

# The Journey to the End of Smoking

## A Personal and Population Perspective

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**Background:** Smoking cessation is best represented as a journey and not a single event. This article chronicles the path of change for the population of smokers in Maryland.

**Purpose:** This study compared the population of ever-smokers in Maryland over three time points (2000, 2002, and 2006) examining how the population of ever-smokers shifted over time.

**Methods:** Analysis of process of change and social influence variables conducted using data from the Maryland Adult Tobacco Surveys (MATS) administered in 2000, 2002, and 2006.

**Results:** Analyses indicated an increasing percentage of ever-smokers (100 lifetime cigarettes) who have successfully quit and maintained cessation for more than 5 years. By 2006, the population of current adult smokers (aged  $\geq 18$  years) was smaller but seemed less interested in and able to quit. More 2006 smokers were in earlier stages of change for cessation and not interested in or planning to quit in the near term. Many had unsuccessfully tried to quit, with a substantial minority finding that cessation products found effective in research were not effective for them. Despite past failures, the vast majority expects to quit, has considered quitting, and believes that they will likely succeed eventually. Larger percentages of 2006 smokers are being advised to quit by medical professionals, are accessing empirically supported quit-smoking aids, and have multiple quit attempts. They also smoked every day for more years, smoked as many cigarettes per day, and had environments as filled with smoking as their 2000 and 2002 counterparts.

**Conclusions:** Increasing successful cessation would require not only appropriate use of effective products but also successful negotiation of important tasks in the cessation journey. Health literacy and a consumer perspective can help to bridge gaps in the dissemination and effective use of empirically supported treatments.

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### Introduction

Despite the substantial difficulties of quitting nicotine addiction and low rates of sustained success for individual cessation attempts, tobacco use in the U.S. has plummeted over the past 40 years. National estimates indicate that smoking declined significantly (17%) from 1965 (42%) to 1990 (25%). The decline has been modest since 1990 with prevalence rates at 23.3% in 2000<sup>1</sup> and 19.8% in 2007.<sup>2</sup>

In 2007, the population of U.S. adult current smokers was an estimated 19.8% (43.4 million), with 77.8% (33.8 million) smoking every day and 22.2% (9.6 million)

smoking only some days.<sup>2</sup> However, among the estimated 90.7 million adults who were ever smokers (i.e., had smoked at least 100 cigarettes in their lifetimes), over half (52.1%; 47.3 million) were no longer smoking.<sup>2,3</sup> Moreover, current adult smokers have not given up on quitting smoking, with 70% reporting that they want to quit and almost half (44%) reporting a quit attempt in the past year.<sup>4</sup> Unfortunately, the majority of those making a quit attempt failed to sustain it, with only 5% successful at 3 months for smokers quitting “cold turkey” (i.e., abruptly and without assistance).<sup>5</sup> Among smokers quitting on their own, only one third remained abstinent after 2 days, only one quarter at 7 days, and less than one in five remained abstinent (19%) at 1 month.<sup>6</sup> Overall, less than 5% of those who had quit smoking in the past year were successful in maintaining their abstinence from smoking for 3–12 months.<sup>1</sup> Successful cessation is greater if empirically supported products and services are used with success at 1 year reaching from 10% to 30%.<sup>5,7–9</sup>

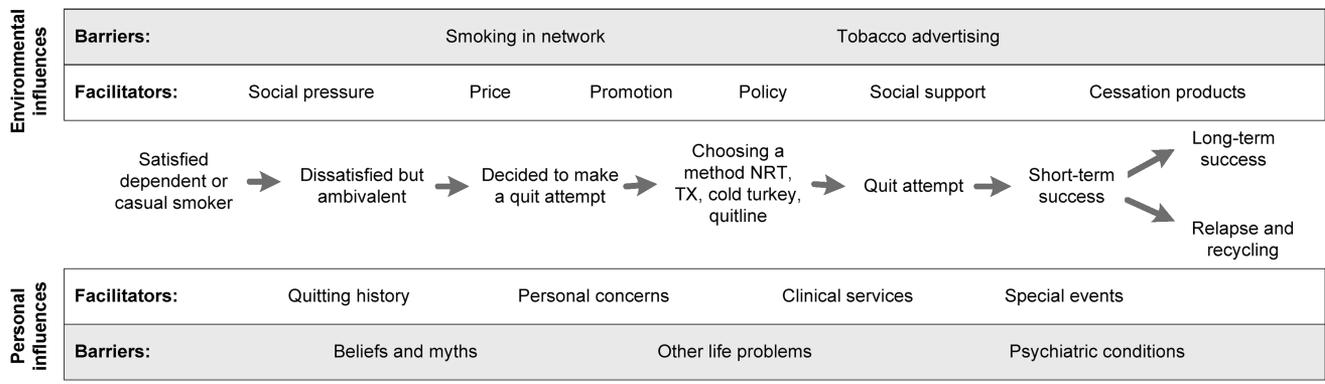
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**Figure 1.** The smoker's journey  
NRT, nicotine replacement therapy; Tx, treatment

How can there be so much overall, long-term success amidst such disappointing, short-term rates of cessation? The answer lies in taking a broad perspective on the overall process of addictive behavior change. Smoking initiation and smoking cessation represent a journey through a process of change influenced by multiple, interacting factors from genes and family to social influences, environment, and personal choices (Figure 1). One needs an extensive, longitudinal perspective to view success and understand the process.<sup>10</sup> Individual smokers spend substantial periods of time feeling either satisfied or stuck with their smoking before seriously considering and committing to change. Once dissatisfied, they have a number of tasks to accomplish including making a decision to quit, planning and committing to quit, making an attempt, and sustaining that attempt over time.

