MAGIC MASSACHUSETTS GAMBLING IMPACT COHORT STUDY

UNIVERSITY OF MASSACHUSETTS SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES

THE MA GAMBLING IMPACT COHORT: ANALYSES ACROSS THREE WAVES

Abstract

This report details analyses and findings from the first three waves of the Massachusetts gambling impact cohort—the first adult longitudinal cohort study of gambling and problem gambling in the US. Principally, we focus on Wave 3 data collection and changes across the three waves in terms of (1) gambling participation, (2) incidence of problem gambling, and (3) transitions within the cohort.

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Abbreviations/Glossary

AAPOR – American Association of Public Opinion Research
ABS – Address Based Sampling
BGPS – Baseline General Population Survey
CASRO – Council of American Survey Research Organizations
CATI – Computer Assisted Telephone Interview
CAWI – Computer Assisted Web Interview
CI – Confidence Interval
CPGI – Canadian Problem Gambling Index
DSM – Diagnostic and Statistical Manual of Mental Disorders
EGM – Electronic Gaming Machines
Etiology – the cause or causes of a disease or condition
Incidence – proportion of a population that newly develops a condition over a specified period of time
IRB – Institutional Review Board
LLLP – Leisure, Lifestyle, Lifecycle Project
MAGIC – Massachusetts Gambling Impact Cohort
MGC – Massachusetts Gaming Commission
NORC – National Opinion Research Center at the University of Chicago
NZ NGS – New Zealand National Gambling Study
PG – Problem Gambling
PPGM – Problem and Pathological Gambling Measure
Prevalence – proportion of a population that has a condition at a given point in time
PUMS – Public Use Microdata Sample
QLS – Quintile Longitudinal Study
SAQ – Self Administered Questionnaire
SEIGMA – Social and Economic Impacts of Gambling in Massachusetts
SFTP - Secure File Transfer Protocol
Swelogs - Swedish Longitudinal Gambling Study
UMass – University of Massachusetts
VGS – Victorian Gambling Study

Executive Summary

Between September 2013 and May 2014, a Baseline General Population Survey (BGPS) of 9,578 Massachusetts adults (18+) was assessed to establish the impacts of the introduction of new casinos in Massachusetts between 2015 and 2019. This is known as the **S**ocial and **E**conomic **I**mpacts of **G**ambling in **Ma**ssachusetts (SEIGMA) study. In April 2014, a contract to conduct a cohort study utilizing the BGPS sample was awarded to the present research team. A total of 4,860 individuals from the BGPS were deemed eligible for the new cohort study (**Ma**ssachusetts **G**ambling **I**mpact **C**ohort: MAGIC), in part due to having characteristics making them at greater risk for developing gambling problems. Of these individuals, 3,139 agreed to participate and completed the inaugural MAGIC questionnaire between March 2015 and September 2015.

The cohort begins with the BGPS in 2013/2014, which we are calling Wave 1. Typically, the date a cohort study begins and is established is the date of initial contact with respondents. In this case, however, initial contact was made through the BGPS study. Therefore, we use the term *established* to note the date when BGPS respondents were asked to participate in the cohort study. Using this terminology, the cohort study began in 2013/2014 (Wave 1) and the cohort was established in 2015 (Wave 2). The appropriate description of who continues from Wave 1 to Wave 2 is *response rate*, whereas the appropriate description of who continues from Wave 2 and beyond is *retention rate*.

The questionnaire completed in the BGPS (Wave 1) was very similar to the questionnaire completed in Wave 2. The response rate from Wave 1 to Wave 2 was 65.1%. These respondents established the MAGIC cohort. The Wave 3 questionnaire was significantly expanded to more comprehensively assess variables of etiological significance to problem gambling and administered between March and August 2016. A total of 2,450 individuals completed Wave 3, for a cohort retention rate of 78.1%.

The current report presents results across the first three waves of MAGIC with a focus on Wave 3 data collection and changes in (1) gambling participation, (2) incidence of problem gambling, and (3) gambling behavior across the first three waves. Subsequent reports will more comprehensively analyze and identify variables predictive of future problem gambling as well as remission from problem gambling. As this is a longitudinal cohort study, readers should exercise caution when generalizing findings to the population of Massachusetts residents.

Changes in Gambling Participation

Changes in gambling participation within the cohort were examined by comparing the self-reported past-year behaviors of the 2,428 members of the cohort who completed all three waves. There was a statistically significant increase in daily lottery games, sports betting, and private betting from Wave 1 to Wave 2. The magnitude of these increases, however, was small.

From Wave 2 to Wave 3, there was a statistically significant increase in overall gambling participation, all lottery, traditional lottery, instant games, daily games, bingo, sports betting, and online gambling. However, the magnitude of many of these changes was either small or medium. These increases (especially the larger increases) may be a result of changes in how the questions were asked from Wave 2 to Wave 3. For instance, the large increase in daily games may in part be due to a wording change in the question in Wave 3 which included more examples of daily games compared to Wave 2 (i.e., Wave 3 included Mass Cash and the Numbers Game). There was also a large increase in online gambling participation from Wave 2 to Wave 3. This change, however, was also likely driven by a questionnaire change whereby in Wave 3, unlike in previous waves, all questions concerning participation in specific

gambling formats were followed up by a question as to whether the individual participated in this format online.

It is notable that out-of-state casino gambling significantly decreased from Wave 2 (2015) to Wave 3 (2016) and the magnitude of this change was large. This change may reflect the introduction of Massachusetts' first slot parlor, Plainridge Park Casino, which opened in June 2015. This may have resulted in fewer Massachusetts residents gambling in out-of-state casinos.

From Wave 1 to Wave 2, there was a statistically significant decrease in the average maximum frequency of gambling, yet the size of this change was small. This decrease continued from Wave 2 to Wave 3 and again the size of this change was small. From Wave 2 to Wave 3, there was a significant decrease in total gambling expenditures and the magnitude of this change was large. This change, however, was likely affected by outliers which affected the estimate at Wave 2. From Wave 2 to Wave 3, there was a statistically significant increase in the average number of gambling formats engaged in. The size of this change, however, was small. Overall, there does not seem to be a notable change in these measures of gambling intensity.

Once again, since this is a cohort study, caution should be taken when generalizing these findings to the Massachusetts population.

Incidence of Problem Gambling

Incidence in this study is defined as the number of individuals classified using the Problem and Pathological Gambling Measure (PPGM) as Non-Gamblers, Recreational Gamblers, and At-Risk Gamblers in one wave who are classified as Problem or Pathological Gamblers in the next wave. These estimates are based on behavior reported over the past 12 months and are weighted to the Massachusetts population.

The 'natural' (prior to the opening of casinos in Massachusetts) problem gambling incidence rate within the cohort from Wave 1 (2013/2014) to Wave 2 (2015) in Massachusetts was 2.4% (95% CI [1.5%, 3.7%]). From Wave 2 (2015) to Wave 3 (2016), the problem gambling incidence rate within the cohort was 1.2% (95% CI [0.6%, 2.2%]). While the incidence rate from Wave 1 to Wave 2 is high relative to other jurisdictions—which tend to range from 0.12% to 1.4%—the incidence rate substantially declined from Wave 2 to Wave 3.

'Remission' refers to individuals who meet criteria for a disorder at one point in time but not at a subsequent point in time. Remission is defined as a temporary end of signs and symptoms of a disorder. From Wave 1 to Wave 2, the remission rate (49.4%, 95% CI [29.2%, 69.8%]) within the cohort indicated that approximately half of the Problem Gamblers in Wave 1 were no longer classified as Problem Gamblers in Wave 2. From Wave 2 to Wave 3, the remission rate was 44.0% (95% CI [25.6%, 64.2%]). It appears that the high rate of remitting cases continued from Wave 2 to Wave 3 as the number of people becoming a problem gambler and remitting from problem gambling was almost equal, with slightly more individuals remitting compared to those becoming new problem gamblers.

With the unexpected finding of an unusually high incidence rate from Wave 1 to Wave 2, the research team endeavored to triangulate this finding using other data sources.[1] No corroborating evidence supported the high incidence found from Wave 1 (2013/2014) to Wave 2 (2015).

Part of the difference (and decline) in incidence across the three waves could be explained by variation in the inter-assessment windows from Wave 1 to Wave 2 (an average of 16.5 months) and from Wave 2 to Wave 3 (an average of 12.5 months).[2] While the questions assessing gambling behavior specified a 12 month recall window, the longer length of time between assessments may have independently contributed to the relatively higher incidence rate from Wave 1 to Wave 2. The higher incidence rate from Wave 1 to Wave 2 may have also been the result of factors influencing retention between Wave 1 and Wave 2, which may not have been as strong between Wave 2 and Wave 3 (see Volberg, Williams, Stanek, Zorn, and Mazar (2017) for a discussion of these issues).

Stability and Transitions of Gambling Behavior

Another goal of the present analyses is to elucidate the stability and transitions of gambling behavior experienced by members of the cohort across the three waves. Since we are interested in understanding transitions within the cohort, we do not extrapolate to the Massachusetts population and only include participants for whom we have complete PPGM information across all three waves (n=2,418).

The most stable group of gamblers were Recreational Gamblers, with 70.2% of Recreational Gamblers at Wave 1 remaining in this category across the next two waves. This represents 49.2% (n=1,189) of the cohort. The second most stable group of gamblers were Non-Gamblers—48.1% of Non-Gamblers at Wave 1 remained Non-Gamblers across the next two waves, representing 7.0% (n= 169) of the cohort. Of those who were Problem/Pathological Gamblers at Wave 1, 32.8% remained Problem/Pathological Gamblers at Wave 2 and Wave 3. This represents 0.87% (n=21) of the cohort. The least stable group were At-Risk Gamblers, where only 20.4% of At-Risk Gamblers at Wave 1 remained in this category across all three waves. This represents 2.6% (n=63) of the cohort.

Interestingly, none of the Problem Gamblers at Wave 1 moved to Non-Gambling by Wave 3 and only one transitioned into a Non-Gambler at Wave 2 (and then moved to Recreational Gambling at Wave 3). Only 4.9% (15 of the 309) of At-Risk Gamblers at Wave 1 moved to become Non-Gamblers at either Wave 2 or Wave 3. Like Problem/Pathological Gamblers, this suggests that At-Risk Gamblers rarely transition to Non-Gambler status. Recreational Gamblers also seem unlikely to transition into becoming Non-Gamblers, as only 12.5% (211 of 1,694) of Recreational Gamblers at Wave 1 transitioned to become Non-Gamblers at Wave 2 or Wave 3.

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[1] We specifically examined whether there were significant differences in (a) the prevalence rate of problem gambling in the Baseline Targeted Population Survey in Plainville and surrounding communities in 2014 compared to the Follow-Up Targeted Population Survey in 2016; (b) the prevalence rate of problem gambling in Springfield and surrounding communities subsample of the Baseline General Population Survey in 2013/2014 compared to the Baseline Targeted Population Survey in Springfield and surrounding communities in 2015; (c) the incidence of problem gambling in MAGIC Wave 3 in 2016 relative to Wave 2 in 2015; and (d) any secondary data sources pertaining to problem gambling (i.e., Department of Public Health admissions data, Massachusetts Council on Compulsive Gambling helpline calls, Gamblers Anonymous chapters). No significant changes were found.

[2] The average time between assessments was computed using an unweighted pairwise comparison of the dates that each respondent completed the Wave 2 or Wave 3 questionnaire compared to the previous wave of the questionnaire. The weighted interval was 16.5 months between Wave 1 and Wave 2 and 12.5 months between Wave 2 and Wave 3.

Limitations

Generalizing findings from the MAGIC study to the Massachusetts population should be undertaken with care since there are several factors that deserve attention when interpreting results. One important limitation concerns whether all sampling biases have been accounted for. The response rate was 36.6% for Wave 1 and 65.1% for Wave 2 and the retention rate was 78.1% for Wave 3. This produces ample opportunity for differential response and retention rates for subgroups of the population. Various adjustments and weighting partially accounted for some differential response and retention rates within the cohort, but the methods, by necessity, were limited to a few factors and available information. Other factors could be related to response and retention rates and affect estimates and interpretation. In particular, the first wave of the study (BGPS/Wave 1) was introduced as a survey of "health and recreation" in an effort to prevent participation bias related to respondents' attitudes toward gambling. In Wave 2 and Wave 3, however, respondents were aware that the survey was predominantly about gambling, which may have influenced their decision to join and remain in the cohort or to drop out.

There are several other limitations of all cohort studies. For one, repeated surveying is known to have some influence on self-report of behavior (e.g., social desirability to convey 'improvement'), as well as some influence on actual behavior (i.e., intensive scrutiny of one's behavior may serve as a sort of intervention). Observed changes over time are also sensitive to the reliability of the measurement instruments. For less reliable measures, repeated assessments typically lead to regression to the mean, resulting in some artifactual accentuation of transitions from more to less severe states.

Key Findings, Implications, and Future Directions

The following takeaways can be gleaned from this report:

- Out-of-state casino gambling significantly decreased from Wave 2 (2015) to Wave 3 (2016).
    - The magnitude of this change was large.
    - This change may reflect the introduction of Massachusetts' first slot parlor, Plainridge Park Casino, which opened in June 2015.
- No notable changes in measures of gambling intensity were detected across the three waves.
- Prior to the opening of casinos in Massachusetts, the problem gambling incidence rate from Wave 1 (2013/2014) to Wave 2 (2015) in Massachusetts was 2.4% (95% CI [1.5%, 3.7%]).
    - Compared to other jurisdictions, this is surprisingly high. This result is likely artifactual and driven by the 16-month inter-assessment window.
- From Wave 1 to Wave 2, the remission rate was 49.4% (95% CI [29.2%, 69.8%]).
- From Wave 2 (2015) to Wave 3 (2016), the problem gambling incidence rate within the cohort declined to 1.2% (95% CI [0.6%, 2.2%]).
- From Wave 2 to Wave 3, the remission rate was 44.0% (95% CI [25.6%, 64.2%]).
    - Slightly more individuals were remitting rather than becoming new problem gamblers.
- Concerning stability (remaining in the same gambling behavior subtype classification across waves), Recreational Gamblers were the most stable, followed by Non-Gamblers. Problem/ Pathological Gamblers and At-Risk Gamblers were the least stable.
- Individuals who gamble were unlikely to transition to non-gambling across the three waves.

