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22

A Socioecological Approach to Addressing Tobacco-Related Health Disparities

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Contents

Figures and Tables

Figures

Tables

A Socioecological Approach to Addressing Tobacco-Related Health Disparities

Foreword

Use of tobacco products remains the leading preventable cause of death and disability for all population groups in the United States. The special effect of tobacco use on minority health and health disparities has received moderate attention over the past 30 years. National Cancer Institute (NCI)–funded programs have led many of these research efforts, and the Master Settlement Agreement energized subsequent public health mobilization efforts. This monograph is a comprehensive report covering cutting edge and state-of-the-art summaries of research on tobacco-related health disparities from the perspectives of epidemiology, individual behavior, biology, cultural context, and societal structures. This multilevel approach reflects the appropriate methodology to address the science of minority health and health disparities research and creates a foundation for future topics that the National Institute of Minority Health and Health Disparities will focus on. In consideration of advancing the field and adding emphasis to specific issues, I will comment on five areas.

The success of tobacco control in the United States over the past 50 years is unprecedented. Smoking rates have been decreased by more than 50% among men, and cardiovascular mortality has decreased across all populations by an even greater proportion. Reductions in secondhand smoke exposure have been found even when using the most sensitive measures of detectable cotinine in children under 5 years, although further reductions in exposure are needed, especially among African Americans and people living in poverty.[1] Despite this remarkable progress, tobacco smoking has been causally linked to about 4 out of 5 lung cancer deaths in the United States.[2] Fifty years after the landmark Surgeon General's report *Smoking and Health* of 1964, the 2014 Surgeon General's report stated that in the United States 83.7% of lung cancer deaths among men and 80.7% of those among women were attributed to tobacco smoking.[3] There is potential to further decrease the tobacco epidemic through implementation of evidence-based interventions to prevent uptake and promote cessation. A complementary proposal to require a gradual decrease in nicotine content of manufactured cigarettes over a decade would likely lead to even less tobacco dependence and lower overall use.[4] Indeed, on July 28, 2017, Food and Drug Administration Commissioner Dr. Scott Gottlieb announced that the agency will take a comprehensive approach to regulating nicotine, including an exploration of reducing nicotine in combustible cigarettes to render them minimally or non-addictive.[5]

The approach to smoking cessation for most of the past 30 years has been designed around the nicotine addiction paradigm. However, as has been well documented, nearly half of racial/ethnic minority smokers are either non-daily smokers or very light smokers (NDVL) who consume fewer than 5 cigarettes per day.[6] The addiction paradigm does not apply to this increasingly prevalent pattern of smoking because these smokers are not dependent on nicotine and do not have classic withdrawal symptoms when they try to quit. The research community has failed to focus on the challenge of how to assist non-daily and very light smokers in quitting, and by doing so, has ignored the most prevalent smoking behavior pattern of minority populations. In fact, eligibility criteria for most smoking cessation trials have included smoking 10 or more cigarettes per day, thus systematically avoiding empirical evidence on what intervention components may work in NDVL smokers. One possible approach would incorporate the availability of underused evidence-based cessation interventions such as quitline advice with clinician referrals and the electronic medical record. Clinician educational interventions have had limited but tangible benefits in promoting cessation using strategies based on the stages of change model and prescribing medication adjuncts.[7] Referral to a quitline through an electronic consultation platform

is now feasible and would continue to allow clinicians to motivate, advise, and assist with medication. Given that most smokers visit a clinician at least yearly, this approach would potentially expand cessation efforts to reach underserved and minority populations.

The immigrant paradox continues to present a perplexing observation that most scientists try to explain by endorsing the concept that as immigrants acculturate, behaviors will change and disease rates will go up. Among Asian and Latino immigrants to the United States, increasing acculturation among women is strongly associated with greater use of tobacco, although the patterns are either absent or reversed among men. Despite this, and the fact that over half of Latinos were born in the United States, overall smoking rates among Latina and Asian women are below 10%.[8] Although overall smoking rates are lower for both Latinos and Asians, much higher smoking rates have been found in some demographic subgroups, such as Cuban and Puerto Rican men and women and Vietnamese men. In considering the influence of acculturation on behavior, scientists need to take socioeconomic status into account in an integral way. Acculturation is not a linear process; it often results in a bicultural individual and is strongly influenced by the social class background of the immigrant family and the change in status and social mobility they experience in the United States.[9] This complex interaction has not been well studied and will require greater attention when evaluating tobacco-related health disparities.

Much discussion in the past has focused on the relative importance of race/ethnicity and social class in influencing health outcomes. Tobacco use behavior is an excellent example of how these factors interact, how they explain mutually independent variance and assist scientists and public health leaders in determining approaches. In tobacco-related health disparities, some demographic groups stand out as needing special emphasis in the future. First, people with co-incident chronic and severe mental disorders (SMD) smoke at exceedingly high rates,[10] and only recently have programs been developed to provide greater cessation assistance. Similarly, individuals with other substance use problems have excess smoking rates, and like those with SMD, suffer from societal marginalization and stigmatization that affect their quantity and quality of life. Second, the social class gradient in smoking behavior is quite striking as measured by smoking rates that approach 40% among persons with 9 to 11 years of education or even among those with general education diplomas (GEDs), compared to less than 5% among college graduates.[8] This disparity cuts across racial/ethnic groups but is most accentuated among poor whites. Finally, sexual and gender minorities (SGM) have higher smoking rates,[11] suffer from structural discrimination, and have not been well studied for long-term health outcomes; only recently have public health researchers begun to abandon the “Don’t ask, don’t know” mantra.