After making an unsuccessful attempt to quit, smokers often re-cycle through these tasks multiple times until they achieve success. Most successful quitters report having to make multiple attempts before they finally get the entire process done properly to make quitting a success.<sup>11</sup> Although the final, successful attempt to quit can seem to happen quickly and be easy for some smokers, usually they have had multiple experiences trying to quit and experienced multiple environmental forces that have influenced the quitting process.<sup>12,13</sup> In fact, the average number of attempts has been reported variously to be anywhere from 5 to more than 10.<sup>14,15</sup>

This descriptive study examines data from population surveys of adult smokers in Maryland to highlight elements of the process of stopping smoking from a population perspective. For both individuals and populations the distal outcome of sustained cessation is the product of multiple individual quit attempts and successful movement through the process of change, and includes the impact of policies, products, promotion, and services that support cessation. Prevalence of cessation or current

smoking at a single point in time, however, offers an incomplete picture of the process and the personal journey of each smoker. The quitting process was conceptualized as a journey through a series of stages that attempt to capture the various tasks of change described above<sup>11,16–18</sup> and in the Methods section. The overall perspective is a social learning one where social and personal influences interact and create the context for change.<sup>19</sup>

This study compared the population of ever-smokers in Maryland over three time points (2000, 2002, and 2006), examining how the population of ever-smokers shifted over time. Links among tobacco policy, prevention and cessation events, and changes in population readiness to quit and long-term success were explored, and changes in attitudes and experiences of smokers over this 6-year span examined. Successful long-term cessation represents a bottom-line measure of smoking behavior change but does not reflect the ongoing process and how that entire process can be affected by prevention and cessation efforts. The aim of this study is to examine the journey of the population of smokers in Maryland over time through the cessation process. Although this is not a cohort study, it does offer a view of how the population of smokers has changed over the years, realizing that this population consists of new initiators as well as continuing smokers at each time point. The assumption is that there will be significant differences across populations, representing progress and challenges for Maryland tobacco control efforts.

Multiple policy and environmental changes related to smoking have occurred during this period of time (2000–2006). Taxes on cigarettes increased effective June 1, 2002, from \$.66 to \$1.00 a pack. The Surgeon General's report on secondhand tobacco smoke was published.<sup>20</sup> A new medication for treating tobacco dependence (varenicline) was approved by the FDA in 2006.<sup>21</sup> Several local jurisdictions went smokefree, and the Maryland Health

Department launched a major campaign entitled “Smoking Stops Here.” The national quitline was available to Maryland residents, and the Maryland-sponsored quitline was established with accompanying advertising in 2006.

## Methods

The present analyses utilize population data collected from three Maryland Adult Tobacco Surveys (MATS) conducted in 2000, 2002, and 2006. Telephone surveys were administered among the residential population of adults aged 18–65 years in the fall of each survey year, using Computer-Assisted Telephone Interviewing (CATI) technology, with MACRO International, Inc. as the contractor. The surveys included core questions from the CDC-assisted, state-based Adult Tobacco Survey (ATS). The MATS questionnaire covered a variety of topics including but not limited to tobacco use, second-hand smoke exposure, social context of smoking, and exposure to interventions as well as media messages.

## Survey Methodology

The 2000 MATS survey was conducted via telephone between October 16, 2000 and January 15, 2001. In all, 16,596 Maryland adults participated in the survey with 44.9% of eligible volunteers participating.

For the 2002 MATS there were both base and supplemental surveys collected in 2002. The base survey collected data from all 24 jurisdictions (i.e., 23 counties and Baltimore City). The supplemental survey oversampled target minorities in 16 jurisdictions in order to obtain more precise estimates. The base survey was administered between October 2002 and January 2003 and the supplemental survey between November 2002 and February 2003. The sample consisted of 27,192 Maryland adults with 43.3% of eligible volunteers participating.

The 2006 MATS survey was conducted via telephone from October 2006 through January 2007. In this survey 21,799 Maryland adults participated with 55.9% of eligible volunteers participating. It is not clear why the response rate for this survey was higher than that for prior ones. Increased media attention, initiation of the quitline, and discussions about a proposed clean indoor air act could have increased response rates. However, the weighting process should help to make the surveys comparable. For more detailed information on the MATS surveys, please refer to reports published by Maryland Department of Health and Mental Hygiene (DHMH).<sup>22–24</sup>

## Weighting

Analysis weights were constructed to allow the data to be generalized to the adult population of the state of Mary-

land as a whole, as well as by jurisdiction. This weight was then calibrated to population control totals based on data provided by the U.S. Census, so that the weighted distribution of the data matched the adult population distribution in terms of basic demographic characteristics.