The finding of out-of-state casino gambling significantly decreasing from Wave 2 to Wave 3 adds to the evidence that the opening of Plainridge Park Casino in Plainville, Massachusetts in June 2015 may have been successful in 'recapturing' Massachusetts residents who were previously gambling at out-of-state

casinos (see *Plainridge Park Casino First Year of Operation: Economic Impacts Report*—umass.edu/seigma/reports—for a detailed discussion of Plainridge Park Casino's 'recapture' of Massachusetts residents' casino spending).

Results from the Massachusetts cohort study suggest that while findings from Wave 1 to Wave 2 evinced a relatively high incidence rate of problem gambling (2.4%), this high rate has not continued from Wave 2 to Wave 3 (1.2%). While the number of people who remitted was approximately half the number of people who became problem gamblers from Wave 1 to Wave 2, we see from Wave 2 to Wave 3 that the number of people who became problem gamblers and the number of people who remitted was almost equal. In fact, slightly more individuals remitted compared to becoming problem gamblers. This suggests that additional treatment resources and prevention efforts may be especially beneficial in continuing the higher remission over incidence rate.

Examining the stability and transitions within the cohort across the three waves also proved instructive. Overall, these three waves of data suggest that both Problem/Pathological and At-Risk Gamblers are unlikely to transition to become Non-Gamblers. These findings suggest that when individuals move to less harmful gambling behaviors, they are unlikely to abstain from gambling altogether, but pursue more moderate forms of gambling behavior. While the majority of Recreational Gamblers remained Recreational Gamblers across all three waves, when individuals in this category did transition, they also seemed unlikely to transition into Non-Gamblers.

These results are consistent with findings that some 'controlled' gambling may not be incompatible with recovery from Problem/Pathological Gambling (Slutske, Piasecki, Blaszczynski, & Martin, 2010). More broadly, treatment providers may consider not insisting on abstinence from gambling as a treatment goal since this can reduce treatment seeking by those experiencing problem gambling (Ladouceur, Lachance, & Fournier, 2009). Eventual transition to abstinence as a goal by the patient may emerge from controlled consumption (Dowling & Smith, 2007). Overall, our findings corroborate evidence that Problem/Pathological Gambling recovery tends to occur without abstinence. Nonetheless, these findings only represent three waves of data and, since gambling problems can be transitory and episodic, we look forward to examining how our cohort members transition in future waves and whether this pattern persists.

The goal of the MAGIC study is to uncover high-risk populations in Massachusetts and inform the development of effective and efficient prevention and treatment programming in the Commonwealth. Our next MAGIC report will examine longitudinal predictors of problem gambling across waves and whether there are racial/ethnic, income, gender, and/or regional differences in these predictors. We will also examine the predictors of problem gambling remission and the extent to which accessing treatment is one of these factors (compared to financial exhaustion, self-care, etc.). In later waves, we hope to conduct in-depth interviews with a cross-section of At-Risk and Problem/Pathological Gamblers who remit, do not remit, and relapse to more fully understand pathways to remission.

Introduction

The MGC Research Agenda

In November, 2011, an Act Establishing Expanded Gaming in the Commonwealth was passed by the Legislature and signed by Governor Deval Patrick (Chapter 194 of the Acts of 2011). This legislation permits casinos and slot parlors to be introduced in Massachusetts under the regulatory auspices of the Massachusetts Gaming Commission (MGC). Section 71 of the Expanded Gaming Act requires the MGC to establish "an annual research agenda" and identifies three essential elements of this research agenda:

- Understanding the social and economic effects of expanded gambling
- Implementing a baseline study of problem gambling and the existing prevention and treatment programs that address its harmful consequences
- Obtaining scientific information relative to the neuroscience, psychology, sociology, epidemiology, and etiology of gambling

In March 2013, the MGC selected a research team based at the University of Massachusetts Amherst School of Public Health and Health Sciences to carry out the first two elements of this research agenda through the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) project. While robust in many regards, the SEIGMA methodology provides population-based 'snap shots' of the dynamic process of behavior change during a time of gambling expansion. The cross-sectional design of the SEIGMA project is in contrast to a longitudinal cohort design that follows a group of people with a shared experience (exposure to expanded gambling) at intervals over time. A cohort study can provide etiological information about how gambling and problem gambling develops, progresses, and remits over time. The information collected through a cohort study has significant value as it can highlight risk and protective factors important in developing effective prevention, intervention, treatment, and recovery support services.

In October of 2013, the MGC recommended to the Legislature that a longitudinal cohort study be added to the MGC research agenda. In November of 2013, the MGC issued a Request for Proposals to conduct a multi-year cohort study to provide insight into the causes of problem gambling and variables influencing changes in gambling status. In April of 2014, the MGC selected the same University of Massachusetts Amherst School of Public Health and Health Sciences research team to conduct the cohort study. Due to uncertainties associated with possible repeal of the Expanded Gaming Act, the MGC directed that the study not begin until after the results of the referendum had been determined in November of 2014. The Massachusetts Gambling Impact Cohort (MAGIC) study was launched in December of 2014.

Cohort Studies of Gambling and Problem Gambling

Cohort studies are a specific type of study used to investigate the causes of disease and to establish links between risk factors and health outcomes. A cohort study examines a group of people with a shared experience (e.g., exposure to an increase in gambling opportunities) at intervals over time. There are two main types of cohort studies. 'Retrospective' cohort studies look at data that already exist and try to identify risk factors for particular conditions. While retrospective cohort studies tend to be less costly, interpretation of results can be limited due to missing data. 'Prospective' cohort studies are typically planned far in advance and conducted over an extended period of time.

Researchers began conducting prospective cohort studies of gambling and problem gambling in the early 1990s. These early studies involved relatively small groups of people. They had a number of other

limitations, including restrictive demographics, a short time span or small number of assessments, looking at either gambling or problem gambling but not both, a short questionnaire that examined only a subset of variables potentially involved in the development (or, 'etiology') of problem gambling, and poor retention rates. Several reviews of these studies have been published (M. W. Abbott & Clarke, 2007; el-Guebaly et al., 2008; W. Slutske, 2007; Williams et al., 2015).

The limitations of these smaller studies led to the launch of several large-scale longitudinal cohort studies of gambling and problem gambling in five countries. These are described below, followed by a brief summary of the factors most consistently linked to future problem gambling among all of the studies.

The Leisure, Lifestyle, Lifecycle Project (LLLP) was funded by the Alberta Gambling Research Institute and launched in 2006. A cohort of 1,808 Albertans was recruited with representative sampling from the major regions of the province. Five age cohorts were established at baseline (13–15; 18–20; 23–25; 43–45; 63–65) with equal numbers in each group. The sample included a subset of 524 'high risk' individuals presumed to be at higher risk for developing gambling problems because of their greater expenditure and frequency of gambling. All participants received a comprehensive 2–3 hour assessment of all variables of etiological relevance to gambling and problem gambling at each wave of the study. The LLLP had a 19–21 month interval between assessments. A total of 1,030 adults completed the fourth and final assessment, for an overall retention rate of 76.1%. A total of 313 adolescents completed the fourth and final assessment, for a retention rate of 71.8%. A final report on the results of the LLLP was published in 2015 (el-Guebaly et al., 2015).

The Quinte Longitudinal Study (QLS) was funded by the Ontario Problem Gambling Research Centre and also launched in 2006. A total of 4,123 Ontario adults aged 17–90 were recruited from the Quinte region in Ontario, Canada. A subset of 1,216 'high risk' individuals at elevated risk for developing gambling problems by virtue of their greater expenditure on gambling, past-year gambling on slot machines or horse races, or an intention to gamble at a proposed slots-at-racetrack facility, was included in the sample. All participants received a comprehensive 1–2 hour assessment of all variables of etiological relevance to gambling and problem gambling at each wave of the study. The QLS had five assessment periods, with a 12-month interval between the start of each period and a five-month assessment window. The final assessment period ended in 2011. An exceptionally high retention rate of 93.9% was attained in the QLS. A report summarizing the results of the QLS and comparing these with the LLLP was published in 2015 (Williams et al., 2015).

The Swedish Longitudinal Gambling Study (Swelogs) was funded by the Public Health Agency of Sweden and launched in 2008. The study began in 2008/2009 with an extensive telephone prevalence survey of gambling, problem gambling, and health in a random sample from the Swedish Register of the Total Population aged 16–84 stratified by gender, age, and risk for problem gambling. Those not reached by telephone received a postal survey that was followed up with a reminder. A total of 8,165 of the initial sample of 15,000 responded. Register data on sociodemographics from national registers was added to the response data and also used to calculate survey weights. Follow-up assessments of the 8,165 Swedes occurred in 2009/10 with 6,021 participants, in 2012 with 4,188 participants, and finally in 2014 with 3,559 participants. A total of 2,847 individuals participated in all four waves. A separate track used a case control design whereby all moderate risk and problem gamblers in the epidemiological track of the study and a sample of low-risk and non-problem gamblers (identified using the CPGI) were selected for interviews. Each moderate risk and problem gambler was matched on basic demographics with three people selected from the general population sample to form a control group. This in-depth

track included comprehensive telephone interviews completed in 2011 with 2400 participants, again in 2013, and a third qualitative wave completed 2015. A final feature of the study is a follow up of 578 people from a 1997/1998 Swedish gambling prevalence study (289 problem gamblers and a matched set of controls). There is a report for wave one and wave two, and several fact sheets describing the results, available in English at www.folkhalsomyndigheten.se.

The Swelogs research team has published four articles in English: (1) describing the study methodology (Romild, Volberg, & Abbott, 2014), (2) comparing the results of the 1997/1998 prevalence survey in Sweden with the Swelogs baseline epidemiological survey in 2009 (M. W. Abbott, Romild, & Volberg, 2014), (3) examining problem gambling prevalence and incidence in Sweden (M. Abbott, Romild, & Volberg, 2018), and (4) identifying the riskiness of different forms of gambling in Sweden (Binde, Romild, & Volberg, 2017). Data was also used in two doctoral theses, each with four articles that were also published separately.

The Victorian Gambling Study (VGS) was funded by the Victoria Department of Justice in Australia and launched in 2008. The study began with a general population representative survey of gambling behaviour and health among 15,000 adults in Victoria, with oversampling of local government areas that showed higher EGM expenditure. There were three subsequent waves roughly 12 months apart in 2009, 2010, and 2011. The retention rate at the end of the study was 24.7%. The assessment consisted of a 15 to 25 minute telephone interview focusing on gambling behaviour, health and well-being, important life events in the past 12 months, and demographic information. Reports on the results of the VGS have been published by the Victoria Department of Justice (Victoria Department of Justice, 2009, 2011) and the Victorian Responsible Gambling Foundation (Billi, Stone, Marden, & Yeung, 2014; Victorian Responsible Gambling Foundation, 2012a, 2012b). Four technical reports with additional analyses of the VGS (Stone, Yeung, & Billi, 2016a, 2016b, 2016c, 2016d) are also freely available from the Victorian Responsible Gambling Foundation.

The New Zealand National Gambling Study (NZ NGS) is funded by the New Zealand Ministry of Health and began in 2012. The study started with a face-to-face prevalence survey of gambling and problem gambling among 6,251 people aged 18 years and older living in private households. This study oversamples important ethnic groups in the country, including Māori, Pacific people, and Asian people. The assessment consisted of a 45-60 minute structured interview focusing on gambling behaviour, problem gambling, life events, mental health, alcohol and substance use and misuse, health conditions, social connectedness, level of deprivation, and demographics. The NZ NGS has had four assessment periods from 2012 to 2015, with a 12-month interval between the start of each period. Reports and articles on the results of each wave of the study are available online (M. Abbott, Bellringer, Garrett, & Kolandai-Matchett, 2017; M. W. Abbott, Bellringer, Garrett, & Mundy-McPherson, 2014a, 2014b, 2015a, 2015b, 2016, 2018). A further cohort of 106 high risk gamblers was recruited from gambling venues and via advertisements in 2014/15, and re-assessed in 2015/16, with the purpose of assessing their similarity to the NGS high risk gamblers for potential sample combination, thereby increasing statistical power for sub-group analyses. In 2018, a sub-sample of 50 participants is taking part in semi-structured interviews to understand how and why people transition between different gambling states.

Table 1 summarizes key features of the five large cohort studies.

Table 1: Comparing Five Cohort Studies of Gambling and Problem Gambling

	Alberta, Canada LLLP	Ontario, Canada QLS	Sweden Swelogs	Australia VGS	New Zealand NGS
Data collection period	2006-2011	2006-2011	2008-2014	2008-2012	2012-2018
Recruited sample	1,808	4,123	8,165	15,000	6,251
Assessment length	2-3 hour	1-2 hour	15-25 min	15-25 min	45 min
Interval (months)	17-22[1]	12	12[2]	12	12
PG Measure	CPGI 5+	PPGM	CPGI 5+	CPGI 8+	CPGI 8+
Baseline PG prevalence	3.6%[3]	3.1%[3]	1.0%[4]	2.6%[4]	2.5%[4]
Wave 2 PG prevalence	2.0%[3]	2.9%[3]	1.1%[4]	1.5%[4]	2.0%[4]
Incidence (Wave 1 – Wave 2)	N/A	1.4%[3]	0.8%[4]	0.12%[4]	0.28%[4]
Proportion of Wave 2 PGs that are new cases	N/A	49.0%	73.5%	33.3%	51.6%

[1] This is the average elapsed time between waves for all respondents.
[2] Between Wave 1 and Wave 2; the interval between subsequent waves was 24 months.
[3] Unweighted
[4] Weighted

Some consistent findings emerge from the full body of longitudinal studies of gambling and problem gambling (Williams et al., 2015). First, gambling categorization is surprisingly unstable, with people moving into and out of problem or at-risk gambling status over time. In general, recreational gamblers and non-gamblers tend to be most stable over time. Less than half of people with gambling problems tend to have a gambling problem in the next assessment period, and only a small minority of problem gamblers remain in this status over multiple consecutive assessments. Another consistent finding from the longitudinal studies is that no single variable is overwhelmingly present in people who develop gambling problems and absent in those who do not. Instead, there are many different variables that increase the risk of future problem gambling. This is consistent with what has been found in other areas of addiction.

