



Patterns of menthol cigarette use among current smokers, overall and within demographic strata, based on data from four U.S. government surveys



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ABSTRACT

The National Health and Nutrition Examination Survey, National Survey on Drug Use and Health, National Health Interview Survey and Tobacco Use Supplement to the Current Population Survey provide estimates of the proportions of U.S. smokers who currently use menthol cigarettes, overall and within demographic strata. Among adult past-month, regular and daily smokers, menthol cigarette use ranges from 26% to 30%, with statistically higher proportions of female versus male smokers (8–11 percentage points higher) currently using menthol cigarettes. Compared to adult smokers overall, statistically higher proportions of non-Hispanic Black smokers (72–79%) and statistically lower proportions of non-Hispanic White smokers (19–22%) currently use menthol cigarettes, with no differences among smokers of other race/ethnicity groups (18–20% to 28–30%, depending on the survey). Higher proportions of younger adult past-month, regular and daily smokers (aged 18–25 years) currently use menthol cigarettes compared to older adult smokers (aged 26–29 years and/or ≥ 30 years); however, differences are small in magnitude, with the vast majority of adult smokers (70–75%) who currently use menthol cigarettes being aged ≥ 30 years. Comparisons between youth and adult smokers are provided, although data for youth smokers are less available and provide less consistent patterns of menthol cigarette use.

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1. Introduction

Previous studies have examined patterns of menthol cigarette use among nationally representative samples of U.S. adults (Alexander et al., 2010; Caraballo and Asman, 2011; Cubbin et al., 2010; Delnevo et al., 2011; Fagan et al., 2010; Fernander et al., 2010; Lawrence et al., 2010; Mendiondo et al., 2010; Rock et al., 2010; Stahre et al., 2010; Trinidad et al., 2010). These studies provide consistent data to indicate that a majority of African-American

smokers use menthol cigarettes; and, menthol cigarette use is generally higher among female compared to male smokers. In contrast, studies that provide nationally representative estimates of menthol cigarette use among youth and/or younger adult compared to older adult smokers provide less consistent data on age-related patterns (Appleyard et al., 2001; Delnevo et al., 2011; Fernander et al., 2010; Hersey et al., 2010, 2006; Lawrence et al., 2010; Mendiondo et al., 2010; Rock et al., 2010; Thorne et al., unpublished; Wackowski and Delnevo, 2007).

When evaluating the available studies on menthol cigarette use among younger compared to older smokers, it is important to consider potential threats to internal validity, as well as the generalizability of findings to the U.S. population overall. For example, the National Youth Tobacco Survey (NYTS) differs from other government surveys with regard to both target population (*i.e.*, restricted to youth enrolled in public and private schools, grades 6–12) and data collection methodology (*i.e.*, group versus private setting). The potential for group versus private survey setting to affect data

Abbreviations: NHANES, National Health and Nutrition Examination Survey; NHIS, National Health Interview Survey; NSDUH, National Survey on Drug Use and Health; NYTS, National Youth Tobacco Survey; TUS-CPS, Tobacco Use Supplement to the Current Population Survey; YRBSS, Youth Risk Behavior Surveillance System.

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quality is underscored by a comparison of youth responses to identically worded items from the school-based Youth Risk Behavior Surveillance System (YRBSS) and household-based National Health Interview Survey (NHIS). Kann et al. (2002) reported that 39 of the 42 identically worded items produced higher risk estimates for YRBSS compared to NHIS; for 24 of the items, comparisons yielded statistically significant differences, including higher estimates for ever having tried cigarette smoking, having smoked a whole cigarette prior to the age of 13 years, ever having smoked regularly, and having smoked regularly prior to the age of 13 years. The potential for data collection setting to influence responses related to risky behaviors has been discussed elsewhere (e.g., Delnevo and Bauer, 2009).

In addition to presenting original analyses of menthol cigarette use among current smokers, overall and within demographic strata, based on data from four U.S. government surveys, this paper provides a review of the available studies on patterns of menthol cigarette use among youth, younger adult and/or older adult smokers. Studies on patterns of menthol cigarette use were identified by searching the U.S. National Library of Medicine's PubMed database, using the terms "menthol" and "cigarette" (1990 to present). Articles were screened for data on socio-demographic patterns of menthol cigarette use among U.S. smokers, and papers that provided relevant data were further reviewed and evaluated for generalizability and methodological quality. A synthesis of the inferences that can be drawn from these studies is provided.

Among the 10 studies identified, four examine menthol cigarette use among youth smokers based on data from NYTS (Appleyard et al., 2001; Hersey et al., 2010, 2006; Wackowski and Delnevo, 2007). Findings from one of these studies would not be generalizable to all youth smokers, as analyses are specific to Asian Americans and a small number of Hawaiian/Pacific Islanders (Appleyard et al., 2001). The remaining three studies provide estimates of menthol cigarette use among youth smokers overall.