Smoking rates should be interpreted cautiously as they may be underestimated. Blumberg and Luke<sup>25</sup> examined the preliminary results from the 2006 National Health Interview Survey (NHIS) and found that wireless telephone use is on the rise. In the latter half of 2006, 15.8% of American homes did not have a landline telephone. This is important as wireless-only adults were also more likely to be current smokers (29.6%) compared to adults with landlines (18.9%).<sup>25</sup> However, it should be noted that efforts were made to prevent bias and ensure that the household sample was representative. For instance, a random sample of eligible individuals in a household were obtained based on demographic characteristics such as age, gender, race, parents of children, and adults without children to ensure that respondents selected were as representative as possible of the entire Maryland adult population.

## Staging Methodology

In each survey, all ever-smokers (i.e., individuals who smoked >100 lifetime cigarettes, whether current or former smokers) were classified into one of five stages of change (SOC) using a typical SOC algorithm.<sup>26</sup> Although there have been criticisms of this type of assessment of stages,<sup>27–29</sup> this classification allows comparison with other studies and has been found to be useful way to segment the population and operationalize the stage construct in prior population studies.<sup>10,30,31</sup>

**Precontemplation.** Smokers currently smoking every day or on some days who were not seriously planning to quit smoking cigarettes within the next 6 months were considered in the precontemplation stage.

**Contemplation.** Smokers currently smoking every day or on some days who were seriously planning to quit smoking cigarettes within the next 6 months, or reported planning within the next 30 days but had not stopped smoking for 1 day or longer during the past 12 months because they were trying to quit were considered in the contemplation stage.

**Preparation.** Smokers currently smoking every day or on some days who were seriously planning to quit smoking cigarettes within the next 30 days, and who reported stopping smoking cigarettes for 1 day or longer during the past 12 months because they were trying to quit were considered in the preparation stage.

**Action.** Ever-smokers (100 lifetime cigarettes) not currently smoking who stopped within the past 6 months were considered in the action stage.

**Maintenance.** Ever-smokers not currently smoking who stopped for longer than 6 months but less than 5 years were considered in the maintenance stage. A 5-year cutoff was used arbitrarily based on cancer recovery models and to concentrate on successful quitting within the timeframe of this study.

**Long-term maintenance.** Ever-smokers who successfully quit smoking more than 5 years ago were considered to be in long-term maintenance. These individuals have established a new pattern of behavior and exited the cycle of change. They are included to examine overall change in the population of smokers in Maryland over this 6-year period.

## Measures

The MATS survey is focused almost exclusively on tobacco use and included demographic information, attitudes and intentions about smoking, environmental and familial tobacco smoking, experiences with quitting smoking, access to quitting advice and resources, and descriptions of current tobacco use including items assessing dependence (time to first cigarette in the morning) and cessation activities. These surveys also included questions about alternative tobacco use (e.g., chewing tobacco, cigars, pipes, bidis, and kreteks). However, individuals reporting any current use of these types of tobacco were excluded from analyses as this study focused exclusively on cigarette smoking. Some former smokers in the surveys (i.e., individuals in action or maintenance) reported current alternative tobacco use (12%, 7%, 9%, respectively

across the surveys) and were excluded from the current analyses.

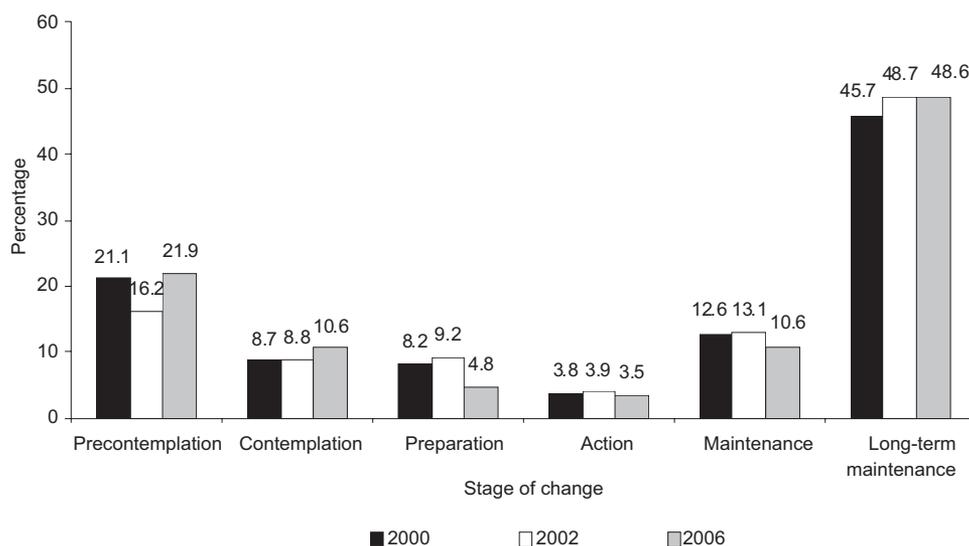
Comparisons based on stage and survey wave used ANOVA and chi-square analyses, where appropriate. All between-stage and across-wave post hoc comparisons were evaluated using Tukey's B, with an alpha level of  $p < 0.05$ . Interpretations, however, should be made cautiously as weighted data and large N's can make small differences significant.

## Results

### Ever-Smokers and Current Smokers

Over the 6-year period from 2000 to 2006 there were significant reductions in the prevalence of current smokers (individuals who smoked at least one cigarette in the past 30 days), from an estimated 16.9% of adults in 2000 to 14.8% in 2002 and then to 13.8% in 2006, paralleling the national 3% decline from 2000 to 2007.<sup>24</sup> Smoking rates among men declined from 18.8% in 2000 to 15.9% in 2006 and rates among women declined from 15.2% to 11.8%. Prevalence in the MATS survey differs from the Behavioral Risk Factor Survey (BFRSS) estimate for Maryland of 17.7%. Differences could be due to data collection methodologies and the single focus on tobacco of the MATS increasing non-participation among current smokers. However, differences should not compromise the comparisons across surveys in this study as all surveys used the same methodology.