There are some factors that are much stronger predictors than others of future problem gambling. In general, gambling-related variables most strongly predict future problem gambling. Specifically, future problem gambling is best predicted by currently being a problem gambler, followed by being in the at-risk category. The latter variable is primarily associated with the continuation of problem gambling, as well as relapse, rather than in the onset of problem gambling.

Other strong gambling-related predictors of future problem gambling include a big gambling win in the past year, intensity of overall gambling involvement, higher frequency of involvement in continuous forms of gambling (e.g., EGMs), rating gambling as an important leisure activity, having family members and/or close friends who gamble heavily, gambling to escape or distract oneself, higher levels of gambling fallacies, and shorter distance to the nearest EGM venue.

Personality is the next most important category of variables that predict future problem gambling. Particularly important traits include impulsivity, vulnerability to stress, lower agreeableness, and lower conscientiousness. These personality traits have not been assessed in all of the prospective cohort studies; still, this profile is consistent with the personality profile of people with gambling problems that

seek treatment, as well as people with gambling problems drawn from community samples. These traits are also commonly found in people who abuse substances.

The third category of variables associated with future problem gambling includes mental health problems. Depression has long been known to be a strong correlate of problem gambling and it is the second most commonly identified predictor of problem gambling across the large prospective cohort studies. Having any mental health disorder has also been found to be a consistent predictor of future problem gambling, such as having behavioral addictions or substance abuse (including tobacco use).

When these variables are included in multivariate models, the complexity of future problem gambling becomes even more apparent. Even after eliminating variables with overlapping predictive power, there are still many variables that predict future problem gambling. In multivariate approaches, gambling category is again the strongest individual predictor, but the individual gambling variables lose some predictive power. Beyond the gambling-related variables, the only variables that robustly add predictive power to multivariate results are impulsivity, having a behavioral addiction, having a lifetime history of addiction to drugs or alcohol, and having a family history of mental health problems.

An important finding from the longitudinal cohort studies is that different variables predict the first onset of problem gambling versus relapse and the continuation of problem gambling. Almost all of the gambling-related predictors tend to be first onset predictors. In contrast, non-gambling variables have a greater role in problem gambling continuation and relapse. In particular, the presence of certain personality traits as well as comorbid mental health disorders, a lifetime history of mental health or substance abuse problems, lower intellectual ability, and anti-sociality make it more difficult for people with gambling problems to recover and leave them more susceptible to relapse once they have recovered.

The Massachusetts Gambling Impact Cohort Study

The design of the Massachusetts longitudinal cohort study of gambling and problem gambling builds on existing longitudinal problem gambling research. As the prior discussion illustrates, significant progress has been made in understanding the incidence and etiology of problem gambling in other countries. However, there are several reasons why a Massachusetts longitudinal cohort study of gambling and problem gambling is warranted:

- First, there have been no longitudinal research studies of gambling and problem gambling in Massachusetts (and no major cohort studies of gambling in the United States). There are important differences between Massachusetts and other jurisdictions where longitudinal cohort studies have been conducted. These differences include demographic composition, the availability of casino gambling, the extent of efforts to prevent problem gambling, and the time period in which incidence within the cohort will be examined. It is possible that the nature, incidence, and etiology of problem gambling may be somewhat different in Massachusetts compared with other jurisdictions where similar studies have been carried out.
- Second, the change in gambling availability in Massachusetts during the course of this study (due to the introduction of at least three and possibly four major new gambling venues) will be greater than the fairly stable availability of gambling that occurred in the Alberta, New Zealand, Ontario, Sweden, and Victorian studies. Thus, Massachusetts presents a much better opportunity to understand the role of increased gambling availability, and casino gambling specifically, in the development of problem gambling.

- Third, this research addresses two important limitations of previous research: (a) a low number of problem gamblers, limiting the robustness of the findings and (b) a limited and circumscribed time frame (2 years to 6 years), which precludes a fuller understanding of transitions in and out of problem gambling. MAGIC endeavors to rectify these shortcomings with a much greater oversampling of high risk groups and a longer time frame.
- Finally, the findings from the MAGIC study will be synergistic with those of the SEIGMA study, producing results much richer than either study on its own. While the emphasis in the MAGIC study is on incidence and etiology of problem gambling, and the emphasis in the SEIGMA study is on the prevalence of problem gambling—in addition to a broader focus on the social and economic impacts—both studies will produce considerable evidence pertaining to the other study's focus. The impacts identified in SEIGMA can be explored in greater depth in MAGIC and the factors contributing to incidence and relapse can be explored in greater depth in SEIGMA.

Principal Study Questions

The three primary research goals of the MAGIC study are to determine the **incidence** of problem gambling, understand the **stability and transitions** associated with problem gambling, and to develop an **etiological model** of problem gambling. We discuss each of these goals in detail below.

Determine the Incidence of Problem Gambling

Incidence studies in the context of a longitudinal cohort can provide a full picture of the nature of the disorder. For example, a stable prevalence rate over time can be the result of either (a) ongoing unremitting problem gambling in the same group of individuals or (b) the rate of new cases is roughly equivalent to the rate of remission among existing problem gamblers. In the context of a longitudinal cohort, we want to understand which of these two different scenarios is occurring, as they have different implications for prevention and treatment. A cohort study is best suited to examine these issues and establish incidence.

Determine the Stability and Transitions Associated with Problem Gambling

Previous research has found the duration of Problem Gambling to be relatively short, with one year being the modal duration. In contrast, persons classified as Recreational Gamblers and Non-Gamblers have been found to be much more stable gambling classifications over time. This same research has also found high rates of problem gambling relapse following recovery. The present research will re-examine these same issues. An important advantage of the present research is potentially having a greater number of problem gamblers as well as a longer timeframe to examine these transitions.

Develop an Etiological Model of Problem Gambling

Internationally, considerable effort is currently going into the development of strategies to prevent problem gambling. Unfortunately, the majority of these initiatives appear to be fairly ineffectual (Williams, West, & Simpson, 2012). This is partly due to the fact that most of these educational and policy initiatives have been put in place because they "seemed like good ideas" and/or were being used in other jurisdictions, rather than having demonstrated scientific efficacy or being derived from a clear understanding of effective prevention practices. However, it is also due to the fact that there is no comprehensive and well established etiological model of disordered gambling to guide these efforts.

While there are many well established correlates of problem gambling (e.g., gambling fallacies, mental health problems, etc.), their association with problem gambling may occur either because they *caused* problem gambling, developed *concurrently* with problem gambling, or developed as a *consequence* of problem gambling. From a prevention standpoint, knowing how and where to effectively intervene hinges on having research that clearly identifies the variables that are etiologically involved in problem

gambling, their temporal sequence, and their causal connections. Similarly, knowing the factors implicated in sustained recovery from problem gambling is very important for the purposes of treatment. Longitudinal research is the best way of disentangling these complex relationships and understanding the chronology and causal directions, potentially allowing for the creation of a detailed etiological model of how gambling and problem gambling develops, continues, and remits. Longitudinal research has been applied successfully many times in the fields of health, mental health, and addiction to elucidate these connections. To date, however, comprehensive longitudinal studies are relatively uncommon in the area of gambling and problem gambling.

Organization of Report

This report is organized into several sections for clarity of presentation. Following this *Introduction*, an *Overview of Methods* details the selection and recruitment of the study sample. The next sections present findings in the following areas:

- Changes in gambling participation
- Changes in problem gambling status
- Incidence of problem gambling
- Stability and transitions of gambling behavior

The report concludes with a summary of the results and a discussion of the implications of these findings for problem gambling prevention and treatment. Appendices to the report include a detailed explanation of the study methodology and a copy of the questionnaire.

Overview of Methods

This section presents an overview of the methods used in selecting and recruiting the sample for the study. Additional information on the study methodology, intended for technical readers, is provided in Appendices A1 through A4. A copy of the questionnaire is provided in Appendix B.

Sampling Strategy

Baseline General Population Survey (BGPS)

Responses to the SEIGMA Baseline General Population Survey (BGPS) constituted Wave 1 of the MAGIC study. The BGPS was completed in several stages. In the first stage of the survey, the SEIGMA research team and staff from the National Opinion Research Center (NORC) at the University of Chicago worked together to finalize the questionnaire and sampling frame. NORC programmed the questionnaire for computer-assisted web interviewing (CAWI) and computer-assisted telephone interviewing (CATI) administration, as well as creating a self-administered paper-and-pencil questionnaire (SAQ) and advance materials such as letters, postcards, and brochures. All materials were translated into Spanish and back-translated to verify consistency.

In the second stage, the survey was completed by 9,578 Massachusetts adults (aged 18 years and older) between September 2013 and May 2014. Participants were selected by means of address-based sampling (ABS), a method that ensured that each Massachusetts household had a known probability of selection into the sample, independent of their telephone status (i.e., landline, cell, or no telephone) (Iannacchione, 2011; Link, 2008). To achieve a random sample, the study targeted the adult in the household who had the most recent birthday.

The third stage of the survey involved data cleaning and data weighting to increase confidence in generalizing results to the adult population of Massachusetts and preparation of a comprehensive report. Descriptive results from the BGPS were originally published in June 2015 with an updated report published in September 2017 (Volberg, Williams, Stanek, Houpt, et al., 2017). A report on deeper, multivariate analyses of the BGPS results was published in March 2017 (Williams et al., 2017). These reports can be found at www.umass.edu/seigma/reports.

Establishing the Cohort

A cohort study follows a group of people with a shared experience (exposure to expanded gambling) at intervals over time. The MAGIC cohort is a subset of participants from the BGPS.

To establish the cohort, a stratified sample of 4,860 adult residents of Massachusetts aged 18 and older was selected from the 9,578 respondents in the BGPS. The sample was drawn to ensure that a cohort of at least 2,600 would be achieved (assuming a 55% participation rate among selected BGPS respondents).[3] The sample was selected from five high-risk strata, including respondents to the baseline survey who were (a) Problem Gamblers, (b) At-Risk Gamblers, (c) gamblers who spent $1,200 or more annually on gambling, (d) those who gambled weekly, and (e) those who had served in the military since September 2001. The remaining BGPS respondents constituted a single low-risk stratum. All of the respondents in the high-risk strata were selected for the MAGIC study along with a randomly selected third of respondents from the low-risk stratum.

[3] The assumption of a 55% participation rate among selected BGPS respondents was based on experience at NORC with other longitudinal cohort studies.

Table 2 illustrates the sampling strategy for the MAGIC study. The first column lists the strata, while the second column lists the number of respondents from the BGPS in each stratum. In the third column, under the heading *Sampling Framework*, we show the *Sampling Proportion* for each stratum. The next column presents the *number of respondents sampled* for the MAGIC cohort in each stratum. For example, 450 respondents in the BGPS were classified as At-Risk Gamblers and the sampling proportion is 1 (100%), so 450 At-Risk Gamblers were included in the sample drawn for MAGIC.

Table 2: Sampling Strategy for MAGIC

	BGPS	Sampling Framework	
Strata	**N**	**Sampling Proportion**	**# in Sample**
Problem Gambler	133	1	133
At-Risk Gambler	450	1	450
Spends $1,200+ annually	1,088	1	1,088
Gambles weekly	792	1	792
Military service Sept 2001 or later	49	1	49
All other BGPS participants	7,066	0.33	2,348
Totals	9,578		4,860

Wave 2 of MAGIC started with a sample of 4,860 participants who previously participated in BGPS. Those who completed the second wave of data collection would establish and define the MAGIC cohort for future rounds of data collection. Based on an anticipated response rate of 55%, we expected that the MAGIC cohort would consist of 2,673 participants.

Questionnaire

Two instruments were used to assess problem gambling in the MAGIC survey: the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001) and the Problem and Pathological Gambling Measure (PPGM) (Williams & Volberg, 2010, 2014). Worldwide, the CPGI is presently the most common instrument for the assessment of problem gambling (surpassing both the South Oaks Gambling Screen (SOGS) and the DSM-IV criteria for pathological gambling) (Williams, Volberg, & Stevens, 2012). However, the PPGM has superior sensitivity, positive predictive power, diagnostic efficiency, and overall classification accuracy compared to the CPGI as well as other problem gambling instruments (Williams & Volberg, 2014).

The Wave 2 survey instrument was largely the same as the Wave 1 questionnaire.[4] The questionnaire included sections on recreation, physical and mental health, alcohol and drug use, gambling attitudes, gambling behavior, gambling motivations, importance of gambling as a recreational activity, awareness of problem gambling services, gambling-related problems, and demographics.

