflected on the effectiveness of pharmacotherapies among opioid-dependent smokers, and provide suggestions for future directions in this area. Authors found that the literature to date suggests that smoking pharmacotherapies may have limited effectiveness in opioid-dependent patients. However, it is possible that methodological details may have undermined prior investigations of pharmacotherapy efficacy. Greater attention to several important parameters—particularly the timing of the quit attempt, medication adherence and the possibility of an atypical nicotine withdrawal profile—may strengthen future scientific and clinical efforts to use pharmacotherapies with opioid-dependent smokers. Finally, recognizing that pharmacotherapy for smoking cessation tends to be underutilized among individuals with mental illness, Brunette and colleagues<sup>14</sup> evaluated their program to expand cessation pharmacotherapy intervention reach via videoconference efforts directed at prescribers. Results suggest that single session educational outreach with audit and feedback can increase cessation pharmacotherapy utilization, and that videoconference delivery could be an effective, scalable approach to improve workforce capacity in systems serving smokers with mental illness.

The next several papers focus on other underserved population groups at risk of tobacco-related health disparities, including individuals with HIV/AIDS, sexual minorities, homeless, and individuals of low SES. First, Shelley and colleagues<sup>15</sup> examined the correlates of adherence to varenicline among people living with HIV/AIDS. Unadjusted analyses showed that information and motivation were associated with increased adherence self-efficacy, and adherence self-efficacy was associated with increased adherence. However, these associations with adherence were no longer significant after controlling for race/ethnicity and education, suggesting that more research is needed to investigate modifiable psychosocial factors that might mediate medication adherence. Stanton and colleagues<sup>16</sup> reported outcomes of a smoking cessation intervention tailored toward Latinos with HIV/AIDS. Authors found that baseline smoking frequency, older age, and higher intensity of patch use during the trial were significant predictors of smoking abstinence at 6 months. However, the study found no evidence that the tailored intervention improved cessation rates. Fallin and colleagues<sup>17</sup> reported on a social branding intervention, CRUSH, which was designed to decrease smoking among young adult bar patrons identifying as lesbian, gay, bisexual, and transgender. Results indicated that campaign exposure was associated with a lower likelihood of past 30-day smoking and suggested that targeted social branding interventions may hold promise for reducing lesbian, gay, bisexual, and transgender smoking-related disparities. Tucker and colleagues<sup>18</sup> indicated that homeless youth smokers report high rates of motivation to quit and interest in receiving assistance for quitting, highlighting the potential acceptability of cessation interventions among this elusive population. A study by Segan and colleagues<sup>19</sup> described results from a nurse-led intervention for smoking cessation among homeless adults in Australia. Although quit rates were low, the study found that integrating nurse support with readily accessible cessation interventions such as government subsidized pharmacotherapy plus quitline support was feasible, acceptable, and associated with significant financial savings and psychological benefits. Christiansen and colleagues<sup>20</sup> presented an intervention to increase motivation among low SES smokers using an evidence-based quitline cessation treatment, which involved goal- and belief-focused components. Results of this “pre-intervention” showed that quitline call rates for those motivated to quit were significantly higher than unmotivated smokers in the control conditions. Authors concluded that a brief, targeted motivational intervention focusing on cessation goals and beliefs increased engagement of low SES smokers with the quitline. Finally, Hickman and colleagues<sup>21</sup> used a stage-tailored, computer assisted intervention and examined the effects of brief individual counseling and nicotine replacement therapy on smokers with serious mental illness, drug/alcohol addiction, and unstable housing. Results from their randomized feasibility and replication trial did not show differences in smoking abstinence rates between the intervention and a control group receiving nicotine replacement therapy and print materials, but results supported that quit rates among individuals with mental illness and unstable housing were comparable to those in the general population. Overall, these studies reinforce our understanding that vulnerable and underserved groups at risk of tobacco-related health disparities are indeed accepting of tailored interventions, and that such interventions show promise for reducing disparities. Greater attention, from both investigators and funding agencies, is needed to launch a next generation of interventions among groups who experience disparities.

The final four papers in this themed issue focus on intervention issues of relevance to specific ethnic groups in the United States and as well as at-risk populations abroad. First, Robinson and colleagues<sup>22</sup> describe results from two US studies that suggest that black smokers report attending more to smoking cues than white smokers. Results provide support for a potential mechanism underlying tobacco-related health disparities among black smokers, who tend to reside in cue rich environments.<sup>23,24</sup> Tsoh and colleagues<sup>25</sup> report on a mixed methods feasibility study of a lay health worker-delivered, social-network-family-focused intervention for smoking cessation for Chinese and Vietnamese men in the United States. Results suggested that the approach was feasible and acceptable, and that the intervention led to a significant increase in the use of evidence-based cessation resources. Evaluation of the long-term efficacy of the intervention in a larger scale controlled study is warranted. Robertson and colleagues<sup>26</sup> reviewed literature published on indigenous Australian tobacco research from 2004 to 2013 and found dearth of intervention studies focused on these remote communities that suffer tobacco-related health disparities. Authors suggest that the lack of intervention research to guide policies calls for a more systematic use of research translation strategies targeted at indigenous groups. Finally, Ayo-Yusuf and colleagues<sup>27</sup> conducted a secondary data analysis to examine the impact of tobacco control policies on social disparities in smoking in South Africa from 2003 to 2011. Results suggested that annual increases in cigarette taxes were effective in reducing smoking prevalence among those with the least education. Thus, the special issue concludes by circling back to a focus on policy and its potential to affect tobacco-related health disparities in the United States as well as globally.