My last comment is to reflect on the importance of multilevel approaches that incorporate biological pathways. There is unequivocal evidence of the causal effect of tobacco smoking on lung cancer, even if not fully quantified in all population groups. The incidence of lung cancer does not completely mirror smoking behavior even after accounting for at least a 10-year lag time. An observation made in the Multi-Ethnic Cohort Study highlights the unknown factors in this causal pathway.[12] In that observational study of African Americans, Native Hawaiians, whites, Latinos, and Japanese participants, the relative risk of the 1,749 cases of lung cancer identified was calculated by level of cigarette smoking intensity. For a similar level of smoking, Latino, white, and Japanese participants had a 30% to 75% lower risk of lung cancer compared with African Americans and Native Hawaiians. It was not until a smoking intensity of 30 cigarettes per day was reached that the differences in relative risk became non-significant.[12] Multiple possible explanations may be considered, including greater use of mentholated brands by African Americans, nicotine metabolism differences influencing smoking behavior, genetic markers linked to ancestry that have not been discovered, gene–environment interactions that have not

been studied, and smoking topography. Although this is one smoking-related example, the underlying principle is that studying different racial/ethnic groups provides opportunities for scientific discovery that otherwise would not be available.

Minority health and health disparities research has been predominantly framed in a context of social disadvantage and social determinants of health. Without discounting these factors, this NCI monograph is an outstanding example of where the field needs to move to advance the science—that is, toward multilevel discovery that incorporates advances in behavioral, social, clinical, population, and biological sciences in addressing the determinants of health outcomes in minorities and other disparity populations. This tobacco-related health disparities monograph is an excellent illustration of this pathway.

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1. Centers for Disease Control and Prevention. Vital signs: nonsmokers' exposure to secondhand smoke – United States, 1999-2008. MMWR Morb Mortal Wkly Rep. 2010;59(35):1141-6. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5935a4.htm.
2. Siegel RL, Jacobs EJ, Newton CC, Feskanich D, Freedman ND, Prentice RL, Jemal A. Deaths due to cigarette smoking for 12 smoking-related cancers in the United States. JAMA Int Med. 2015;175(9):1574-6.
3. U.S. Department of Health and Human Services. Smoking-attributable morbidity, mortality, and economic costs (chapter 12). In: The health consequences of smoking—50 years of progress: a report of the Surgeon General. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014. Available from: http://www.surgeongeneral.gov/library/reports/50-years-of-progress.
4. Benowitz NL, Henningfield JE. Reducing the nicotine content to make cigarettes less addictive. Tob Control. 2013;22(Suppl 1):i14-7. doi: 10.1136/tobaccocontrol-2012-050860.
5. U.S. Food and Drug Administration. FDA's new plan for tobacco and nicotine regulation. Available from: https://www.fda.gov/TobaccoProducts/NewsEvents/ucm568425.htm.
6. Trinidad DR, Pérez-Stable EJ, Emery SL, White MM, Grana RA, Messer KS. Intermittent and light daily smoking across racial/ethnic groups in the United States. Nicotine Tob Res. 2009;11(2):203-10.
7. Patel MS, Steinberg MB. In the clinic: smoking cessation. Ann Intern Med. 2016;164(5):ITC33-48.
8. Jamal A, King BA, Neff LJ, Whitmill J, Babb SD, Graffunder CM. Current cigarette smoking among adults – United States, 2005-2015. MMWR Morb Mortal Wkly Rep 2016;65:1205-11. doi: 10.15585/mmwr.mm6544a2.
9. Portes A, Zhou, M. The new second generation: segmented assimilation and its variants. Ann Am Acad Pol Soc Sci. 1993;530(1):74-96.
10. Centers for Disease Control and Prevention. Vital signs: current cigarette smoking among adults aged ≥18 years with mental illness – United States, 2009-2011. MMWR Morb Mortal Wkly Rep. 2013;62(05):81-7. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6205a2.htm.
11. Lee JG, Griffin GK, Melvin CL. Tobacco use among sexual minorities in the USA, 1987 to May 2007: a systematic review. Tob Control. 2009;18(4):275-82. doi: 10.1136/tc.2008.028241.
12. Haiman CA, Stram DO, Wilkens LR, Pike MC, Kolonel LN, Henderson BE, et al. Ethnic and racial differences in the smoking-related risks of lung cancer. N Engl J Med. 2006;354(4):333-42.

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Abbreviations

Abbreviation/Acronym	Definition
Add Health	National Longitudinal Study of Adolescent to Adult Health
ASSIST	American Stop-Smoking Intervention Study
BRFSS	Behavioral Risk Factors Surveillance System
CARDIA Study	Coronary Artery Risk Development in Young Adults
CDC	Centers for Disease Control and Prevention
COPD	Chronic obstructive pulmonary disease
CPD	Number of cigarettes smoked per day
FDA	Food and Drug Administration
GED	General educational development diploma
HINTS	Health Information National Trends Survey
MSA	Master Settlement Agreement
MTF	Monitoring the Future study
NATS	National Adult Tobacco Survey
NCI	National Cancer Institute
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NIH	National Institutes of Health
NSDUH	National Survey on Drug Use and Health
NYTS	National Youth Tobacco Survey
PATH	Population Assessment of Tobacco and Health
POS	Point of sale
PRAMS	Pregnancy Risk Assessment Monitoring System
SAMHSA	Substance Abuse and Mental Health Services Administration
SEER	Surveillance, Epidemiology, and End Results program
SEM	Socioecological model
SES	Socioeconomic status
SHS	Secondhand smoke
TRHD	Tobacco-related health disparities
TUS-CPS	Tobacco Use Supplement to the Current Population Survey
YRBS	Youth Risk Behavior Survey