Five questions were added to the Wave 2 instrument. These new questions related to the respondent's internet access, whether the respondent had gambled at an underground casino or slot parlor, and

[4] The BGPS/Wave 1 questionnaire is available in Appendix B of *Gambling and Problem Gambling in Massachusetts: Results of a Baseline Population Survey* and the Wave 2 questionnaire is available in Appendix B of *Analysis of MAGIC Wave 2: Incidence and Transitions* (www.umass.edu/seigma/reports).

whether the respondent had gambled at the new Plainridge Park Casino, which opened in Plainville, Massachusetts in June 2015. The new questions were:

- Do you have an internet connection either at home or at work? (Yes/No)
- Overall, how often do you use the internet? (Daily, A few times a week, A few times a month, A few times a year, Not at all)
- Have you gambled at any "underground" casino or slot parlor in Massachusetts in the past 12 months? (Yes/No)
- The Plainridge Park Casino recently opened in Plainville, Massachusetts. Have you gambled at this new casino? If you visited the casino, but did not gamble, please select No. (Yes/No)
- How many times have you gambled at the Plainridge Park Casino?

The two questions related to gambling at Plainridge Park Casino were added late in the field period to coincide with the opening of the new venue on June 24, 2015 and were available only in Web and CATI.

The basis for the Wave 3 questionnaire was the Wave 2 questionnaire with several significant changes (see Appendix B in this report for a copy of the Wave 3 questionnaire). Questionnaire changes to the Wave 3 instrument include the addition of a Lifetime Gambling Measure and Levenson's Primary Psychopathy Scale. Three additional questions were also added:

- Prior to the past 12 month, do you have any significant history of mental health problems such as depression, post-traumatic stress, panic attacks, generalized anxiety, agoraphobia, obsessive-compulsive disorder, bipolar disorder, schizophrenia, bulimia, etc.? (Yes/No)
- Is there any significant history of mental health problems, drug or alcohol addictions, or behavioral addictions in your parents, siblings, or children? (Yes/No/Unsure)
- Were you abused as a child (physically, sexually, or emotionally)? (Yes/No)

As with the Wave 1 and Wave 2 questionnaires, if respondents reported experiencing problems with certain issues while completing the Wave 3 questionnaire, contact information for treatment providers was provided. In contrast to Wave 1, all surveys were completed in English in Wave 2 and Wave 3, regardless of interview mode.[5]

Ethical Review

All waves of data collection efforts were subject to approval by the Institutional Review Boards (IRBs) from both NORC and UMass Amherst. For Wave 3, NORC received IRB approval on February 24, 2016; UMass Amherst received approval shortly thereafter on March 11, 2016. As part of the IRB submission, NORC requested that the IRB waive the requirement of obtaining informed consent documentation in exchange for including informed consent statements in each survey mode.

For web respondents, the informed consent statement was read as part of the screening process, with a hyperlink to the Federal Certificate of Confidentiality printed within the frequently asked questions (FAQs) document. If the respondent clicked 'Next' to move past the informed consent screen, he or she was presumed to be informed of his or her rights as a participant. For mail, the informed consent statement was printed on the inside cover of the hardcopy questionnaire with a printed link to the Federal

[5] A small number of the BGPS respondents drawn for the cohort (n=73, 1.5%) completed the BGPS in Spanish. Among these respondents, 39.7% (n=29) participated in Wave 2 and 15% (n=11) participated in Wave 3. While the decision to administer the MAGIC survey only in English was based on budget constraints, the overall impact on the results is likely small since these respondents represent less than 1% of the cohort.

Certificate of Confidentiality. Respondents returning a booklet with valid response data were considered to have provided consent. Finally, in Wave 1 and Wave 2, respondents completing by telephone were read the informed consent script. Interviewers gained consent by clicking "Continue" if the respondent did not voice any objections. Respondents were also notified that the calls would be recorded. If the respondent objected, the interviewer would select that the respondent refused to be recorded and the interview would continue unrecorded.

All materials provided to potential respondents (letters, brochure, and questionnaire) were submitted to the two IRBs for review. As data collection progressed, any materials requiring modification or new materials not included in the original submission were sent as an amendment to both IRBs for review.

Data Collection

Wave 1 was conducted from September 2013 to May 2014 and Wave 2 was conducted from March 2015 to September 2015. Wave 3 began in April 2016 and ended in August 2016. A series of mailings were scheduled to encourage respondent participation, to inform households about the survey and how they were selected, and to provide contact information for NORC and UMass Amherst. Mailings were scheduled approximately two weeks apart to give respondents enough time to receive and complete the questionnaire and so that NORC could remove completed cases from follow-up mailings. Prior to each mailing, households that had already completed the survey were removed from the mailing list.

To enhance the overall response rate, the survey was offered in three modes – web, mail, and telephone for Wave 1 and Wave 2. Participants were introduced to these modes sequentially. Figure 1 illustrates the multi-mode approach that was employed for reaching the sampled respondents in Wave 1 and Wave 2.

Figure 1: Multi-Mode Data Collection Approach for Wave 1 and Wave 2

Respondents were first invited to participate in the survey online.[6] If respondents did not complete the survey online, they were sent a hardcopy questionnaire with a postage-paid business reply envelope. Respondents who did not reply in the first two modes were contacted by telephone. Respondents could also call the study's toll-free line to complete the survey over the telephone at any time. All cases not reached via any of the three modes were sent to a "locating case management system," as described below.

The cohort of respondents that was established in Wave 2 (n=3,139) was contacted again in April 2016 to complete Wave 3 of the study. In contrast to the data collection procedures used in previous waves, the MAGIC Wave 3 questionnaire was administered online and via paper mail-in questionnaire (SAQ) only. Telephone dialing was only conducted for the purpose of contacting respondents who had not yet completed the survey and prompting them to complete via the web instrument or to return their completed SAQ.

[6] The web survey remained open throughout the data collection period.

Figure 2: Multi-Mode Data Collection Approach for Wave 3

Locating Procedures

The locating case management approach involved the following:

- Calling to determine the status of any existing telephone numbers for the respondent or any telephone numbers for contacts provided by the respondent during Wave 1 and Wave 2
- Performing extensive internet searches for the person
- Conducting searches using a third party locating vendor (Accurint)

All locating activities were reviewed and approved by the NORC IRB and the UMass Amherst IRB.

In the first approach for Wave 2 and Wave 3, locators dialed any telephone numbers associated with the case from Wave 1. Locators also followed up with the three contacts provided by respondents in Wave 1 to find alternate telephone numbers for the respondent. In Wave 2, when locators successfully identified a respondent, the case was opened in the telephone survey and the case was completed. In Wave 3, non-respondents were called as a prompt to complete the online or paper survey.

In the second approach for Wave 2 and Wave 3, after all alternate telephone numbers were exhausted, locators conducted internet searches for contact leads. Internet sites used during this approach included Google, White Pages, and LinkedIn. As leads were generated, locators followed steps to: confirm the respondent and complete the telephone survey in Wave 2 or, in Wave 3, complete the online or paper survey; schedule an appointment to complete the telephone survey in Wave 2, or, in Wave 3, complete the online or paper survey; probe for new address and telephone information if the respondent no longer lived in the household; and leave information about how to contact the project if an informant refused to provide new contact information.

In the third approach for Wave 2 and Wave 3, specially trained locators used Accurint to obtain new address and telephone information for respondents by matching a combination of respondent name, address, telephone number, gender, and age. If all protocols were followed and no further leads identified, indicating that the respondent could not be found, the case was finalized as not locatable.

Data Collection Procedures

This section describes data collection procedures specifically for Wave 3. Readers interested in the data collection procedures for the previous waves should consult *Analysis of MAGIC Wave 2: Incidence and Transitions* (www.umass.edu/seigma/reports).

Respondents who completed Wave 3 of the survey were first mailed a web packet asking them to complete the survey online. Enclosed with this mailing was a web invitation letter, survey brochure, web insert outlining how to access the web survey, and a list of Frequently Asked Questions (FAQs). The invitation letter informed respondents of the purpose of the study and provided a web link and Personal Identification Number (PIN) to access the survey. The letter also offered sending a $50 incentive check

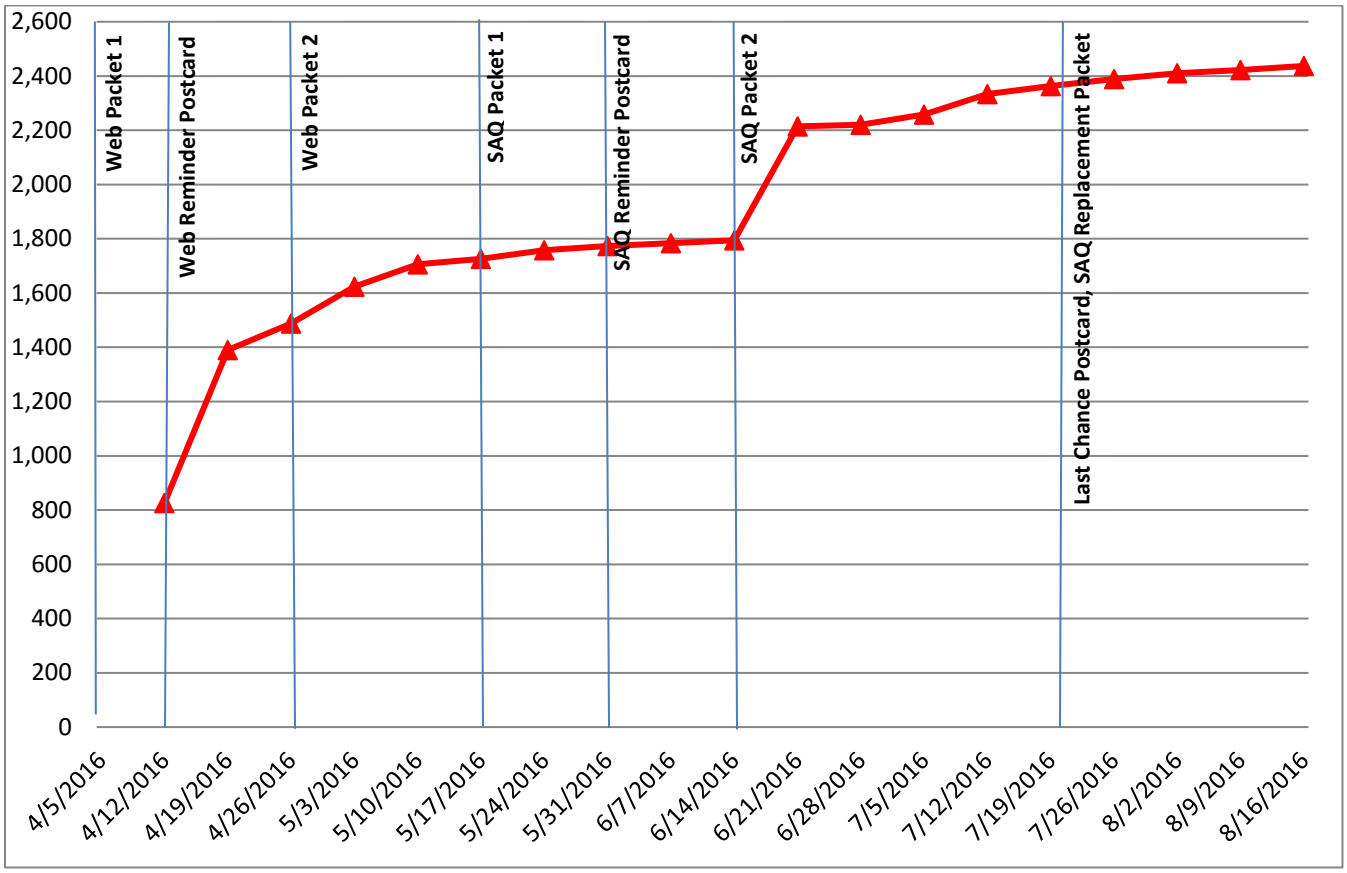
along with an additional $20 if the respondent completed the survey online by the Early Bird date (completed within 14 days) printed on the letter. A reminder postcard was mailed thanking those who had previously completed the survey, while reminding non-responders to complete the survey online. A second web packet mailing followed the postcard mailing. The letter encouraged respondents to complete the survey online and included the web link and PIN to access the survey. The letter also reminded respondents of the $50 incentive check if the respondent completed the survey.

The first self-administered printed questionnaire (SAQ) was mailed approximately a month and a half after the first "web packet" mailing. The SAQ packet included a letter, hardcopy questionnaire, postage-paid business reply envelope (BRE), $50 incentive reminder language, and survey brochure. The letter also provided instructions for completing the questionnaire online if desired. A second reminder postcard was mailed thanking those who had previously completed the survey while reminding non-responders to complete the survey. The final mailing was a replacement questionnaire to the remaining non-responders with a letter emphasizing the importance of the study. Telephone prompting was conducted for the purpose of prompting respondents to complete the survey over the web or to return their completed SAQ. Telephone prompting began July 5, 2016 and lasted for three weeks. Respondents who requested to be "taken off the list" or refused in a hostile manner were removed from the contact list immediately. Near the end of the data collection period, NORC sent pending non-respondents a final "last chance" postcard. This postcard alerted respondents that data collection would be ending July 29, 2016 and encouraged their participation before this date.

Key to this study, and the overall validity of the data collected, was ensuring that the respondent who completed the Wave 3 questionnaire was the same respondent from Waves 1 and 2. In order to confirm that the same respondent was being screened into the Wave 3 survey, respondent demographic information (name, address, age, and gender) collected during Wave 1 (and validated during Wave 2) was preloaded into the main screener question. The screener question was programmed to use the available preloaded information when screening the Wave 3 respondent. Since several respondents from Wave 1 and 2 did not provide all of the requested demographic information, the screener question had alternate text that would display based on the level of demographic information available. The Wave 2 interview month and year was also preloaded as a text fill within the screener question text in order to help respondent's recall.

Figure 3 presents the progress in recruiting respondents into the MAGIC study over the entire data collection period:

Figure 3: MAGIC Wave 3 Recruitment Progress



A total of 76% of the questionnaires completed by the cohort were self-administered online and 24% were completed using the self-administered paper-and-pencil format.