Taken together, the papers in this themed issue present exciting findings on advances in research on interventions addressing tobacco-related health disparities. In the recent past, the majority of the literature in this area was primarily descriptive or focused on risk factors of disparities, which have been referred to as first and second generation research on disparities, respectively.<sup>28</sup> The current collection of papers utilized a wide variety of methodologies and approaches including randomized controlled trial designs, qualitative methods, mixed methods, and community-based participatory research approaches. The methodological rigor used for the studies reported in these papers is evidence of the growth and maturity that has occurred in research addressing tobacco-related disparities over the last decade.

It is worth noting, however, that we are entering a new era with regard to interventions to reduce tobacco use. We have yet to know whether or not harm reduction or other evolving approaches reduce disparities. At the time when the evidence was synthesized for the 1998 Surgeon General’s Report and the 2008 Public Health Service *Guidelines on Treating Tobacco Use and Dependence*,<sup>2</sup> many products that could potentially influence intervention protocols were not on the radar of the tobacco control community or were not in the US market. Dual use of tobacco products was not an emerging problem, which has increased with the increasing use of flavored tobacco products like menthol cigarettes, electronic cigarettes (e-cigarettes), smokeless tobacco, hookah, and cigars, little cigars and cigarillos. For example, R. J. Reynolds stated in 2014 to its investors that it is expanding its portfolio in harm reduction and other products including electronic cigarettes, snus, moist snuff, cigarettes, and nicotine replacement therapy.<sup>29</sup> Vuse, a vapor/e-cigarette and Zonnic Gum, a smoking cessation product manufactured by R. J. Reynolds, entered the market in 2013 and 2014, respectively. None of the papers

included in this themed issue reported research on noncombustible tobacco products like e-cigarettes and hookah or smokeless tobacco/snus or cigars, little cigars, or cigarillos. A better understanding the impact of these products and their marketing on health disparities is needed.

As an example, e-cigarettes represent a dramatic new nicotine delivery technology and are an emerging health issue. Since their introduction in the United States in 2007, e-cigarettes sales have been doubling annually and are projected to surpass the \$2 billion mark in 2013.<sup>30</sup> In the United States, the most recent data from a representative national sample of adults reported that 4.2% of adults used e-cigarettes every day, some days or rarely.<sup>31</sup> Among high school students, 13.4% reported e-cigarette use in the past 30 days and rates are highest among whites and Hispanics as compared to blacks and non-Hispanic other races (15.3% vs. 15.3% vs. 5.6% vs. 9.4%, respectively). Thirty-day past use rates are low among middle school students with 3.9% reporting e-cigarette use, and 3.1% of whites, 3.8% of blacks, and 6.2% of Hispanics. Among high school students, 9.4% used hookah in the past 30 days and 9.4% of whites, 5.6% of blacks, 13% of Hispanics, and 6% of non-Hispanic others. Among middle school students, 2.5% used hookah in the past 30 days, 1.4% of whites and 5.6% of Hispanics. Due to small sample sizes, data are not reported for blacks and non-Hispanic other races.<sup>32</sup>

These data are not suggestive of disparities among minority racial/ethnic groups, but demonstrate growing usage trends about which little is known. In general, data are limited for all populations and more information is needed about the dual use of these products with non-menthol, menthol, and flavored cigar, little cigar, and cigarillos, which would increase quitting difficulty and nicotine dependence among disparate groups. Evidence-based cessation interventions do not exist for dual users and the implications for behavioral counseling, medications, community- and policy-based intervention are unknown. Perhaps more importantly, intervention research using e-cigarettes cannot be conducted currently because investigators have been unable to obtain the Investigational New Drug approval required from the Food and Drug Administration. As the regulatory environment becomes more favorable for e-cigarette intervention research, it is critical that researchers are intentional about including populations that are disproportionately impacted by tobacco-related morbidity and mortality.

While the papers in this issue represent a diverse spectrum in tobacco-related health disparities, there remains a dearth of research utilizing multidisciplinary approaches, especially those that integrate basic science, clinical, translational, public health, community-based participatory, and regulatory approaches within the same study to address disparities. The causes of tobacco-related health disparities are complex and multilevel; therefore interventions that draw from transdisciplinary and multilevel approaches will be key in for reducing health disparities. An example of such transdisciplinary approaches recently proposed by Leventhal<sup>33</sup> is the “Sociopharmacology” paradigm which is a “platform for studying how contextual factors amplify psychopharmacological determinants of smoking to disproportionately enhance vulnerability to smoking in populations impacted by tobacco-related health disparities.” Although Leventhal’s framework was specific to interface of social factors with psychopharmacology of smoking, the principles are applicable to other fields such as neurobiology, genetics, etc. in nicotine and tobacco research.

Finally, this special issue presents an opportunity for funding agencies to reconsider priority areas of research. There has been an increased focus on genomics research and the Precision Medicine Initiative, which is focused on building a one million person epidemiological cohort.<sup>34</sup> The implications for reducing disparities are not yet known, but the National Institutes for Minority Health and Health Disparities intends provide leadership in this area through transdisciplinary collaborative research centers.<sup>35</sup> For many years there has been a huge push for team science, yet it is not clear how the current funding streams have facilitated or hindered team science that might improve interventions to reduce disparities. The focus on translational research has waned, yet we know that interventions, if accessible and applicable to different groups, could be cost-effective and have enormous potential to reduce disparities. Thus, funding agencies like the National Institutes of Health, the Centers for Disease Control and Prevention, and the Food and Drug Administration would likely observe huge returns on investment if multilevel and integrated community, clinical and policy-based interventions were a top priority. Supporting approaches that foster collaborations across the full spectrum of tobacco control research and practice will be critical for eliminating tobacco-related health disparities, and we hope to see a resurgence of attention to this area in future funding priorities.

## Declaration of Interests

*None declared.*

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