

# Changes in and Patterns of Exclusive E-cigarette and Dual Tobacco Use among U.S. Young Adults, 2014-2015 and 2018-2019

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## BACKGROUND

- Young adulthood (ages 18-24 years) is a critical period in which individuals may initiate and/or maintain patterns of electronic nicotine delivery system (ENDS) use.
- The number of ENDS products have continued to increase and patterns of ENDS use among this population have not been well-characterized in the literature.
- Understanding patterns of ENDS use, either alone or in combination with cigarettes, can inform regulatory work on tobacco use and protect young adults from tobacco-related health outcomes.
- In December 2019, the Family Smoking Prevention and Tobacco Control Act was amended to raise the minimum age for sale of tobacco products from 18 to 21 years (i.e., Tobacco 21).
- While the Tobacco 21 law went into effect after data collection of the 2018-2019 TUS-CPS, this study reflects the age sub-group (age 18-20 years) that would be affected by this law following its implementation in December 2019.

## OBJECTIVES

Goal: To better understand patterns of ENDS use among the U.S. young adult population.

- Examine prevalence of and patterns of ENDS use either exclusively or in combination with cigarettes among U.S. young adults ages 18-24 years in 2018-19.
- Assess changes in prevalence of and patterns of ENDS use from 2014-2015 to 2018-2019.
- Stratify tobacco use by age group (18-20 years, 21-24 years).

## METHODS

**Study Population:** 2014-2015 and 2018-2019 Tobacco Use Supplement to the Current Population Survey (TUS-CPS) respondents.

### Analytic Approach

- Estimated prevalence in ENDS use (current, exclusive, or dual) from 2014-2015 to 2018-2019 among young adults ages 18-20 and 21-24 years using sample weights.
- Summarized proportion of young adults who reported specific tobacco behaviors using data from 2018-2019.
- Estimated statistical difference using t-tests to determine significant differences between exclusive and dual users, as well as differences between estimates for 2014-2015 and 2018-2019.

### Tobacco Use Measures

- Current ENDS Use:** Ever used ENDS at least one time and used ENDS every day or some days at the time of interview.
- Exclusive ENDS Use:** Currently used ENDS only at the time of interview without using any other tobacco products (i.e., cigar, pipe, hookah, smokeless tobacco).
- Cigarette Use:** Current, former, and never. Current cigarette smokers were adults who reported smoking at least 100 cigarettes during their lifetime and reported smoking every day or some days at the time of interview. Former cigarette use was defined as using at least 100 cigarettes in their lifetime and not currently smoking some days or every day. Never smokers were defined as those who have not smoked at least 100 cigarettes during their lifetime.
- Dual Use (Cigarette and ENDS):** Currently used cigarettes and ENDS without concurrently using cigar, pipe, hookah, or smokeless tobacco.
- ENDS Use Characteristics:** e.g., ENDS flavors (tobacco flavor or no flavor, mint/menthol flavor, other characterizing flavors-such as clove, spice, candy, fruit, chocolate, alcohol, or other flavors, or more than one flavor type (any combination).
- Sociodemographic Characteristics:** e.g., age, sex, race/ethnicity.

## RESULTS

- The analyses included 28,658 young adults ages 18-24 years in 2014-2015 and 33,516 in 2018-2019.
- Among U.S. young adults ages 18-24 years in 2018-2019, 3.3% used ENDS exclusively and 0.8% used both ENDS and cigarettes. (Fig. 1)
- Among young adults who currently used ENDS in 2018-2019, 25.1% were current smokers, 21.4% were former smokers, and 53.5% were never smokers. (Fig. 2)
- In 2018-2019, dual users were more likely to be older than those who exclusively used ENDS. For example, 76.9% (95%CI: 65.3-85.5%) of dual users were aged 21-24 compared to 48.8% (95%CI: 42.8-54.8%) of exclusive ENDS users. (Fig. 3)
- Among all current young adult ENDS users in 2018-2019, 13.9% used mint/menthol flavors, 48.2% used characterizing flavors such as clove, spice, candy, fruit, chocolate, alcohol, mint, or menthol in 2018-2019, and 28.5% used more than one flavor type. (Fig. 4)