Data Processing

Before delivering the data to the UMass Amherst research team, NORC completed a series of data editing and cleaning procedures. Throughout data collection, SAS programs were run to identify any errors that occurred in the Web system. This allowed NORC to reconcile inconsistencies in the data and fix system or questionnaire errors as they occurred, which minimized data cleaning required after data collection was complete. NORC then combined the data from all data collection modes into a single analytic file which included a variable to indicate the mode of data collection used to complete each interview. NORC delivered the data to the UMass Amherst team via a Secure File Transfer Protocol (SFTP).

The dataset delivered to the UMass Amherst research team contained 2,455 complete records. A case was considered complete when 7 or more of the GY (gambling in the past 12 months) questions were answered. After the dataset was received, skip patterns and outliers were reviewed and a cleaned dataset was created. Using the cleaned data, several additional composite variables were created and added to the final dataset. Finally, a variable was added to the dataset to link Wave 1 and Wave 2 data with the Wave 3 respondents.

The UMass Amherst team also reviewed verbatim responses for several questions that offered an "Other" response category. The verbatim responses were back-coded into existing response categories. Both the original verbatim and the original response to the root question were maintained in the final dataset.

Matching Respondents Across Waves

Procedures used by NORC to screen respondents from Wave 1 into Wave 2 and from Wave 2 into Wave 3 involved the use of programmed questions based on preloaded information (name, address, gender, year of birth, month and year of the previous wave survey completion) in the Web mode. For most of the respondents, gender and year of birth exactly matched the respondent from Wave 1 to Wave 2 (n= 3,052, 97%) and from Wave 2 to Wave 3 (n=2,439, 99%). For these respondents, it seemed reasonable to assume the same person in the household responded to each wave.

There were discrepancies in gender and/or year of birth for a small number of respondents (n=87, 3.0%) from Wave 1 to Wave 2 and for a small number of respondents from Wave 2 to Wave 3 (n=16, 0.6 %). Among the small group of respondents with discrepancies in gender and/or year of birth, 51% of the Wave 2 respondents were deemed to be the same individual who completed the BGPS and 69% of Wave 3 respondents were deemed to be the same as Wave 2 respondents. The 43 respondents whose gender and/or year of birth could not be matched to BGPS data are included in the cohort but have missing data for Wave 1 of the study. These 43 individuals were not included in any of the Wave 1 to Wave 2 analyses. Table 3 presents information about the different types of disagreement and number of respondents with each type of disagreement in the cohort.

Looking across the three waves, the largest group (n=77, 75%) included respondents whose gender matched but whose year of birth did not match. A smaller group (n=26, 25%) included respondents whose gender did not match or whose gender and year of birth did not match across two waves.

Table 3: Respondent Mismatches in Gender, Year of Birth, or Both Across Three Waves

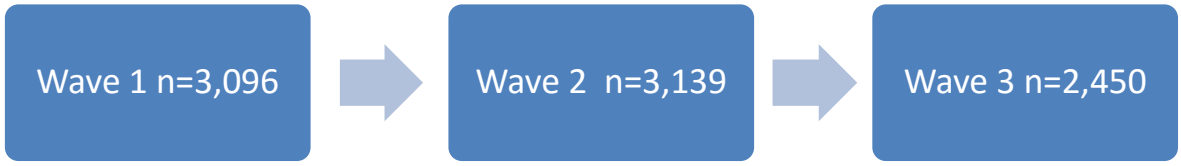
Gender	Year of Birth	Wave 1 to Wave 2 Frequency	Wave 2 to Wave 3 Frequency	Match
Match	**Mismatch** 1-2 years difference	36	10	Yes
Match	**Mismatch** 3-5 years difference	6	1	Yes
Match	**Mismatch** >5 years difference 2 digit year	2	0	Yes
Match	**Mismatch** >5 years difference	20	2	No
Mismatch	**Match**	9	2	No
Mismatch	**Mismatch**	14	1	No
TOTAL		**87**	**16**	

Among the respondents with matching gender and mismatching year of birth from Wave 1 to Wave 2 or from Wave 2 to Wave 3, 53 respondents reported a mismatch in year of birth of five years or less. Review of these individuals' responses to other items in the subsequent survey led the research team to conclude that the same respondent completed both questionnaires. Another two respondents from

Wave 1 to Wave 2 with matching gender but with year of birth mismatched by more than five years appeared to have indicated their age using a two-digit response rather than year of birth in Wave 1. Based on this assumption, these respondents' year of birth matched across the two waves and the research team concluded that the same respondent had completed both questionnaires.

There were 22 instances where respondents' gender matched across Wave 1 and Wave 2 or Wave 2 and Wave 3 but the difference in year of birth was greater than five years. There were also 11 instances where respondents' year of birth matched across two waves but gender did not and 15 instances where neither gender nor year of birth matched across two waves. For the Wave 1 data analytic file, this equalled the exclusion of 43 individuals since we considered the Wave 1 data to come from a different respondent. As a consequence, the MAGIC cohort includes Wave 1 data on 3,096 respondents and Wave 2 data on 3,139 respondents. The 3,139 Wave 2 respondents establish the MAGIC cohort. From Wave 2 to Wave 3, five respondents were not included in the analytic file since we suspect the data comes from a different respondent. The analytic file for Wave 3 includes 2,450 respondents.

Figure 4: Sample Size Across Waves



Missing Data

Missing data is anticipated in the MAGIC study due to incomplete responses to the questionnaire and sample attrition. A consequence of missing data is (a) reduction in power to address key hypotheses and (b) the potential for bias in reporting results and interpreting conclusions.

Item non-response was similar for each of the data collection modes. Respondents were allowed to refuse to answer any question or to give a "don't know" response. The percentage of complete responses was extremely high for nearly all of the items. The non-response rate was greater than 10% for only one question in Wave 1 and Wave 2: household income. In Wave 3, several additional variables had non-response rates of greater than 10%, including: life events; symptoms as a result of life events; association with alcohol or drug use; percentage of time spent on EGM and/or casino table games; amount of money spent on out-of-state gambling; and age gambled for money for the first time. For interested readers, the response rate for individual questions by data collection mode for each wave is shown in Appendix A4.

Weighting and Comparability Across Three Waves

MAGIC is a longitudinal study of a cohort of Massachusetts residents aged 18 and over who were selected using a probability sample of respondents in the SEIGMA Baseline General Population Survey (BGPS). For this reason, the weights for Wave 2 and Wave 3 of MAGIC are closely related to the weights developed for the BGPS. A total of 4,860 addresses were selected for the MAGIC study from addresses for the 9,578 BGPS respondents. Wave 2 respondents (n=3,139) define and establish the MAGIC cohort. The Wave 3 survey attempted to interview each subject in the MAGIC cohort approximately 12.5 months after Wave 2. A total of 2,450 respondents completed the Wave 3 survey.

Weights were developed for respondents at Wave 2, and these weights were used for estimating Wave 1 to Wave 2 differences. The weights accounted for: 1) the stratified BGPS design; 2) unknown eligibility of addresses (region, language, and last mode of contact—Web, SAQ, CATI); 3) non-response to the BGPS (including several sampling frame variables); 4) the MAGIC probability sample design; 5) non-response to Wave 2 (own/rent status of household, presence of children, education of respondent, and past-year gambling participation); 6) household size; 7) the 2013 MA population (region, gender, age, race/ethnicity, education); 8) weight trimming. More details are provided in the Appendix of the Wave 2 data report.

Weights were developed for respondents at Wave 3, and these weights were used for estimating Wave 2 to Wave 3 differences. The weights accounted for: 1) the stratified BGPS design; 2) unknown eligibility of addresses (region, language, and last mode of contact—Web, SAQ, CATI); 3) non-response to the BGPS (including several sampling frame variables); 4) the MAGIC probability sample design; 5) response rates to Wave 2 of MAGIC; 6) differential non-response to Wave 3 (last mode of attempted interview in the BGPS, born in the US, education, disability, and number of gambling formats participated in); 7) household size by region; 8) the 2016 MA population (region, age, gender, race/ethnicity, and education); 9) weight trimming. Here, we detail the weighting procedures for Wave 3. For technical readers, Appendix A3 fully details the Wave 3 weighting procedures.

The BGPS was a stratified, multi-mode address-based (ABS) probability sample survey with Massachusetts addresses serving as the primary sampling frame. One individual per household aged 18 and over with the closest birthday to the mailing date was invited to participate in the survey. The steps in the weighting make use of weights from the BGPS that accounted for address based probability sampling of the BGPS and completion rates for the BGPS. Since the MAGIC cohort is defined by respondents to the Wave 2 MAGIC survey, the weights account for the probability sample rates for the MAGIC cohort and completion rates for the Wave 2 MAGIC respondents. Finally, the weights account for the completion rates for the Wave 3 survey, household size, and raking by region, age, gender, race, and education to align the respondents to the 2016 Massachusetts population.

Weight Accounting for Respondents to the BGPS Survey (MW3WT1)

The initial step in the weighting makes use of weights from the BGPS that accounted for:

1. Baseline stratified sampling weight (Baseline Design weight: *WT1*)
2. Adjustment for unknown eligibility (Eligibility weight: *WT2*)
3. Adjustment for completion of the questionnaire (Completion weight: *WT3*)

The weights corresponded to inverse probability sampling weights that accounted for the stratified BGPS design (*WT1*), adjustment for unknown eligibility (based on the frame variables for region, language, and address type) (*WT2*), and adjustment for survey completion (based on the variables for region, language, and last mode of contact (Web, SAQ, CATI)) (*WT3*). The development of these weights ensures that the total weight in each region matches the number of addresses in each region and similarly that totals match Massachusetts totals by type of address, language, and last mode of contact. Details on the development of weights for the BGPS are given in Appendix A of *Gambling and Problem Gambling in Massachusetts: Results of a Baseline Population Survey* (www.umass.edu/seigma/reports).

Weight Accounting for Respondents to the Wave 2 Survey (MW3WT2)

The MAGIC cohort is defined by respondents to a stratified probability sample of BGPS respondents. Two additional factors were used to adjust the weights for the MAGIC cohort:

4. Adjust for the MAGIC probability sample design (MAGIC Design weight: *MWT1*)
5. Adjust for response rates to the Wave 2 MAGIC study (MAGIC Wave 2 Completion weight: *MWT2*)

Details of the development of these weights are given in Appendix A3 of *Analysis of MAGIC Wave 2: Incidence and Transitions* (www.umass.edu/seigma/reports).

Weight Accounting for Respondents to the Wave 3 Survey (MW3WT3)

The third adjustment to the weights accounts for differential non-response. All 3,139 MAGIC cohort participants were contacted for interview in Wave 3. Completed surveys were obtained from 2,450 of the 3,139 subjects in the MAGIC cohort. The first step in adjusting the weights for response is to drop from the cohort the 22 subjects who were deceased/ineligible. The total number of addresses represented by the remaining 3,117 Wave 3 cohort members is 2,699,451. Among these 3,117 cohort members, completed responses were obtained for 2,450 (78.6%) subjects.

A stepwise logistic regression was used to determine the most significant variables related to the rate of response. The dependent variable of interest was whether a survey was completed. Eighteen variables were used in the logistic regression (gender, age, race, education, children, home ownership, born in US, disabilities, employment, marital status, family gambling issues, saliency of gambling, frequency of gambling, number of gambling formats, region, type of address, language, and BGPS mode attempt). Nearly all variables (except region and type of address) were significantly related to response rates at the 0.10 level. Five variables (given in order of inclusion: BGPS mode attempt, US born, education, disability, and number of gambling formats) were significant at the 0.05 level. Addresses where one or more of the variables was missing (n=179) were not included in the logistic analysis.

We examined the response rates for cohort addresses for the five variables (with no missing data) that were statistically significant at the 0.05 level in the logistic regression model. We note that the lowest completion rates occurred for addresses where the BGPS contact was via telephone (CATI) (63.75%), where the respondent was not born in the US (65.91%), and where the respondent reported a disability (68.53%). We developed address groups based on response to the five variables (last mode of attempted interview in the BGPS, born in the US, education, disability, and number of gambling formats participated in) that had different response rates in Wave 3.

Adjustment for household size (MW3WT4)

The sample was also adjusted for household size (# age 18+=1, 2, 3, or 4+) by region.

Adjusting weights using raking based on cross-classified pairs of the variables region, age, gender, age, race/ethnicity, education (MW3WT5)

We adjusted weights assigned to respondents to more closely align with the distribution of 19 years and older persons in MA by region (Western, Eastern MA), age (19-34, 35-49, 50-64, 65+), gender (male, female), race/ethnicity (Hispanic, Black (only), Asian (only), White, Other), and education (high school or less, some college/college graduate, some post graduate education). We determined raking variables via a preliminary analysis of the 2016 one-year American Community Survey Public Use Microdata Sample (PUMS) files. In an ideal setting, reliable PUMS data for population totals would be available for a full cross-classification of adjustment variables. In practice, estimates of the population based on the PUMS data are based on an approximate 1% sample of the MA population, and the PUMS data themselves are weighted to estimate the number of subjects in each post-stratum. For this reason, we did not use a

cross-classification of all 5 variables to define post-strata for weighting. Instead, we constructed pairs of variables, using 10 pairs (i.e., region x age, region x gender, etc.).

Trimming of weights by setting the minimum weight to be the average weight/8, and the maximum weight to be average weight x 8 (MW3WT6)

The process of weighting to account for the sample design and response rates leads to different weights for different respondents. The weights are constructed so that an unbiased estimate can be made for the Massachusetts adult population. The weights ensure that if the expected value of response (such as the incidence of problem gambling) varies between respondents with different weights, the overall weighted estimator is an unbiased estimate for the population mean. An additional consequence of varying weights is a decrease in the precision of the estimator. When there is a weak relationship between the variables used for weighting and the expected value of response, reducing the range of weights can increase the precision of the estimator, while not creating appreciable bias. Such a reduction in the range of weights is accomplished by reducing the maximum weight and increasing the minimum weight. This process is called weight trimming. By trimming weights appropriately, a more accurate estimator may be constructed. The same criteria for weight trimming used for the BGPS and Wave 2 were used for Wave 3. The maximum weight was set to be 8 times the mean weight and the minimum weight was assigned as 1/8 the mean weight.