By dividing the population into various stages of change at each survey time point, the study offers a differentiated view of



**Figure 2.** Distribution of the stages of change for smoking cessation in Maryland in 2000, 2002, and 2006

the population's journey through the process of smoking cessation (Figure 2). A majority of Maryland ever-smokers have been quit for more than 6 months (maintenance and long-term maintenance) ranging from 58.3% in 2000 to 61.8% in 2002 and decreasing slightly back to 59.2% in 2006 according to weighted estimates. Although nicotine is highly addictive and smoking is difficult

to quit, as demonstrated by the modest overall 3-month to 1-year cessation success rates, almost two thirds of ever-smokers have found ways to quit. Viewing sustained cessation as a process of learning how to quit and the product of a journey of re-cycling through multiple cessation attempts can bridge the gap between the modest success rates of single attempts and the marked overall success of the population of ever-smokers.

A somewhat disturbing trend in the data is that among current smokers and those who have quit for 5 years or less (action and maintenance), there is a decline in sustained cessation (14.1% in action and maintenance in 2006 versus 16.4% in 2000 and 17.0% in 2002) and an increase in the percentage of ever-smokers who report being in precontemplation and contemplation. This represents almost one third of ever-smokers (32.5% in 2006 compared to 29.8% in 2000 and 25.0% in 2002 ( $p < 0.05$  for all comparisons)). Current smokers (new initiators and continuing smokers) in the 2006 cohort appear less motivated and more ambivalent about quitting. This supports a view that more current smokers represent a “hard-core” group of smokers who are less engaged in the process of change.<sup>32</sup>

### Current Smoker Characteristics by Stage and Wave

Current smokers differed by stage of change and by survey on smoking characteristics (Table 1). As found in previous studies, smokers in advanced stages had better prognostic indicators in terms of years smoked and intensity of the nicotine addiction. Within each survey wave individuals classified as in preparation smoked fewer cigarettes per day in the past 30 days,

did not smoke for as many years, and had fewer years of daily smoking. However, 2006 current smokers had more years of smoking, more years smoking every day, and included a greater percentage of smokers who smoked regularly for more than 5 years that those in 2000 and 2002. The 2006 current smokers did have fewer days smoked in the past 30 days (12.8 vs 14.8 in 2000) indicating some impact of environmental restrictions but smoked about the same numbers of cigarettes per day (14.7) as their counterparts in earlier surveys. In 2006, over 50% of all current smokers smoked their first cigarette within 30 minutes of waking, an indicator of physical dependence with precontemplators reporting significantly greater dependence (56.2% in precontemplation; 46.8% in contemplation, and 47.4% in preparation, all comparisons significantly different at the  $p < 0.05$  level). More severe dependence also differed significantly by stage, with 27.7% of those in precontemplation reporting smoking within the first 5 minutes of waking compared to 22% of

**Table 1.** Smoking characteristics by stage of change for current smokers and by wave (M [SD])

Smoking characteristics and stage of change	2000 (Wave 1)	2002 (Wave 2)	2006 (Wave 3)
<b>Total number of years smoked</b>			
Precontemplation	13.0 (11.6) <sup>a1</sup>	13.8 (11.8) <sup>b1</sup>	16.9 (14.2) <sup>c1</sup>
Contemplation	11.1 (10.0) <sup>a2</sup>	11.9 (10.6) <sup>b2</sup>	14.3 (12.7) <sup>c2</sup>
Preparation	10.0 (9.4) <sup>a3</sup>	10.1 (10.1) <sup>a3</sup>	13.7 (13.0) <sup>b3</sup>
All stages	12.0 (10.9)	12.4 (11.2)	15.7 (13.7)
<b>Total number of years smoked every day</b>			
Precontemplation	19.9 (13.7) <sup>a1</sup>	21.5 (13.8) <sup>b1</sup>	21.0 (15.0) <sup>c1</sup>
Contemplation	17.6 (11.9) <sup>a2</sup>	18.7 (12.0) <sup>b2</sup>	19.5 (12.9) <sup>c2</sup>
Preparation	16.1 (11.9) <sup>a3</sup>	16.8 (12.1) <sup>b3</sup>	19.8 (14.0) <sup>c3</sup>
All stages	18.6 (13.1)	19.6 (13.1)	20.5 (14.4)
<b>Number of days smoked in past 30 days</b>			
Precontemplation	14.9 (9.1) <sup>a1</sup>	13.2 (8.5) <sup>b1</sup>	12.9 (8.9) <sup>c1</sup>
Contemplation	16.3 (8.1) <sup>a2</sup>	14.6 (9.0) <sup>b2</sup>	13.1 (8.7) <sup>c1</sup>
Preparation	13.6 (8.5) <sup>a3</sup>	14.1 (8.8) <sup>b3</sup>	12.0 (8.1) <sup>c2</sup>
All stages	14.8 (8.8)	13.9 (8.7)	12.8 (8.7)
<b>Number of cigarettes smoked per day in past 30 days</b>			
Precontemplation	15.9 (12.5) <sup>a1</sup>	16.0 (11.9) <sup>b1</sup>	16.1 (12.4) <sup>c1</sup>
Contemplation	14.3 (10.2) <sup>a2</sup>	13.9 (10.4) <sup>b2</sup>	13.1 (9.0) <sup>c2</sup>
Preparation	12.8 (11.1) <sup>a3</sup>	11.4 (10.2) <sup>b3</sup>	11.9 (10.4) <sup>c3</sup>
All stages	14.9 (11.8)	14.2 (11.2)	14.7 (11.4)