From 2014-2015 to 2018-2019:

- Current ENDS use statistically significantly increased in age groups 18-20 years (2.6 percentage points) and 21-24 years (1.2 percentage points). (Fig. 5)
- Exclusive ENDS use increased among former cigarette smokers by 17.5 percentage points (14.1% to 31.6%) for age group 18-20 years and 11.8 percentage points (9.9% to 21.7%) for age group 21-24 years. (Fig. 6)
- Flavored ENDS use statistically significantly increased by 10.7 percentage points (from 86.2% to 96.4%) for age group 18-20 years and 12.0 percentage points (from 81.3% to 96.5%) for age group 21-24 years. (Fig. 7)

FIGURE 1. Prevalence of exclusive and dual ENDS use among young adults, TUS-CPS 2018-2019

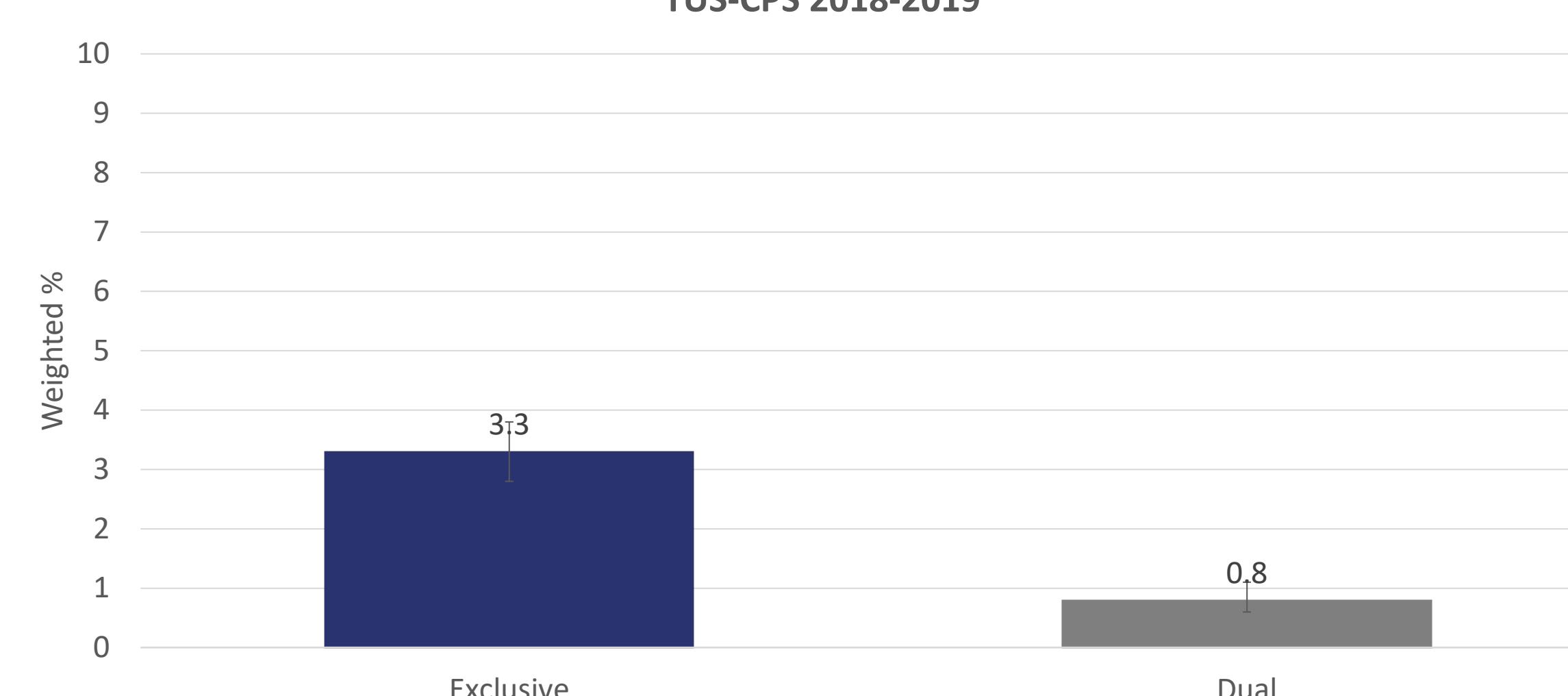


FIGURE 2. Smoking status among current ENDS young adult users, TUS-CPS 2018-2019

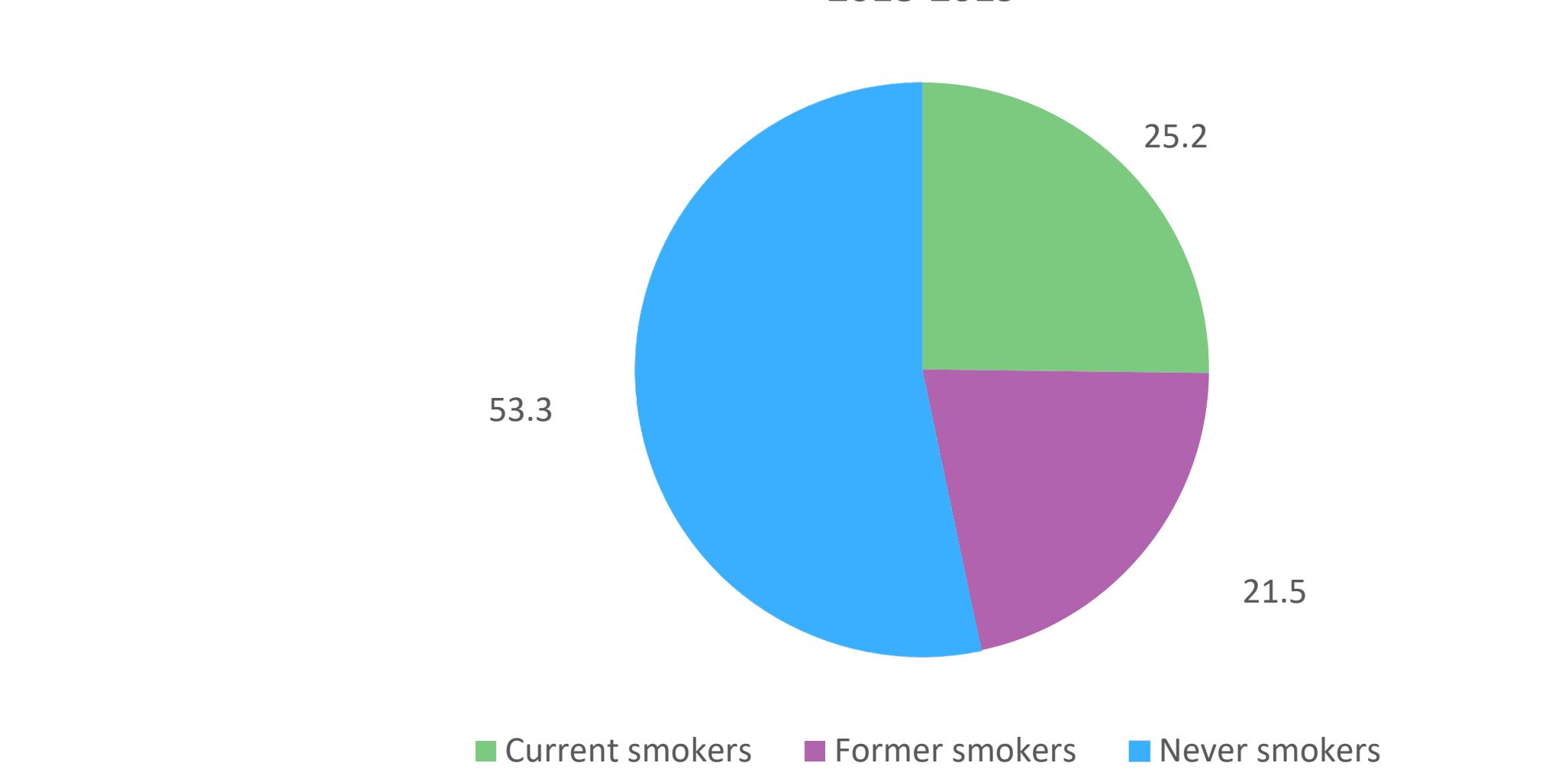


FIGURE 3. Age differences among exclusive and dual ENDS young adult users, TUS-CPS 2018-2019