MAGIC Wave 2 and Wave 3 Response and Retention Rates by Strata

Table 4 presents information about the number of BGPS respondents drawn for the MAGIC cohort, the size of the achieved sample from each risk group (or stratum), and the AAPOR RR3 response rate (Wave 2) and retention rate (Wave 3) for each group. [7]

Table 4: Sample Composition by Risk Groups

	BGPS Drawn Sample	Wave 2 Achieved Sample	Wave 2 Response Rate (%)	Wave 3 Achieved Sample	Wave 3 Retention Rate (%)
Problem Gambler	133	81	61.4	66	81.5
At-Risk Gambler	450	295	65.7	227	76.9
Spends $1,200+ annually	1,088	726	67.2	575	79.2
Gambles weekly	792	534	67.6	410	76.8
Military service Sept 2001 or later	49	37	78.7	27	73.0
All other BGPS participants	2,348	1,466	63.1	1,145	78.1
Total	4,860	3,139	65.1	2,450	78.1

The overall response rate for Wave 2 was 65.1% and the retention rate for Wave 3 was 78.1%. For both Wave 2 and Wave 3, Table 4 shows that the response and retention rate differed somewhat by risk group. In Wave 2, a lower proportion of Problem Gamblers and "All other BGPS participants" completed the questionnaire and a higher proportion of veterans who served after 9/11 completed the questionnaire. The Wave 3 retention rate pattern is largely the inverse of the Wave 2 response rate—in

[7] The AAPOR RR3 is equivalent to the CASRO response rate; both take into account the proportion of households whose eligibility status could not be determined. The response rate also accounts for the resolution rate, screener completion rate, and interview completion rate. Retention rate is calculated by dividing the number of individuals who completed the survey by those eligible to complete the survey.

Wave 3, Problem Gamblers completed the questionnaire at the highest proportion instead of the lowest while veterans who served after 9/11 completed at the lowest proportion instead of the highest. This inversion may be explained by categories of individuals who are particularly enamored with gambling (i.e., Problem Gamblers) and who have continued with the survey after Wave 2 (when it became clear that the questionnaire centrally focused on gambling) being more likely to complete subsequent gambling focused surveys than other groups.

Table 5 provides an overview of the: intervals of assessment, assessment window, average time since previous assessment, eligible sample, number of completed surveys, content of the questionnaire, survey modalities, and the response and retention rate across the three Waves. It is interesting that the percent of respondents completing the survey online has steadily climbed from Wave 1 (44%) to Wave 3 (76%). This may be a result of comfort with online mediums more generally increasing through the years. In Wave 3, the option to complete the survey by telephone was no longer available.

The main consideration with survey administration concerns whether it is self-administered or administered via a personal interview. Self-administered gambling surveys (paper or web) produce significantly more accurate self-report compared to telephone interviews because of greater anonymity and being able to proceed at one's own pace (Williams & Volberg, 2009). In this regard, it is important to recognize that 94% or more of surveys have been self-administered in Wave 1 and Wave 2, and the change to 100% in Wave 3 likely does not make a significant difference in terms of the validity of responses. The movement from paper to web self-administration is increasing over time in all surveys and studies have generally found no evidence of differential responding in self-administered web surveys compared to self-administered paper surveys (Dodou & de Winter, 2014).

With the loss of telephone interviewing in Wave 3, the main effect, if any, is potential higher dropout rates of older individuals who previously completed the survey via telephone interview. However, even if true, this would not affect our main results as this demographic has the lowest rates of problem gambling. Moreover, we examined the number of participants who completed the survey by telephone in Wave 2 and found no statistically significant within-group differences in demographics or PPGM status.

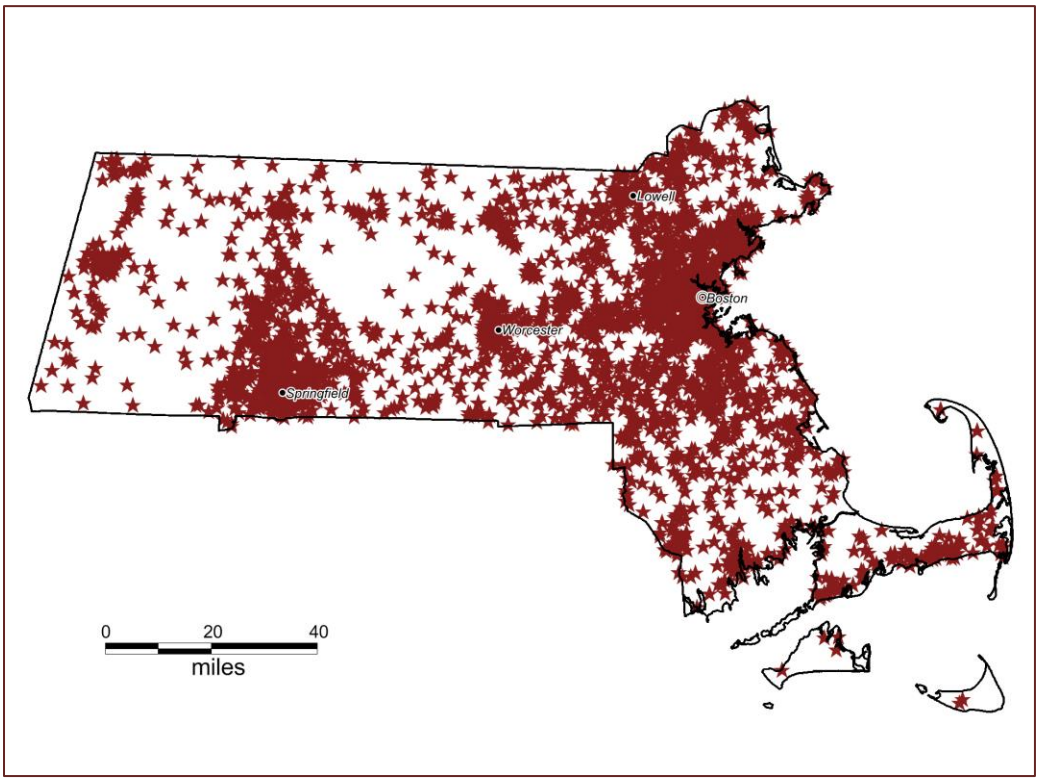
Table 5. Details of the Different Waves of MAGIC

Wave	Date	Assessment Window	Average Time Since Previous Assessment	Eligible Sample	Completed Surveys	Survey Content	Survey Modality	Response/ Retention Rate
1	Sep 11, 2013 – May 31, 2014	8.5 months	Not applicable	Not applicable	3,096	Short	44% web, 50% paper, 6% phone	36.6%
2	Mar 17, 2015 – Sep 11, 2015	6 months	16.5 months	4,860	3,139	Short	58% web; 36% paper; 5% phone	65.1%
3	Mar 31, 2016 – Aug 15, 2016	4.5 months	12.5 months	3139	2,450	Comprehensive	76% web; 24% paper	78.1%
4	*Mar 2017 – Jul 2017*	*Postponed due to budgetary constraints*						
4	Apr 6, 2018 – Jul 24, 2018					Comprehensive		
5	Mar 2019 – Jul 2019					Comprehensive		
6	Mar 2020 – Jul 2020					Comprehensive		

Assessment Window: length of time the survey is open to complete
Average Time Since Previous Assessment: average length of time since the previous assessment for the average participant
Eligible Sample: members of the designated cohort (i.e., people who completed Wave 2) minus individuals unable to participate due to death or permanent medical incapacitation
Completed Surveys: total number of surveys from the eligible sample deemed complete, defined as having completed at least 7 of the 10 primary questions on participation in gambling
Survey Content: whether the survey was short, due to a focus on casino impacts, or comprehensive due to a focus on the etiological predictors of problem gambling
Survey Modality: percent of surveys self-administered online; self-administered via a mailed paper survey; and administered via a telephone interview
Response Rate: accounts for the proportion of households whose eligibility status could not be determined while accounting for the resolution rate, screener completion rate, and interview completion rate
Retention Rate: number of completed surveys as a percentage of the eligible sample

Finally, it is helpful to understand where in Massachusetts the members of the cohort reside. Figure 5 displays the distribution of addresses of the participants who completed the questionnaire in Wave 2. This shows that the distribution of the cohort is quite similar to the distribution of the population of Massachusetts. The majority of the cohort lives in the Greater Boston and Southeastern regions of the Commonwealth and there is a sizable proportion of respondents from the Pioneer Valley in Western Massachusetts.

Figure 5: Residential Location of the MAGIC Cohort



Statistical Analyses

Statistical analyses of survey data where respondents have unequal weights is more complex than standard statistical analyses due to the need to properly account for the weights in estimating parameters and their variance. Special software and statistics have been developed for such situations. All three waves were analyzed using SAS-callable SUDAAN, release 11.0.1. SUDAAN enables the appropriate calculation of variance estimations for data from surveys using complex sampling strategies. When exact expressions for the variance were not possible, the Taylor series linearization method was used combined with variance estimation formulas specific to the sample design.

Results

The cohort is not intended to be a representative sample of the adult population of Massachusetts. Following the approach taken in some other gambling cohort studies (e.g., Victoria Department of Justice, 2011), we do use weighted data in the calculation of the incidence rate to correct for non-response bias and to more confidently generalize to the Massachusetts adult population. We also use weighted data to correct for non-response bias to examine changes in gambling participation rates. Nonetheless, as this is a cohort study, care should be taken when generalizing to the population since weighting cannot overcome all biases. Findings pertaining to transitions, however, are based on unweighted data and refer only to the study cohort.

The BGPS established the baseline prevalence of problem gambling in Massachusetts prior to the opening of any casinos and also provided other important information about gambling participation and problem gambling. This included prevalence rates among important demographic groups and among past-year participants in different gambling activities (Volberg, Williams, Stanek, Houpt, et al., 2017). A follow-up general population survey of Massachusetts is planned in 2020 once all of the casinos are operational.

Our focus in this section of the report is on changes in cohort gambling participation across three waves of the cohort. Transitions from Wave 1 to Wave 2 occurred before any casinos had opened in Massachusetts whereas transitions from Wave 2 to Wave 3 occurred after a slots parlor—Plainridge Park Casino in Plainville, Massachusetts—opened in June 2015. We also present information about the incidence of problem gambling within the cohort prior to the opening of any casinos in Massachusetts (Wave 1 to Wave 2) and after a slots parlor had opened (Wave 2 to Wave 3).[8] Finally, we examine changes in problem gambling status between 2013/2014, 2015, and 2016 within the cohort.

Changes in Gambling Participation

In this section, we present information about changes in gambling participation between Wave 1, Wave 2, and Wave 3 based on participants who completed all three waves. Table 6 provides information on questionnaire completion across the three waves.

Table 6: Completion Across Waves

Wave 1 (2013-2014)	Wave 2 (March-Sept 2015)	Wave 3 (April-August 2016)	Frequency	Percent
1=no	**2=yes**	**1=no**	21	0.67
1=no	**2=yes**	**2=yes**	22	0.70
2=yes	**2=yes**	**1=no**	668	21.3
2=yes	**2=yes**	**2=yes**	2428	77.3

Table 6 shows that complete questionnaires from the first three waves of the study are available from 2,428 respondents or 77% of the original cohort. There are 43 respondents who participated in Wave 2 but could not be matched to respondents from the same address who completed Wave 1. Among these 43 respondents, about half completed Wave 3 and about half did not. Finally, there were 668

[8] Plainridge Park Casino opened on June 24th 2015, shortly before Wave 2 data collection concluded. All but 5% of the Wave 2 questionnaires (n=167) were completed or returned before the opening of Plainridge Park Casino.

respondents who completed Wave 1 and Wave 2 but did not complete Wave 3. Since Wave 2 technically established the cohort, there were no “dropouts” from Wave 1 to Wave 2.

Table 7 presents differences in overall past-year gambling participation as well as past-year participation in specific activities for the 2,428 respondents who completed all three waves of the questionnaire. Table 7 shows that there was a statistically significant increase in daily lottery games, sports betting, and private betting from Wave 1 to Wave 2. However, looking at the odds ratios (OR), the magnitude of all of these changes is small. From Wave 2 to Wave 3, there is a statistically significant increase in overall gambling participation, all lottery, traditional lottery, instant games, daily games, bingo, sports betting, and online gambling. Nonetheless, the magnitude of many of these changes was either small or medium. It is notable that out-of-state casino gambling significantly decreased from Wave 2 to Wave 3 and the magnitude of this change was large.

The increases seen from Wave 2 to Wave 3 may be partly artifactual as the manner in which the questions were asked changed. For instance, online gambling was asked as a single question in Wave 1 and Wave 2 but it was asked as a supplemental question for each individual type of gambling in Wave 3 (i.e., if the person indicated they participated in a particular type of gambling, they were asked whether it was online or land-based participation). Furthermore, daily fantasy sports (which is available online) was an additional question in Wave 3. Finally, the increase in participation in daily lottery games from Wave 2 to Wave 3 may reflect the addition of Mass Cash and the Numbers Game as examples. Obtained rates of participation tend to increase when questions about involvement are asked in a repeated and more specific fashion such as this.

Table 8 presents information about changes in overall gambling expenditure, maximum frequency of gambling, and number of gambling formats engaged in across all three waves. From Wave 1 to Wave 2, there was a statistically significant decrease in the average maximum frequency of gambling. The magnitude of this decrease, however, was small. This trend continued from Wave 2 to Wave 3 and, again, the magnitude of this change was small. From Wave 2 to Wave 3, there was a significant decrease in total gambling expenditures and the magnitude of this change was large. However, it is clear in looking at the median that this change was likely affected by outliers which particularly affected the estimate at Wave 2. From Wave 2 to Wave 3, there was a statistically significant increase in the average number of gambling formats engaged in. The size of this change, however, was small.