Note: Means that have no superscript in common are significantly different from each other (Tukey's B,  $p < 0.05$ ). Superscripts of <sup>a</sup>, <sup>b</sup>, <sup>c</sup> are used to indicate comparisons across wave (i.e., 2000 vs 2002 vs 2006) for each stage. Superscripts of <sup>1</sup>, <sup>2</sup>, <sup>3</sup> are used to indicate comparisons between stages at each wave (e.g., precontemplative vs contemplative vs preparation at Wave 1 [2000]).

**Table 2.** Readiness to change by stage of change and wave

Readiness to change and intentions	2000 (Wave 1)	2002 (Wave 2)	2006 (Wave 3)
<b>Ever seriously considered quitting</b>			
Precontemplation	75.2 <sup>a1</sup>	72.4 <sup>b1</sup>	68.6 <sup>c1</sup>
Contemplation	96.1 <sup>a2</sup>	95.5 <sup>b2</sup>	95.2 <sup>c2</sup>
Preparation	96.8 <sup>a3</sup>	97.7 <sup>b3</sup>	96.5 <sup>c3</sup>
All stages	84.7	85.2	79.7
<b>Number of prior quit attempts (M [SD])<sup>a</sup></b>			
Precontemplation	4.0 (7.6) <sup>a1</sup>	4.3 (6.5) <sup>b1</sup>	4.6 (11.2) <sup>c1</sup>
Contemplation	5.1 (7.3) <sup>a2</sup>	4.4 (5.3) <sup>b2</sup>	5.7 (11.3) <sup>c2</sup>
Preparation	7.6 (11.4) <sup>a3</sup>	6.7 (9.8) <sup>b3</sup>	10.3 (17.9) <sup>c3</sup>
Action	6.5 (9.7) <sup>a4</sup>	5.6 (9.5) <sup>b4</sup>	4.7 (8.7) <sup>c1</sup>
Maintenance	4.8 (6.9) <sup>a5</sup>	5.3 (7.7) <sup>b5</sup>	6.8 (14.2) <sup>c4</sup>
All stages	5.1 (8.4)	5.2 (7.7)	5.8 (12.6)
<b>RUNG</b>			
<b>Readiness ladder 1 (lowest)–10 (highest)</b>			
Precontemplation	2.9 (2.6) <sup>a1</sup>	3.1 (2.7) <sup>b1</sup>	3.1 (2.9) <sup>c1</sup>
Contemplation	5.0 (3.1) <sup>a2</sup>	4.8 (3.0) <sup>b2</sup>	5.4 (3.1) <sup>c2</sup>
Preparation	6.5 (3.0) <sup>a3</sup>	6.4 (3.1) <sup>b3</sup>	6.7 (3.3) <sup>c3</sup>
All stages	4.2 (3.2)	4.4 (3.2)	4.2 (3.3)

Note: Means/percentages that have no superscript in common are significantly different from each other (Tukey's B,  $p < 0.05$ ). Superscripts of <sup>a, b, c</sup> are used to indicate comparisons across wave (i.e., 2000 vs 2002 vs 2006) for each stage (e.g., precontemplative vs contemplative vs preparation at Wave 1 [2000]).

<sup>a</sup>Number of prior quit attempts question relevant for all stages. Superscripts of <sup>1, 2, 3, 4, 5</sup> are used to indicate comparisons between stages at each wave (e.g., precontemplation vs contemplative vs preparation at Wave 1 [2000]).

smokers in contemplation and 19.3% of those in preparation ( $p < 0.05$  for all comparisons).

### Smoking History, Motivation, and Expectations About Quitting

In contrast, smoking history for current smokers differed minimally by stage and survey wave. Current smokers first tried smoking at age 14–15 years and began smoking regularly at age 17 or 18 years on average. Dimensions of initiation do not differ substantially across waves, with some indications that smokers in precontemplation had started slightly earlier. The vast majority of current smokers have seriously considered quitting smoking at some point, although this percentage differs significantly by stage and seems to be decreasing especially for smokers in precontemplation in 2006 (Table 2). Nevertheless most of the smokers who stated that they were not considering quitting in the next 6 months (precontemplation) considered quitting in the past and had made multiple quit attempts. Reported quit attempts seem to be colored by stage status with individuals in prep-

aration (planning to quit in the next 30 days and having made one quit attempt in the past year) reporting the most prior attempts, and those in precontemplation reporting fewer attempts but still averaging four to five prior quit attempts.