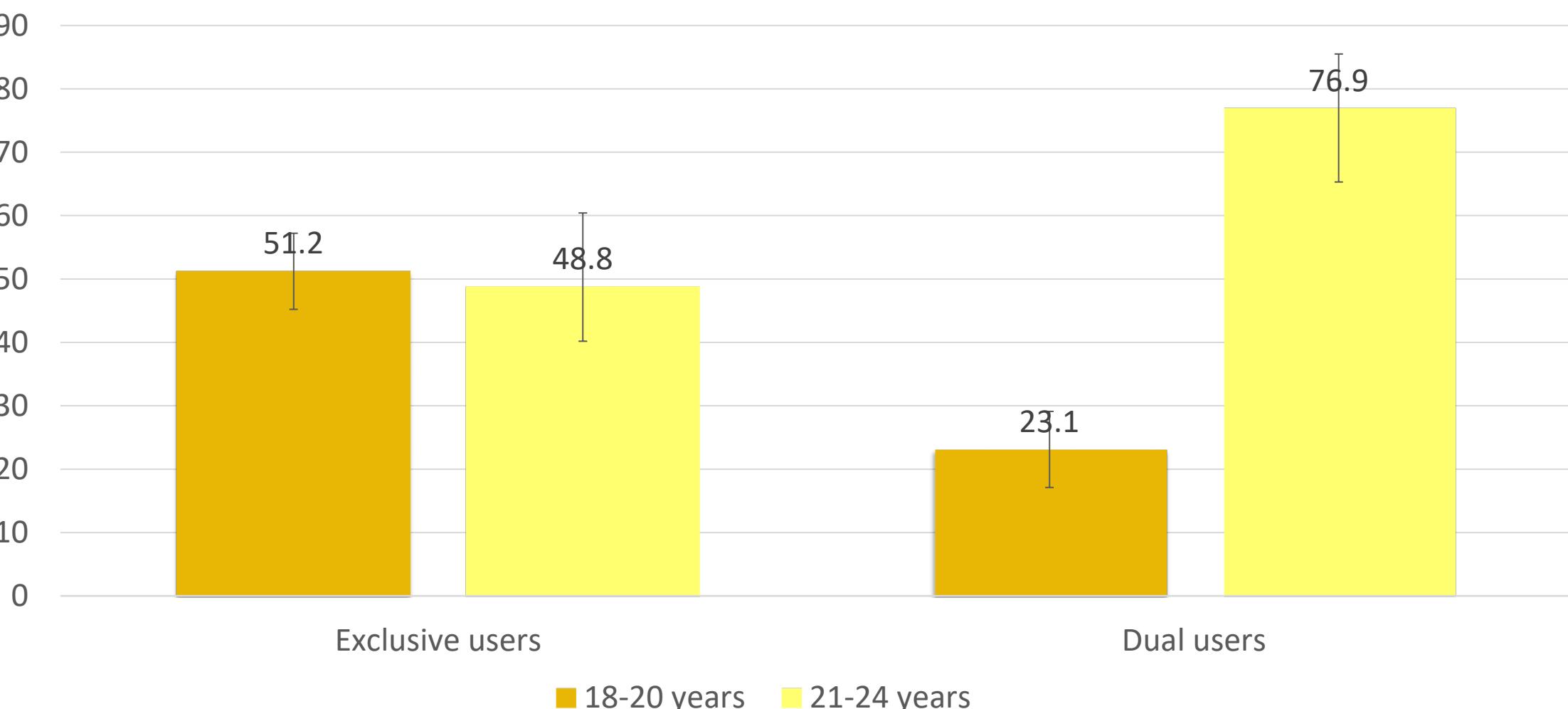


FIGURE 4. Use of flavors among current ENDS young adult users, TUS-CPS 2018-2019

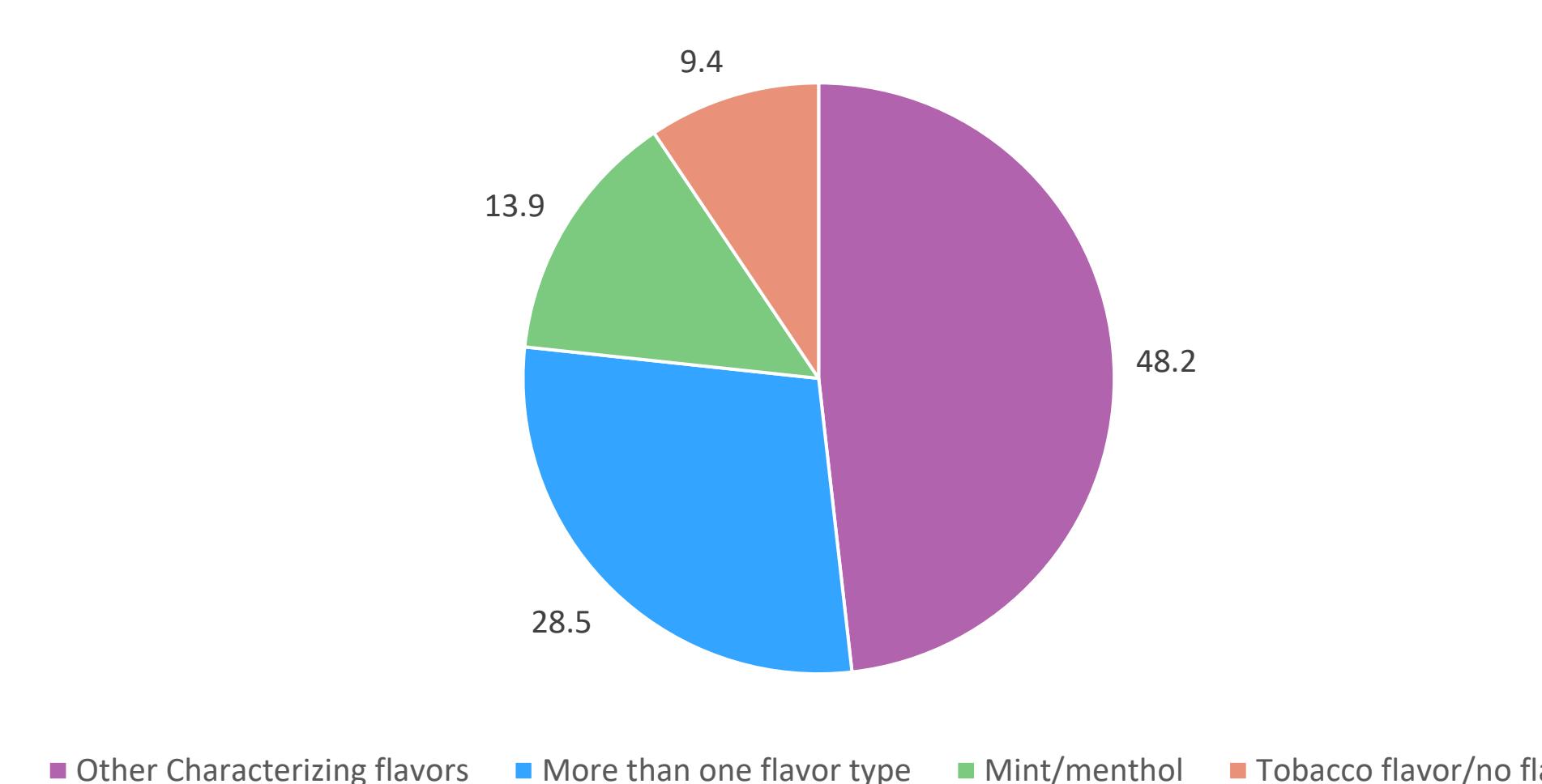