Table 7: Pairwise Comparison of Gambling Participation Activities Across Three Waves (unweighted)

										Test for change				
		MAGIC Wave 1 (2013-2014)		MAGIC Wave 2 (March – Sept 2015)		MAGIC Wave 3 (April – August 2016)		Change Across Three Waves	Wave 1 to Wave 2		Wave 2 to Wave 3	
	N	%	95% CI	%	95% CI	%	95% CI	p-value[8]	p-value[9]	OR[10]	p-value[9]	OR[10]
Any gambling[1]	2,420	85.3	(83.8, 86.6)	84.5	(83.0, 85.9)	86.4	(84.9, 87.7)	.0232	.2467	1.15	.0063	1.40
All Lottery	2,408	72.9	(71.1, 74.7)	72.5	(70.7, 74.3)	77.3	(75.6, 79.0)	<.0001	.5832	1.07	<.0001	2.24
Traditional Lottery	2,423	70.0	(68.1, 71.7)	69.6	(67.7, 71.4)	73.7	(71.9, 75.4)	<.0001	.6154	1.06	<.0001	1.75
Instant Games	2,403	47.3	(45.3, 49.3)	46.9	(44.9, 48.9)	50.2	(48.2, 52.2)	.0007	.6292	1.04	.0003	1.40
Daily Games[2]	2,395	18.0	(16.5, 19.6)	19.9	(18.3, 21.5)	35.3	(33.4, 37.2)	<.0001	.0131	1.32	<.0001	4.73
Raffle	2,396	44.5	(42.6, 46.5)	42.9	(40.9, 44.9)	44.9	(42.9, 46.9)	.1457	.1368	1.12	.0609	1.16
EGM	2,418	Not asked Wave 1		Not asked Wave 2		21.7	(20.1, 23.4)					
Table Games	2,417	Not asked Wave 1		Not asked Wave 2		12.1	(10.8, 13.4)					
Casino: Out of state[3]	2,212	33.0	(31.0, 34.9)	32.5	(30.6, 34.5)	22.3	(20.6, 24.1)	<.0001	.5820	1.06	<.0001	3.26
Bingo[4]	2,394	4.7	(3.9, 5.6)	5.2	(4.4, 6.2)	7.1	(6.2, 8.2)	<.0001	.1851	1.34	.0001	2.07
Racing[5]	2,403	6.2	(5.3, 7.3)	6.8	(5.9, 7.9)	5.7	(4.9, 6.7)	.0632	.2123	1.25	.0205	1.52
Sports betting[6]	2,404	15.8	(14.4, 17.4)	17.8	(16.3, 19.4)	16.9	(15.4, 18.4)	.0382	.0093	1.34	.2287	1.14
Private Betting	2,407	13.2	(11.9, 14.6)	14.6	(13.2, 16.0)	Not asked at Wave 3			.0481	1.26		
Online[7]	2,257	1.5	(1.1, 2.1)	1.9	(1.5, 2.6)	6.6	(5.6, 7.7)	<.0001	.1138	1.67	<.0001	6.53
Other gambling	2,414	Not asked Wave 1		Not asked Wave 2		4.7	(3.9, 5.6)					

[1] Different in Wave 2 and Wave 3. Since the types of gambling asked about differed somewhat between waves, the calculation of "any past year gambling" is not equivalent.
[2] Wave 3 includes Mass Cash and Numbers Game
[3] Question slightly different between waves
[4] Wave 3 includes Online Bingo
[5] Wave 3 includes Horse or Dog Racing and previous waves include only Horse Racing
[6] Wave 3 includes Social Betting, Online Betting, and Fantasy Sports
[7] For every gambling format, the Wave 3 questionnaire asked the respondent whether they engaged in this form of gambling online. This change in the questionnaire likely drove the large increase seen in online gambling from Wave 2 to Wave 3.
[8] Cochran's Q Test (unweighted): non-parametric test to evaluate changes at a dichotomous level over multiple time periods.
[9] McNemar's test (unweighted): non-parametric test designed to evaluate changes in dichotomous variables over two time periods.
[10] Odds Ratio (OR): assesses the magnitude of the change/effect size.

Table 8: Pairwise Comparison of Gambling Involvement Measures Across Three Waves (unweighted)

			MAGIC Wave 1 (2013-2014)			MAGIC Wave 2 (March – Sept 2015)			MAGIC Wave 3 (April – August 2016)			Test for change				
												Change Across Three Waves	Wave 1 to Wave 2		Wave 2 to Wave 3	
		N		%	95% CI		%	95% CI		%	95% CI	p-value[3]	p-value[4]	Cohen's d	p-value[4]	Cohen's d
Total gambling expenditures	mean	2,420		-1416	(-1,823.3, -1,007.8)	*	*-3197*	*(-5,410.5, -983.0)*		-1106	(-1,439.9, -771.2)	0.0002	0.1310	-7.52	0.0051	8.87
	median			-135	(-159.6, -109.8)		-122	(-139.7, -104.2)		-99.4	(-120.7, -78.1)					
Max. freq. of gambling	mean	2,418		48.5	(45.4, 51.6)		47.0	(43.9, 50.1)		46.2	(43.1, 49.2)	0.0030	0.0072	-0.19	0.0562	-0.11
	median			7.8	(6.9, 8.6)		6.7	(5.9, 7.5)		5.9	(5.8, 6.1)					
Number of gambling formats[1]	mean	2,428		2.5	(2.5, 2.6)		2.6	(2.5, 2.6)		2.7	(2.6, 2.8)	<.0001	0.1533	0.03	<.0001	0.13
	median			1.9	(1.8, 2.0)		2.0	(1.8, 2.1)		2.1	(2.0, 2.3)					
Number of gambling formats consistent across waves[2]	mean	2,428		2.4	(2.3, 2.5)		2.4	(2.4, 2.5)		2.6	(2.5, 2.7)	<.0001	0.3493	0.02	<.0001	0.15
	median			1.8	(1.7, 1.9)		1.8	(1.7, 1.9)		2.1	(2.0, 2.2)					

[1] Waves 1 and 2 include 10 formats (lottery, instant, raffle, daily, sports, bingo, horse racing, private betting, online, out of state casino) while Wave 3 includes 10 formats (lottery, instant, raffle, daily, sports, bingo, racing, EGM, table games, other).

[2] Waves 1, 2, and 3 include 9 formats (lottery, instant, raffle, daily, sports, bingo, racing, online, out of state casino)

[3] Friedman's test (unweighted): non-parametric test that evaluates within group changes on continuous measures over two or more occasions.

[4] Wilcoxon Signed Rank test (unweighted): non-parametric test that evaluates whether there are changes within the same group over time via a pairwise comparison.

Note: Asterisks indicate estimates are unreliable, relative standard error > 30%

Total gambling expenditures: minus sign for expenditures refers to dollars lost

Maximum frequency of gambling: refers to days per year

Changes in Problem Gambling Status

Beyond gambling participation, it is important to consider changes in problem gambling status among the members of the cohort between 2013/2014, 2015, and 2016. Changes between Wave 1 and 2 are presented in Table 9 and changes between Wave 2 and 3 are presented in Table 10.

Examining changes between Wave 1 and 2, the largest group by far was composed of individuals who were not problem gamblers in both waves. In addition, a total of 60 individuals became problem gamblers for the first time in Wave 2, 40 individuals who were problem gamblers in Wave 1 remitted in Wave 2, and 39 individuals remained problem gamblers across both time periods. Similarly, the largest group of people across Wave 2 to Wave 3 was made up of individuals who were not problem gamblers in both waves. From Wave 2 to Wave 3, 35 individuals became problem gamblers in Wave 3, 38 individuals who were problem gamblers in Wave 2 remitted in Wave 3, and 40 individuals remained problem gamblers across both time periods.

Table 9: Problem Gambling Status in Wave 1 and Wave 2

Wave 1	Wave 2	Frequency
Not a problem gambler	**Not a problem gambler**	2,943
Not a problem gambler	**Problem gambler**	60
		3,003
Problem gambler	**Not a problem gambler**	40
Problem gambler	**Problem gambler**	39
		3,082
Missing	**Not a problem gambler**	45
Missing	**Problem gambler**	---
Not a problem gambler	**Missing**	8
		3,139

Dash (---) indicates value suppressed due to small cell size

Table 10: Problem Gambling Status in Wave 2 and Wave 3

Wave 2	Wave 3	Frequency
Not a problem gambler	**Not a problem gambler**	2,330
Not a problem gambler	**Problem gambler**	35
		2,365
Problem gambler	**Not a problem gambler**	38
Problem gambler	**Problem gambler**	40
		2,443
Missing	**Not a problem gambler**	---
Not a problem gambler	**Missing**	---
		2,450
Missing	**Did not complete Wave 3**	5
Not a problem gambler	**Did not complete Wave 3**	659
Problem gambler	**Did not complete Wave 3**	25
		3,139

Dash (---) indicates value suppressed due to small cell size

Missing information from Wave 1 to Wave 2 and from Wave 2 to Wave 3 affects the number of respondents that can be used to evaluate changes in problem gambling incidence. From Wave 1 to Wave 2, 57 people were not included in the calculation of incidence because their problem gambling status was unavailable at either Wave 1 or Wave 2 (Table 9). "Missing" problem gambling status in Table 9 for Wave 1 indicates either obtaining different respondents in Wave 1 and Wave 2 (n=43) or missing responses to PPGM items (n=6). "Missing" problem gambling status for Wave 2 is due to missing responses to PPGM items (n=8). The bottom of Table 10 shows 696 people who were not included in the calculation of incidence because their problem gambling status was unavailable at either Wave 2 or Wave 3. "Missing" problem gambling status in Wave 2 is due to missing responses to PPGM items (n=3) and "missing" problem gambling status in Wave 3 indicates missing responses to PPGM items (n=4) or individuals who did not complete Wave 3 (n=689). It is also notable that 25 problem gamblers at Wave 2 did not complete Wave 3. This loss of information may bias the remission rate in an unknown direction between Wave 2 and Wave 3.

Table 11 presents information about problem gambling status as a proportion of the overall sample from Wave 1 to Wave 2 for the 3,082 individuals with complete data and from Wave 2 to Wave 3 for the 2,443 individuals with complete data.

Table 11: Problem Gambling Status, Wave 1 to Wave 2 and Wave 2 to Wave 3

	Wave 1 to Wave 2				Wave 2 to Wave 3			
Problem Gambler	UN[1]	N[2]	% [2]	95% CI[2]	UN[1]	N[2]	% [2]	95% CI[2]
No → No	2,943	5,032,690	95.5	(93.9, 96.6)	2,330	5,054,316	95.4	(93.5, 96.7)
No → Yes	60	123,631	2.3	(1.5, 3.6)	*35*	*58,899*	*1.1*	*(0.6, 2.1)*
Yes → No	*40*	*57,385*	*1.1*	*(0.6, 2.0)*	38	82,090	1.5	(0.9, 2.7)
Yes → Yes	*39*	*58,764*	*1.1*	*(0.6, 2.1)*	*40*	*104,496*	*2.0*	*(1.1, 3.6)*
Total	3,082	5,272,470	100.0		2,443	5,299,801	100.0	

[1] Unweighted N refers to the total number of respondents who completed the PPGM

[2] Weighted N is the total number of respondents who completed the PPGM weighted to the MA population

Note: Italics indicate estimates are unreliable, relative standard error > 30%

Incidence of Problem Gambling

We will be reporting two estimates of problem gambling incidence—from Wave 1 to Wave 2 and from Wave 2 to Wave 3. **Incidence** in this study is defined as the number of individuals classified as PPGM Non-Gamblers, Recreational Gamblers, and At-Risk Gamblers in one wave who are classified as Problem Gamblers or Pathological Gamblers in the next wave. To calculate incidence, the number of individuals who transitioned to problem gambling is divided by the number of individuals who had the possibility of transitioning from non-problem gambling to problem gambling. The calculation of incidence excludes any respondents classified as Problem Gamblers in Wave 1.

From Wave 1 to Wave 2, the calculation of the incidence rate includes 3,003 respondents for whom we have complete information from both Wave 1 and Wave 2 (see Table 9 above). It does not include:

- Respondents who were problem gamblers at Wave 1 (n=79)
- Respondents for whom we could not determine problem gambling status at Wave 1 (n=49)
- Respondents for whom we could not determine problem gambling status at Wave 2 (n=8)

Based on this approach and using population weighting, the incidence of problem gambling within the cohort in 2015 (Wave 2) was 2.4% (95% CI [1.5%, 3.7%]) (Table 12).[9] In Wave 2, the incidence rate in Massachusetts was high relative to other jurisdictions where longitudinal cohort studies have been conducted. In other jurisdictions, incidence rates have ranged from 0.12% to 1.4%.[10] The remission rate within the cohort was 49.4% (95% CI [29.2%, 69.8%]) as half of the Problem Gamblers in Wave 1 were no longer classified as Problem Gamblers in Wave 2.[11]

Table 12. Incidence and Remission Rates, Wave 1 to Wave 2

	Wave 1 to Wave 2	
Problem Gambler	**UN[1]**	**N[2]**
No → No	2,943	5,032,690
No → Yes	60	123,631
Incidence rate	2.0%	2.4%
Yes → No	*40*	*57,385*
Yes → Yes	*39*	*58,764*
Remission rate	50.6%	49.4%

[1] Unweighted N refers to the total number of respondents who completed the PPGM
[2] Weighted N is the total number of respondents who completed the PPGM weighted to the MA population

From Wave 2 to Wave 3, the calculation of the incidence rate includes 2,365 respondents for whom we have complete information from both Wave 2 and Wave 3 (see Table 10 above). It does not include:

- Respondents who were problem gamblers at Wave 2 (n=78)
- Respondents for whom we could not determine problem gambling status at Wave 2 or Wave 3 (n=7)
- Respondents who did not complete Wave 3 (n=689)

[9] Incidence is calculated based on the weighted Ns in Table 12. For Wave 2 incidence: 123,631/(123,631+5,032,690) = 123,631/5,156,321 = 2.4%. In contrast, the unweighted incidence rate for Wave 2 is 2.0% (60/(60+2943) = 60/3003 = 2.0%). The higher weighted incidence rate is related to higher weights associated with the demographic characteristics of members of the cohort who became problem gamblers in Wave 2 of the study.

