

# A New Look at Consumers' and Clinicians' Options in Smoking Cessation: Smokeless Tobacco, Nicotine Replacement Therapy, Zyban<sup>®</sup>, Chantix<sup>®</sup> and other Interventions

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## Introduction

In recent years, a debate has emerged in the literature over the potential for smokeless tobacco to serve as an aide in smoking cessation or prevention. Some cross-sectional evidence supported the reform of smokeless tobacco regulation, although this has been contested. Unusually high smokeless tobacco incidence has emerged in Sweden, perhaps due to resurgence in the popularity of "snus", a spit-free smokeless tobacco product. Tobacco-related cancers are relatively infrequent in Sweden and snus is widely marketed as a cigarette alternative by Swedish firms such as Northerner Scandinavia, Inc. (Northerner.com). Even more recently, American tobacco companies such as Altria Group<sup>1</sup> and R.J. Reynolds<sup>2</sup> have begun to market domestic versions of snus and other new smokeless tobacco products. This study utilized individual level data to estimate the effects of smokeless tobacco use on smoking behavior and incorporated meta-analysis of the research conducted on established cessation aids.

## Objective

The goal of this study was to evaluate the potential of smokeless tobacco to serve as a viable choice for consumers, clinicians, and policymakers seeking to reduce the use of flammable tobacco, which has been documented as having significantly more harmful effects (although both have been reported to cause morbidity and mortality by the Surgeon General).

## Hypotheses

RH1: Onset of smokeless tobacco use increases the likelihood of smoking cessation over time among young American smokers.

RH2: Increasing the level of smokeless tobacco consumption increases the likelihood of smoking cessation over time among young Americans who already use both cigarettes and smokeless tobacco ("dual users").

RH3: Changes to the probability of successful smoking cessation associated with smokeless tobacco use is comparable in magnitude to established cessation tools such as Chantix<sup>®</sup>, nicotine replacement therapy (NRT) and Zyban<sup>®</sup>.

## Data & Methods

This study was quasi-experimental in design and made use of a large nationally representative sample from the National Longitudinal Survey of Adolescent Health (Waves I and II). Depending on the particular model in question, the usable sample size varied, but remained near 1,000. Bayesian missing data techniques were used when a reasonably small amount of missingness was found. In addition, outcomes were compared with clinical evaluations of existing cessation tools, such as Chantix<sup>®</sup>, Zyban<sup>®</sup>, NRT, and various combinations of these treatments.

In the design phase the propensity-score matching (PSM) technique -a conditional probability used to

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<sup>1</sup> Altria Group is the parent company of Philip Morris U.S.A., which additionally owns U.S. Smokeless Tobacco Company, John Middleton, Philip Morris Capital Corporation, Altria Client Services and others, as of April, 2011. Altria Group is perhaps best known for their *Marlboro* line of cigarettes, chewing tobaccos, snus, and other new to market smokeless tobacco confections.

<sup>2</sup> R.J. Reynolds is the maker of the *Camel* line of cigarettes, snus, and other new to market smokeless tobacco confections.

weight respondents – was applied to balance those in the sample who constituted the quasi-treatment with the quasi-control groups. This technique was famously used in the analysis of tobacco litigation to "promote honesty" by balancing the groups without reference to the outcome. The spider plot illustrates enormous improvement in balance following use of the PSM weights.

Subsequently, a probit model adapted from the literature was estimated with a cross-section of respondents. Finally, probit, logit, and mixed models with fixed effects were estimated using longitudinal data and regression diagnostics were performed to examine heteroskedasticity, autocorrelation, and potential misspecification.

## Results & Conclusions

These findings generally failed to support the notion that smokeless tobacco has potential to aid consumers in smoking cessation. This result was consistent across models, alternate measurements of smokeless tobacco use and smoking behavior. Although dual-users may experience unique benefits from increased smokeless tobacco, it was clear that pharmaceutical treatments are generally more effective.

A notable exception was in the case of those who dually smoke cigarettes and use smokeless tobacco. Among this sub-population increased smokeless tobacco use was a significant predictor of smoking cessation. It is not clear that smokeless tobacco warrants favorable treatment by policymakers and future research among dual users is warranted if we are to understand their behavior.

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### Endnotes

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