FIGURE 5. Prevalence of current ENDS users, TUS-CPS 2014-2015 and 2018-2019

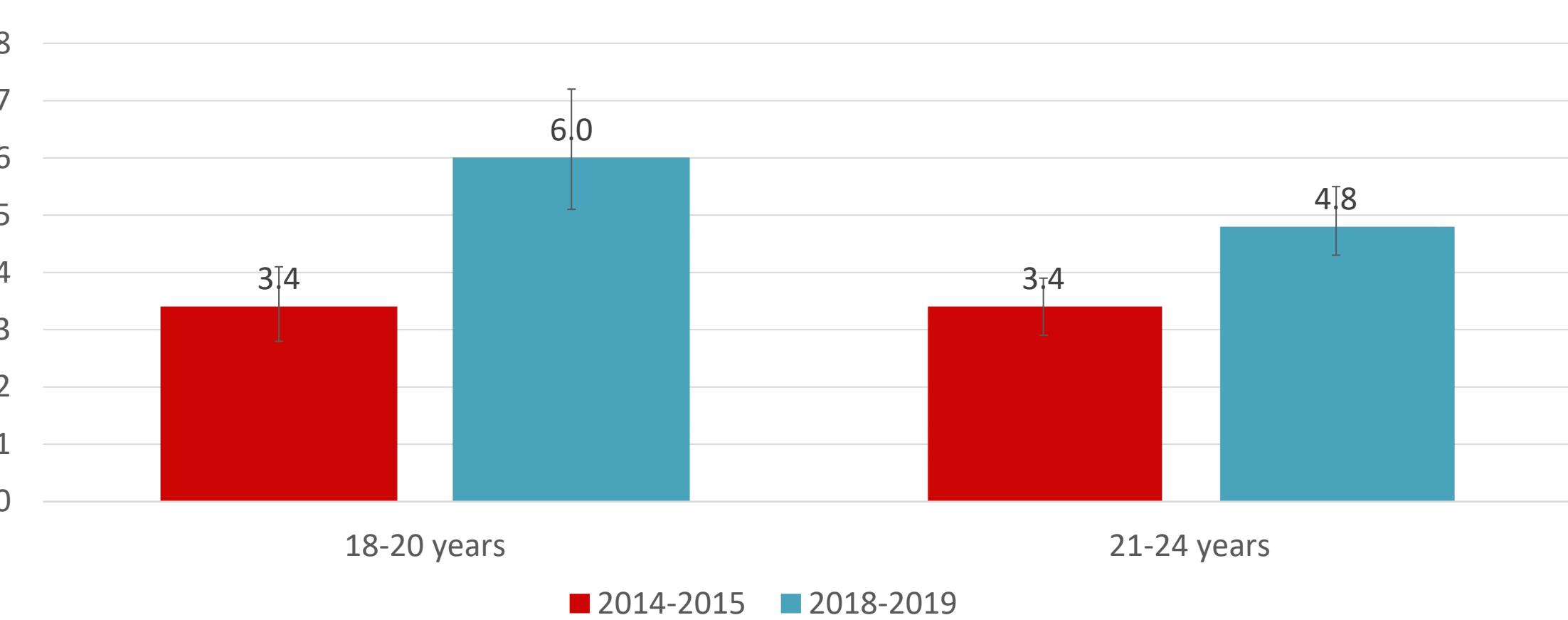


FIGURE 6. Changes in exclusive ENDS use among former cigarette smokers, TUS-CPS 2014-2015 and 2018-2019