In each survey year the average number of previous quit attempts across the five stages was over five. However, the average number of quit attempts reported by current smokers (by definition unsuccessful) increased significantly from 2002 to 2006 for smokers in precontemplation (4.3 to 4.6), contemplation (4.4 to 5.7), and preparation (6.7 to 10.3) stages of change. In 2006, current smokers reported trying to quit more of-

ten but were having less success. The number and range of quit attempts had increased significantly for all these ever-smokers compared to prior years except for those in action. These numbers support the notion that current smokers are having less success, although current motivation to change does not differ much across waves. On a scale of 1 to 10 assessing how ready smokers were to quit smoking, average ratings of all current smokers hovered around 4 for all waves but, as would be expected, differed significantly by stage within each wave with those in precontemplation averaging 3, those in contemplation averaging around 5, and those in preparation averaging around 6.5 on the readiness ruler. There is a range of readiness to quit in the population of smokers that makes generalizing about and reaching all current smokers with a single strategy problematic.

**Environmental smoking.** Smoking in the environment of smokers differs by stage of change and sometimes by wave of survey (Table 3). Over 50% of the cohort of

ever-smokers across all waves (not including those in long-term maintenance) reported having at least one member of their families who smoked, an average of two of their four closest friends who smoked, and having an average of one additional adult smoker living in their homes. Although restrictions on smoking in public places have increased over these years, these numbers are not substantially different across waves.

Within waves, however, smokers in the environment differ significantly by stage with those who are in the process of successful quitting (action and maintenance), having significantly fewer smokers among friends and in the family and home. For precontemplation smokers almost three of four friends smoke, and 70% have a family member who smokes compared to less than two friends and only 50% reporting a family member smoking for quitters in action and in maintenance. These differences are consistent across waves, indicating that there are important changes in the smoking environment as smokers move through the quitting process; these are probably related to network quitting described in a recent study<sup>33</sup> and to a reciprocal relationship between the quitting process and both social network and housing choices.

**Smoking cessation, help seeking, and advice.** Several questions were asked only in the 2006 survey targeting expectations and quitting experiences (Table 4). All ever-smokers were asked if they were smoking every day, some days, or not at all around this time last year. Only 22% of past-5-year ever-smokers were not smoking at all last year, with the greatest percentage among quitters and

smokers who had quit more than 6 months ago as expected. There is also evidence that everyday smoking in the prior year decreased as smokers reported themselves at more advanced stages of cessation. Prior year–someday smoking was highest (24%) for those currently in preparation, indicating that more sporadic smoking or some attempt to modify their smoking may be part of the process of getting ready to quit. Expectations about quitting (*do you ever expect to quit?*) and confidence to succeed (*if you decided to give up smoking completely, how likely you think you would be to succeed?*) were extremely high and differed by stage. Almost all of the smokers in contemplation (98.3%) and in preparation (99.0%) expected to quit sometime. However, 30% of those in precontemplation do not ever expect to quit. Those endorsing being very or somewhat likely to succeed in quitting if they decided to quit also differed by stage, ranging from 73.1% for those in precon-

**Table 3.** Smoking in the environment by stage of change and wave

Predictor variable and stage	2000 (Wave 1)	2002 (Wave 2)	2006 (Wave 3)
<b>Number of adult smokers in the home (M [SD])</b>			
Precontemplation	0.86 (0.9) <sup>a1</sup>	0.78 (.08) <sup>b1</sup>	0.93 (1.1) <sup>c1</sup>
Contemplation	0.90 (1.2) <sup>a2</sup>	0.67 (0.8) <sup>b2</sup>	0.83 (0.9) <sup>c2</sup>
Preparation	0.72 (0.8) <sup>a3</sup>	0.81 (0.8) <sup>b3</sup>	0.80 (1.0) <sup>c3</sup>
Action	0.52 (0.8) <sup>a4</sup>	0.39 (0.6) <sup>b4</sup>	0.35 (0.6) <sup>c4</sup>
Maintenance	0.32 (0.6) <sup>a5</sup>	0.30 (0.6) <sup>b5</sup>	0.27 (0.5) <sup>c5</sup>
All stages	0.71 (0.9)	0.62 (0.8)	0.72 (0.9)
<b>Number of four closest friends who smoke (M [SD])</b>			
Precontemplation	2.7 (1.4) <sup>a1</sup>	2.4 (1.5) <sup>b1</sup>	2.5 (1.5) <sup>c1</sup>
Contemplation	2.4 (1.5) <sup>a2</sup>	2.2 (1.4) <sup>b2</sup>	2.2 (1.5) <sup>c2</sup>
Preparation	2.1 (1.5) <sup>a3</sup>	2.4 (1.5) <sup>b1</sup>	2.0 (1.5) <sup>c3</sup>
Action	1.9 (1.5) <sup>a4</sup>	1.9 (1.5) <sup>a3</sup>	1.8 (1.5) <sup>b4</sup>
Maintenance	1.4 (1.4) <sup>a5</sup>	1.4 (1.5) <sup>b4</sup>	1.4 (1.5) <sup>c5</sup>
All stages	2.2 (1.5)	2.1 (1.5)	2.1 (1.6)
<b>Family member smokes (% yes)</b>			
Precontemplation	67.3 <sup>a1</sup>	65.3 <sup>b1</sup>	69.0 <sup>c1</sup>
Contemplation	71.2 <sup>a2</sup>	55.3 <sup>b2</sup>	64.0 <sup>c2</sup>
Preparation	66.5 <sup>a3</sup>	61.0 <sup>b2</sup>	62.7 <sup>c3</sup>
Action	52.1 <sup>a4</sup>	46.1 <sup>b4</sup>	53.6 <sup>c4</sup>
Maintenance	55.4 <sup>a5</sup>	53.8 <sup>b5</sup>	53.3 <sup>c4</sup>
All stages	64.3	58.3	63.3