Analyses based on data from the 2000 and 2002 NYTS (Hersey et al., 2006) suggest that menthol cigarette use among past-month smokers, i.e., smoked part or all of a cigarette during the past month, is statistically higher among middle school compared to high school students who had been smoking for <1 year, but not among students who had been smoking >1 year; no confidence intervals are provided. Prevalence data provided in one of the results tables (Hersey et al., 2006; Table 3, which includes 95% confidence intervals) indicate no statistically significant differences in the proportions of menthol compared to non-menthol cigarette smokers who had smoked either <1 year or >1 year (Hersey et al., 2006). The authors excluded observations for >20% of survey participants due to inconsistent responses on cigarette brand and menthol status. The high proportion of unreliable data is likely due to the inclusion of less experienced smokers who had no usual brand or were uncertain about the cigarette type being smoked.

Subsequent analyses based on data from the 2006 NYTS attempted to minimize the potential for misclassification by excluding data for youth smokers who provided inconsistent information on brand and menthol status (Hersey et al., 2010). In contrast with previous findings from the less restricted sample (Hersey et al., 2006), no statistically significant differences are indicated for menthol cigarette use among middle school compared to high school past-month and/or lifetime (i.e., smoked ≥ 100 cigarettes) smokers, overall or when stratified by gender and race. In addition, menthol cigarette use is statistically higher among high school compared to middle school past-month and lifetime smokers who reported a usual cigarette brand (past-month smokers: 19.7% versus 6.3%; lifetime smokers: 10.9% versus 1.7%).

Analyses based on data from NYTS (Hersey et al., 2010, 2006) provide no consistent evidence on whether smokers in lower grade levels are statistically more likely to use menthol cigarettes

compared to smokers in higher grade levels. Similarly, analyses based on data from the 2004 NYTS (Wackowski and Delnevo, 2007) indicate no consistent pattern of menthol cigarette use among lower compared to higher grade level past-month smokers (grades 9–12).

Separate publications provide analyses based on data from the 2003 and 2006/07 Tobacco Use Supplement to the Current Population Survey (TUS-CPS) (Fernander et al., 2010; Lawrence et al., 2010). These analyses indicate that adult menthol smokers who had used cigarettes some days or every day during the past month are predominantly aged 25–44 years (40.6%); however, the proportion of menthol cigarette smokers who are younger adults (aged 18–24 years) is statistically higher than the proportion of younger adult non-menthol smokers (17.3% versus 14.1%). Findings from analyses that adjust for demographic variables, age of initiation and purchasing type indicate that smokers aged 18–24 years, 25–44 years and 45–64 years are statistically more likely to use menthol cigarettes compared to smokers aged ≥ 65 years (Fernander et al., 2010). Similar findings are provided based on analyses that adjust for demographic and smoking behavior variables (Lawrence et al., 2010), overall or when stratified by gender and race/ethnicity.

While these findings (Fernander et al., 2010; Lawrence et al., 2010) indicate that higher proportions of smokers aged 18–24 years use menthol cigarettes compared to smokers aged ≥ 65 years, this referent group comprises the smallest proportion of menthol smokers (i.e., 5.7% of menthol smokers are aged ≥ 65 years); thus, the data likewise indicate that menthol smokers are statistically more likely to be aged 25–44 years and/or 45–64 years compared to aged ≥ 65 years. While not provided, a similar comparison among non-menthol smokers would likely indicate similar, elevated distributions of non-menthol cigarette use among younger age groups compared to smokers aged ≥ 65 years.

A more recent analysis of the 2003 and 2006/07 TUS-CPS data (Delnevo et al., 2011) indicates that menthol versus non-menthol cigarette use among lifetime smokers who reported smoking some days or every day in the past month is not statistically different among smokers within the age category of 18–24 years (16.6% versus 13.7%). Findings from this study likewise indicate that menthol versus non-menthol cigarette use is statistically lower among smokers aged 25–44 years (40.3% versus 44.1%), and statistically higher among smokers aged 45–65 years (36.5% versus 33.9%).

Estimates based on data from the 2004–2008 National Survey on Drug Use and Health (NSDUH) suggest that younger past-month smokers are more likely to report menthol cigarette use compared to older smokers (Rock et al., 2010); greater inclusion of less experienced smokers may have increased the potential for misclassification. The data likewise indicate that 5.8% of all menthol cigarette smokers are youths (aged 12–17 years), 23.0% are young adults (aged 18–25 years) and 71.2% are older adults (aged ≥ 26 years); comparatively, the proportions of non-menthol smokers who are youths, young adults and older adults are 3.4%, 19.2% and 77.5%, respectively (Rock et al., 2010). Overall, the proportion of past-month smokers who use menthol cigarettes is suggested to be highest among those who are aged 12–17 years, and to decrease in the older age groups. In contrast to analyses based on NYTS data (Hersey et al., 2010, 2006), whereby attempts are made to correlate menthol status with brand, no attempt was made to validate reported cigarette type among NSDUH participants.

Findings from the two remaining U.S. government surveys that provide data on menthol cigarette use among adult smokers indicate no statistically significant differences based on age. Specifically, Mendiondo et al. (2010) provide estimates from adjusted analyses based on 2005 NHIS data to suggest that menthol versus non-menthol cigarette use is not associated with a younger mean

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