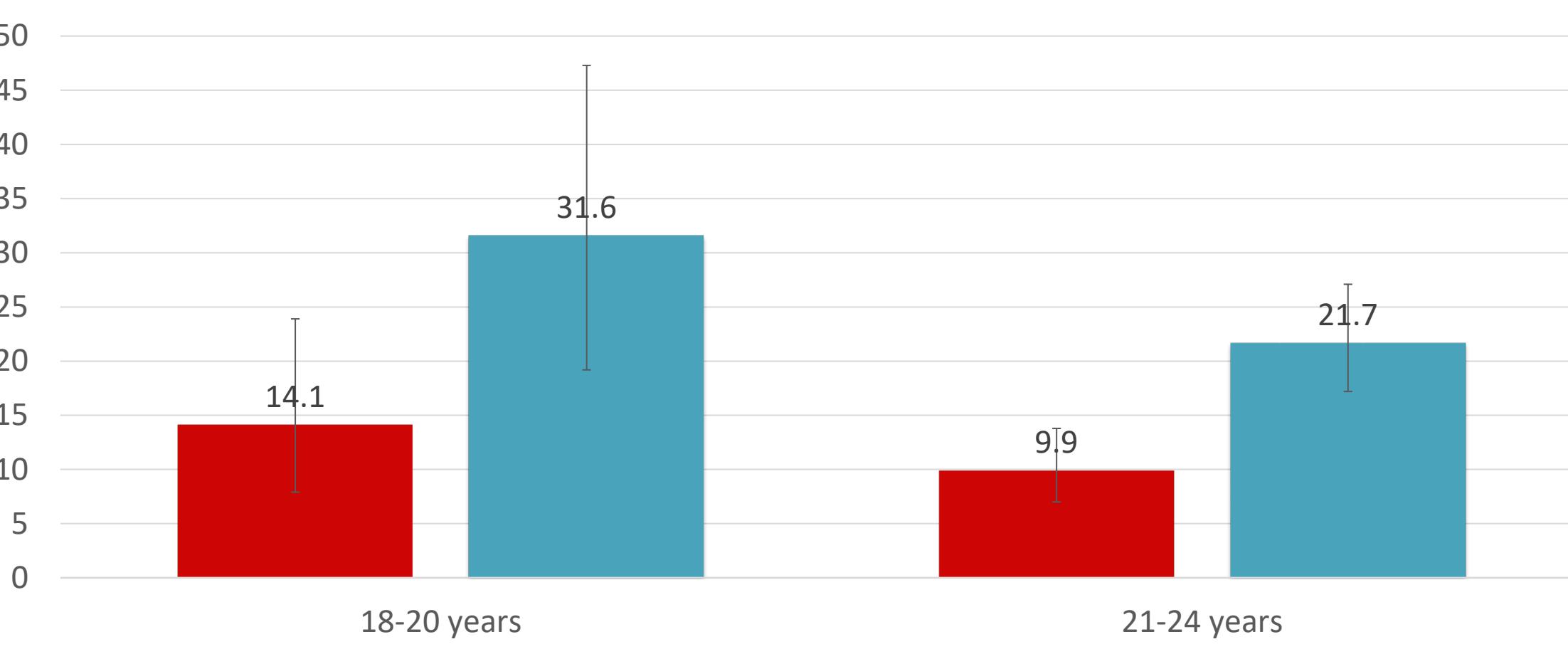