Note: Means/percentages that have no superscript in common are significantly different from each other (Tukey's B,  $p < 0.05$ ). Superscripts of <sup>a</sup>, <sup>b</sup>, <sup>c</sup> are used to indicate comparisons across wave (i.e., 2000 vs 2002 vs 2006) for each stage. Superscripts of <sup>1</sup>, <sup>2</sup>, <sup>3</sup>, <sup>4</sup>, <sup>5</sup> are used to indicate comparisons between stages at each wave (e.g., precontemplation vs contemplative vs preparation at Wave 1 [2000]).

**Table 4.** Expectations about and utilization of cessation products and services in 2006 (%)

<b>Around this time last year were you smoking cigarettes every day, some days, or not at all?<sup>a</sup></b>	<b>Every day</b>	<b>Some days</b>	<b>Not at all</b>
Precontemplation	75.2	20.1	4.7
Contemplation	70.7	20.9	8.5
Preparation	57.7	24.1	18.3
Action	59.9	18.0	22.1
Maintenance	9.9	10.2	79.9
All stages	59.0	18.6	22.4
<b>IF YOU DECIDED TO GIVE UP SMOKING ALTOGETHER, HOW LIKELY DO YOU THINK YOU WOULD BE TO SUCCEED?<sup>a</sup></b>		<b>Very or somewhat likely</b>	
Precontemplation	73.1		
Contemplation	86.1		
Preparation	88.6		
All stages	78.8		
<b>Do you ever expect to quit smoking?<sup>a</sup></b>		<b>% yes</b>	
Precontemplation	70.4		
Contemplation	98.3		
Preparation	99.0		
All stages	82.7		
<b>Used an aid last time you tried to quit?<sup>a</sup></b>		<b>% yes</b>	
Precontemplation	32.5		
Contemplation	34.0		
Preparation	36.3		
All stages	33.5		
<b>Ever used NRT to quit?<sup>a</sup></b>		<b>% yes</b>	
Precontemplation	36.9		
Contemplation	44.9		
Preparation	48.7		
Action	36.5		
Maintenance	33.7		
All stages	39.1		

<sup>a</sup>All between-stage comparisons significant at  $p < 0.05$  level.  
NRT, nicotine replacement therapy

templation to 86.1% and 88.6%, respectively, for those in contemplation and preparation. Although many smokers in precontemplation appear to be laggards in terms of their quitting expectations and motivation, about 80% of current 2006 smokers expect to quit and are confident that they will succeed at some point.

Comparisons across stages and surveys related to help seeking and advice giving related to smoking also indi-

cated progress and challenges. Percentages of current smokers reporting that a doctor advised them to quit increased from 68.5% in 2000 to 75.3% in 2006, and this includes those least ready to change, with percentages of precontemplation smokers given advice increasing from 65.1% in 2000 to 74.5% in 2006. Reports of recommendations for products or medication to assist current smokers quit also rose from 33.4% in 2000 to 38.7% in 2006, with percentages of smokers reporting these recommendations increasing significantly within each wave by stage of change. For example, fewer of the smokers in precontemplation (34.7%) reported receiving these recommendations in 2006 compared with those in contemplation (41.9%) and preparation (48.2%), but all percentages are significantly higher than those reported in 2000 (29.8%, 33.9%, and 40.9% respectively). Smokers seem to be responding to this advice with over 30% of

current 2006 smokers reporting that they used an aid to quit the last time they made an attempt (Table 4). These numbers do not change dramatically by stage, but over 35% of those in preparation report using an aid the last time, compared to around 30% for those in precontemplation. Lifetime use of nicotine replacement therapy (NRT), for example, reached almost 40% for all current smokers and those who quit in the

past 5 years. Percentages differ by stage of change with greater percentages of current smokers, who by definition were not successful, reporting lifetime use of NRT.

Current smokers are being given advice and access to aids and medications in growing numbers, yet there are substantial numbers of those who have used these and not achieved cessation. Over 75% of those who reported using something to help them quit last time mentioned NRT with the use of other aids being reported by fewer ever-smokers (Zyban, 33%; self-help materials, 25.7%; classes, 14.9%; hypnosis, 10.9%; acupuncture, 2.4%; and quitline, 2.3% (note the Maryland Quitline began in mid 2006). Those individuals who reported using something during their last quit attempt differed somewhat by current stage of change, but there was no clear pattern of successful quitters in action or maintenance using certain aids more than those who were unsuccessful. Moreover, similar percentages of smokers currently in precontemplation who had made a quit attempt used these types of aids. Over 80% of those currently in precontemplation who used an aid to help them to quit last time reported that they used NRT, indicating that it may not have been used properly or was ineffective for these individuals. Type and use of aids seem to be only one part of the journey of successful cessation.