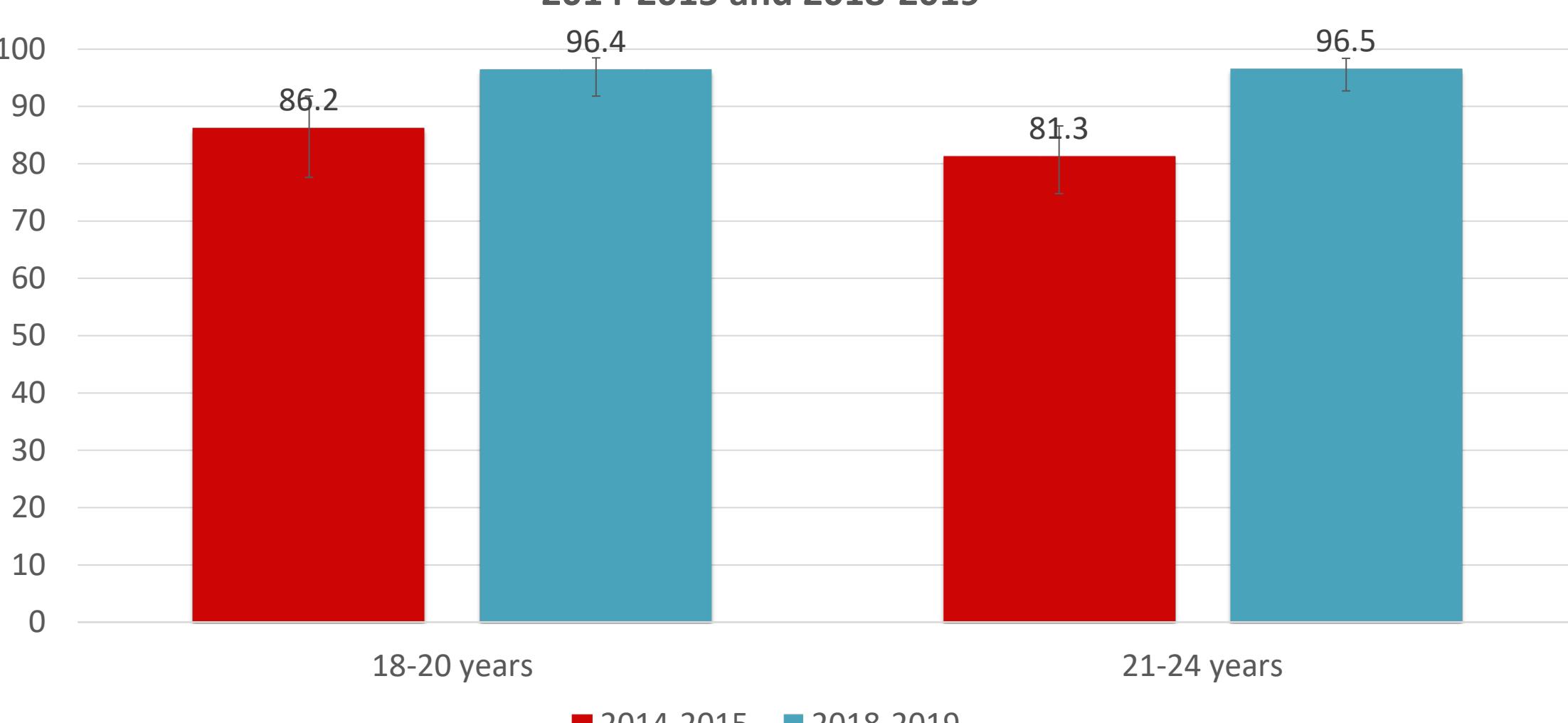


FIGURE 7. Changes in flavored ENDS use among current ENDS users, TUS-CPS 2014-2015 and 2018-2019



## DISCUSSION

- Among young adults (ages 18-24 years), the prevalence of exclusive ENDS use increased from 2014-2015 to 2018-2019, overall and among former smokers. However, dual use did not significantly increase.
- The majority of ENDS users (over 90%), including exclusive and dual users, reported use of one or more characterizing flavor, including clove, spice, candy, fruit, chocolate, alcohol, mint, or menthol in 2018-2019.
- This study found greater increases in changes in current and exclusive ENDS use among adults aged 18-20 years from 2014-2015 and 2018-2019, suggesting the potential significant impact of Tobacco 21 on this population.

## LIMITATIONS

- Longitudinal behaviors cannot be determined (i.e., cannot assess changes in behavior from one group of people over time). These cross-sectional results assess changes in estimates from 2014-2015 and 2018-2019 from a two different groups of people.
- Because responses in the survey were self-reported on sensitive topics like tobacco use via telephone and in-person interview, and questions were asked retrospectively, there may be social desirability bias and recall bias, leading to under-reporting of tobacco use.
- Small sample size of current ENDS use among the young adult population in the data limited our ability to detect significant differences and to examine polytobacco use.

## CONCLUSIONS & IMPLICATIONS

- More young adult ENDS users reported exclusively using ENDS than dual use with cigarettes in 2018-2019.
- The period of young adulthood is a time when adult tobacco use behaviors solidify. These young adults are a key target of intervention and prevention efforts to reduce the likelihood of lifelong tobacco use.
- Understanding young adult ENDS use patterns is important for informing tailored tobacco use prevention strategies and interventions.

## REFERENCES

- Owusu D, Huang J, Weaver SR, et al. Patterns and trends of dual use of e-cigarettes and cigarettes among U.S. adults, 2015-2018. *Prev Med Rep*. 2019;16:101009.
- McMillen RC, Gottlieb MA, Shaefer RM, Winickoff JP, Klein JD. Trends in electronic cigarette use among U.S. adults: use is increasing in both smokers and nonsmokers. *Nicotine Tob Res*. 2015;17(10):1195-1202.
- Dai H, Leventhal AM. Prevalence of e-cigarette use among adults in the United States, 2014-2018. *JAMA*. 2019;322(18):1824-1827.