## Discussion

This examination of smoking in the population of Maryland ever-smokers over the 6-year period from 2000 to 2006 using population survey snapshots from 2000, 2002, and 2006 offers stakeholders in tobacco control programs a view of what has, and has not, changed over time among subgroups of ever-smokers who are at different points along the journey of smoking cessation. By the end of 2006, the population of current smokers was smaller, but at the same time, was less willing and able to quit. A greater percentage were in earlier stages of change and not interested in or planning to quit in the near term. Many current smokers had unsuccessfully tried to quit, with a substantial minority finding that cessation products touted as useful in research studies were not effective for them, highlighting the differences between efficacy and effectiveness.

Nonetheless, the vast majority expects to quit, has considered quitting, and believes that they will likely succeed eventually. More are getting advised to quit by medical professionals and are getting access to quit-smoking aids that are empirically supported. As compared to previous cohorts, the 2006 cohort of current smokers tried to quit more times, but also smoked every day for more years, smoked as many cigarettes per day, and had environments as filled with smoking as their counterparts despite

the increasing numbers of environmental restrictions. Current smokers seem more dependent, living in smoking environments, and learning how to smoke around the restrictions.

The challenge presented to tobacco control programs seeking to increase successful cessation appears to be one of not only helping smokers appropriately use efficacious products but also of addressing their current needs and assisting them to successfully negotiate the critical tasks along the journey of cessation. Greater percentages of smokers in precontemplation and contemplation in the 2006 survey indicate discouragement and ambivalence. This supports the need for motivational interventions. When many of these smokers tried to quit, they accessed NRT and Zyban products in equal percentages as those in action and maintenance but did not seem to benefit from these, either because they used them improperly or they did not have the strength of decision and commitment or a proper plan to use behavioral quitting strategies shown to be part of successful cessation and important adjuncts to any pharmacotherapy regimen. Although the 2006 current smokers have increased their number of quit attempts, they have not achieved greater success as a group, and overall ratings of readiness are not very high. This suggests that there may be important gaps in the dissemination of empirically supported treatments and how to use them successfully.

The overall journey toward cessation of the population of ever-smokers has had substantial success, and there are many encouraging indicators that that current smokers will move toward cessation in greater numbers. Most current smokers are not satisfied smokers and are expecting to quit. However, interest and desire to quit has not turned into proximal motivation to quit yet, and larger percentages of current smokers in 2006 are joining the ranks of the not ready in the near future. Efforts to understand and intervene with the barriers to motivation appear to be more important than ever. Focusing on consumer demand and getting a consumer perspective on products and services seems critical because many of the current smokers have already used current products and services, and they have a unique perspective on these products and services that needs to be understood by tobacco control. Simply doing more of the same may not be in the best interest of current smokers in this study. Even more importantly, unsuccessful attempts need to be examined to discover what seems to be going wrong, especially when these smokers are using empirically supported products and services.

Interestingly, environmental restrictions have not lessened the typical numbers of smokers in the social networks and families of current smokers, indicating that networks of smokers continue to be linked together. Ef-

forts to motivate and facilitate individual smokers to quit should probably target networks as well as individuals. It would also be important to understand how environmental events interact with personal motivation to create and stimulate change. The population of current smokers has cessation expectations and aspirations that seem open to the influence of dramatic environmental events (taxes, free nicotine replacement, clean indoor air initiatives) that could substantially push the cessation process. At times the process may not appear as linear a journey as depicted in this article.<sup>13</sup> However, the stage subgroups do seem to be consistently related to motivational dimensions and can provide some guidance for understanding and intervening with the population of smokers.

### Limitations of Survey

The Maryland Adult Tobacco Surveys suffer from limitations commonly found in other large telephone-based surveys including: over-representation of participants with higher education levels; retrospective reporting; and potential lack of generalizability. The MATS is a telephone survey that did not include cell phone and is subject to bias by inclusion of households with landlines and caller screening. These surveys cannot be generalized to the very poor, active military, or residents of institutions (e.g., long-term hospitals or prisons). Moderate response rates in all three surveys (ranging from 43.3% to 55.9%) also limit generalizability of findings to all Maryland smokers. Moreover, recent statewide interventions that offer free nicotine replacement (gum and patch) through the quitline and include increased taxes, and a Clean Indoor Air Act banning smoking in all bars and restaurants, are not represented in these data.

The following recommendations for tobacco control are consistent with these findings:

1. Understand that the majority of current smokers rate themselves as only modestly ready to quit (4 on a 10-point scale) and that the smallest percentage of smokers are in the most ready group, with average readiness ratings over 6 on this scale. Tailoring media messages and intervention efforts to motivate and not simply educate are needed.
2. Use a consumer-oriented focus with smokers to look for the key barriers preventing current smokers from being more immediately motivated to attempt to quit, recognizing that some barriers may be environmental.
3. Create better access to empirically supported products and services as most current smokers did not use any aids the last time they quit. However, health literacy efforts should include a greater emphasis on educating the consumers of these products and services on how to use these products properly. Pharmacotherapy without proper motivation and behavioral preparation may undermine smokers' cessation efficacy and positive outcome expectations about the utility of these aids.
4. Smoking continues to exist within social networks and subgroups, so tobacco control initiatives may be more effective if they promote network as well as individual smoking-cessation efforts and promote smokefree home initiatives.
5. Population surveys of smokers should focus on process-of-change information. Point prevalence (past-30-day smoking) and smoking habit dimensions are insufficient to understand current smokers and the journey of cessation. Process variables should be included that tap motivation, expectations, attitudes, and intentions, as well as current and past experiences, in order to capture the successes and struggles of personal and population smoking cessation.

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