[10] The 16.5-month inter-assessment window from Wave 1 to Wave 2 may have independently contributed to the unusually high incidence rate. With this in mind, the annualized incidence rate from Wave 1 to Wave 2 is 1.8% (weighted) and 1.5% (unweighted). This annualized incidence rate calculation is quite crude, however, since the 16.5-month inter-assessment window is an average across all participants in addition to the gambling subtype classification questions containing a 12-month recall window.

[11] Remission is calculated based on the weighted Ns in Table 12. For Wave 2 remission: 57,385/(57,385+58,764) = 57,385/116,149 = 49.4%. In contrast, the unweighted remission rate for Wave 2 is 50.6% (40/39+40 = 40/79 = 50.6%).

The incidence of problem gambling within the cohort in 2016 (Wave 3) was 1.2% (95% CI [0.6%, 2.2%]).[12] From Wave 2 to Wave 3, the remission rate was 44.0% (95% CI [25.6%, 64.2%]) (Table 13).[13] From Wave 2 to Wave 3, we find that more individuals were remitting rather than becoming new problem gamblers.

Table 13. Incidence and Remission Rates, Wave 2 to Wave 3

	Wave 2 to Wave 3	
Problem Gambler	**UN[1]**	**N[2]**
No → No	2,330	5,054,316
No → Yes	*35*	*58,899*
Incidence rate	1.5%	1.2%
Yes → No	38	82,090
Yes → Yes	*40*	*104,496*
Remission rate	48.7%	44.0%

[1] Unweighted N refers to the total number of respondents who completed the PPGM
[2] Weighted N is the total number of respondents who completed the PPGM weighted to the MA population

Stability and Transitions of Gambling Behavior

The second major goal in the present report was to determine whether respondents in the study moved from one risk category to another and, if so, whether they moved towards less severe or more severe problems. Assessing transitions in a three-wave study is generally done using a "transition table." As a reminder, the results in this section are based on unweighted data and refer only to the individuals in the study rather than the broader Massachusetts adult population.[14] To elucidate transitions across all three waves, we examine individuals who had complete PPGM information for each of the three waves (n= 2,418).

Table 14 examines the transitions between PPGM groups across the three waves. The table presents transitions across the three waves by grouping participants by risk transition category: no change in risk (white), decrease in risk (light blue), increase in risk (dark blue), and 'in transition' (black). 'In transition' is defined as moving from Wave 1 to higher and lower or lower and higher risk categories in Wave 2 and Wave 3. "Frequency" is the number of participants with a certain PPGM risk transition trend across waves. "Percent" describes the proportion of participants in the sample who displayed a certain PPGM risk transition trend across waves. "% change in risk classification from Wave 1" describes the proportion of participants with the same PPGM classification in Wave 1 and their subsequent transitions (or lack thereof) in risk across the waves.

Examining Table 14, the most stable group of gamblers were Recreational Gamblers, with 70.2% of Recreational Gamblers at Wave 1 remaining in this category across the next two waves of the study. This

[12] Incidence is calculated based on the weighted Ns in Table 13. For Wave 3 incidence: 58,899/(58,899+5,054,316) = 58,899/5,113,210 = 1.2%. In contrast, the unweighted incidence rate for Wave 2 is 1.5% (35/(35+2330) = 35/2365= 1.5%). The lower weighted incidence rate is related to lower weights associated with the demographic characteristics of members of the cohort who became problem gamblers in Wave 3 of the study.
[13] Remission is calculated based on the weighted Ns in Table 13. For Wave 3 remission: 82,090/(82,090+104,496) = 82,090/186586 = 44.0%, In contrast, the unweighted remission rate for Wave 3 is 38/(38+40) = 38/78 = 48.7%.
[14] Very similar results were obtained using weighted data.

represents 49.2% (n=1,189) of the cohort. The second most stable group of gamblers were Non-Gamblers—48.1% of Non-Gamblers at Wave 1 remained Non-Gamblers across the next two waves, representing 7.0% (n= 169) of the cohort. Of those who were Problem/Pathological Gamblers at Wave 1, 32.8% remained Problem/Pathological Gamblers at Wave 2 and Wave 3. This represents 0.87% (n=21) of the cohort. The least stable group were At-Risk Gamblers, where only 20.4% of At-Risk Gamblers at Wave 1 remained in this category across all three waves. This represents 2.6% (n=63) of the cohort.

While some gamblers (and non-gamblers) display stability across waves, others move in and out of gambling risk categories across the waves. Of the Problem/Pathological Gamblers at Wave 1, 48.5% (31 of 64) experienced a decrease in risk in Wave 3. More specifically, 13 of the 31 (41.9%) moved to Recreational Gambling while 18 of the 31 (58.1%) moved to At-Risk Gambling in Wave 3. About two in ten (18.8%) of Problem/Pathological Gamblers (12 of 64) were considered 'in transition,' moving to a lower risk category—At-Risk or Recreational Gambler—at Wave 2 and then moving back into a higher risk category—At-Risk or Problem/Pathological Gambler—at Wave 3. Interestingly, none of the Problem Gamblers at Wave 1 moved to Non-Gambling by Wave 3 and only one transitioned into a Non-Gambler at Wave 2 (and then moved to Recreational Gambling at Wave 3). This may suggest that individuals who have experienced Problem/Pathological Gambling do not tend to abstain from gambling—at least across these three waves—even when their gambling problems remit.

Of those who were At-Risk Gamblers at Wave 1, 7.1% (22 of 309) experienced an increase in risk in Wave 3, moving to Problem/Pathological Gambling. A majority of At-Risk Gamblers at Wave 1 (54.4% or 168 of 309) moved to a lower risk categorization by Wave 3—either Non-Gambler or Recreational Gambler—with the large majority moving to Recreational Gambling (94.0% or 158 of 168). About two in ten (18.1% or 56 of 309) of At-Risk Gamblers at Wave 1 were 'in transition,' moving to a lower or higher risk category at Wave 2 and then back to a lower or higher risk category by Wave 3. Of these 'in transition' individuals, 69.6% (39 of 56) went from a lower risk category—Recreational Gambler—at Wave 2 to a higher risk category—At-Risk or Problem Pathological Gambler—at Wave 3. In addition, of these 'in transition' At-Risk Gamblers, none moved to Non-Gambling at Wave 2 and only one individual transitioned into a Non-Gambler at Wave 3. More generally, only 4.9% (15 of the 309) of At-Risk Gamblers at Wave 1 moved to become Non-Gamblers at either Wave 2 or Wave 3. Like Problem/Pathological Gamblers, this suggests that At-Risk Gamblers rarely transition to Non-Gambler status.

Recreational Gamblers were overwhelmingly stable. Only 10.3% (175 of 1,694) of Recreational Gamblers moved to a more risky gambling category (either At-Risk or Problem/Pathological Gambling) in Wave 3. This suggests that for the majority of individuals, Recreational Gambling is not a risky form of gambling behavior. Of those who were Recreational Gamblers at Wave 1, 12.7% (215 of 1,694) were considered 'in transition,' moving to a higher or lower risk category at Wave 2 and then back to a lower risk category at Wave 3. In fact, all 215 'in transition' Recreational Gamblers moved back to Recreational Gambling at Wave 3. Recreational Gamblers also seem unlikely to transition into becoming Non-Gamblers, as only 12.5% (211 of 1,694) of Recreational Gamblers at Wave 1 transitioned to become Non-Gamblers at Wave 2 or Wave 3. While Recreational Gamblers are the most stable group (70.2% of Recreational Gamblers maintain this categorization across all three waves), this suggests that when Recreational Gamblers do transition (29.8%, 505 of 1,694), they are likely to move into riskier forms of gambling behavior (58.2% or 294 of 505).

While 41.9% (147 of 351) of Non-Gamblers at Wave 1 did move to more risky gambling categorizations by Wave 3, almost all of these individuals moved into Recreational Gambling (95.2% or 140 of 147).

Whether this in fact represents an increase in risk depends on the level of gambling involvement by these individuals. The Recreational Gambler category includes a broad range of gambling behaviors. This ranges from those who may have only purchased a few lottery tickets over a 12 month period to those who gamble more regularly (but display no problem gambling symptomology and have gambling frequency and expenditure below levels of Problem Gamblers). Non-Gamblers 'in transition' represented 10.0% (35 of 351) of those who were Non-Gamblers at Wave 1. Almost all 'in transition' Non-Gamblers (32 of 35) moved back to Non-Gambling at Wave 3 and none moved to Problem/Pathological Gambling at either Wave 2 or Wave 3.

Table 14: Transitions Between PPGM Groups Across Three Waves (unweighted)

Wave 1	Wave 2	Wave 3	Frequency	Percent	% change in risk classification from Wave 1
non gambler	non gambler	non gambler	169	6.99	48.1
non gambler	recreational gambler	non gambler	32	1.32	10.0
non gambler	at risk gambler	non gambler	---	---	
non gambler	at risk gambler	recreational gambler	---	---	
non gambler	recreational gambler	recreational gambler	85	3.52	41.9
non gambler	non gambler	recreational gambler	55	2.27	
non gambler	non gambler	problem or pathological gambler	---	---	
non gambler	recreational gambler	at risk gambler	---	---	
non gambler	recreational gambler	problem or pathological gambler	---	---	
non gambler	at risk gambler	at risk gambler	---	---	
			351		
recreational gambler	non gambler	non gambler	42	1.74	6.8
recreational gambler	recreational gambler	non gambler	73	3.02	
recreational gambler	recreational gambler	recreational gambler	1,189	49.17	70.2
recreational gambler	non gambler	recreational gambler	92	3.80	
recreational gambler	at risk gambler	recreational gambler	116	4.80	12.7
recreational gambler	problem or pathological gambler	recreational gambler	7	0.29	
recreational gambler	non gambler	at risk gambler	---	---	10.3
recreational gambler	recreational gambler	at risk gambler	94	3.89	
recreational gambler	recreational gambler	problem or pathological gambler	---	---	
recreational gambler	at risk gambler	at risk gambler	54	2.23	
recreational gambler	at risk gambler	problem or pathological gambler	9	0.37	
recreational gambler	problem or pathological gambler	at risk gambler	---	---	
recreational gambler	problem or pathological gambler	problem or pathological gambler	6	0.25	
			1,694		
at risk gambler	non gambler	non gambler	---	---	54.4
at risk gambler	non gambler	recreational gambler	---	---	
at risk gambler	recreational gambler	non gambler	---	---	
at risk gambler	recreational gambler	recreational gambler	112	4.63	
at risk gambler	at risk gambler	non gambler	---	---	
at risk gambler	at risk gambler	recreational gambler	42	1.74	
at risk gambler	at risk gambler	at risk gambler	63	2.61	20.4
t risk gambler	recreational gambler	at risk gambler	37	1.53	18.1
at risk gambler	recreational gambler	problem or pathological gambler	---	---	
at risk gambler	problem or pathological gambler	non gambler	---	---	
at risk gambler	problem or pathological gambler	recreational gambler	6	0.25	
at risk gambler	problem or pathological gambler	at risk gambler	10	0.41	
at risk gambler	at risk gambler	problem or pathological gambler	9	0.37	7.1

at risk gambler	problem or pathological gambler	problem or pathological gambler	13	0.54	
			309		
problem or pathological gambler	non gambler	recreational gambler	---	---	**48.5**
problem or pathological gambler	recreational gambler	recreational gambler	7	0.29	
problem or pathological gambler	at risk gambler	recreational gambler	---	---	
problem or pathological gambler	at risk gambler	at risk gambler	10	0.41	
problem or pathological gambler	problem or pathological gambler	recreational gambler	---	---	
problem or pathological gambler	problem or pathological gambler	at risk gambler	8	0.33	
problem or pathological gambler	problem or pathological gambler	problem or pathological gambler	21	0.87	**32.8**
problem or pathological gambler	recreational gambler	at risk gambler	---	---	**18.8**
problem or pathological gambler	recreational gambler	problem or pathological gambler	---	---	
problem or pathological gambler	at risk gambler	problem or pathological gambler	6	0.25	
			64		

Dash (---) indicates value suppressed due to small cell size

Risk Classification Legend:
White = no change in risk
Light blue = decrease in risk
Dark blue = increase in risk
Black = in transition

Finally, it is helpful to consider the potential of the Massachusetts cohort study to inform etiological research on problem gambling. In preparing this report, we sought information from other research teams that have conducted large-scale gambling cohort studies internationally regarding the total number of problem gamblers identified over the course of each study as well as the total number of "new" or first-onset problem gamblers beyond Wave 1 of each study. The total number of problem gamblers identified over the entire course of each study (involving four or five assessments) ranged from 277 in the Quinte Longitudinal Study (QLS) to 134 in the Leisure, Lifestyle, Lifecycle Project (LLLP). The total number of "new" problem gamblers beyond Wave 1 of each study ranged from 134 in the QLS to 43 in the LLLP. Examining the MAGIC cohort with complete PPGM information across the three waves, 137 Problem/Pathological Gamblers and 73 "new" Problem/Pathological Gamblers beyond Wave 1 were identified. The number of problem gamblers and "new" problem gamblers in MAGIC compares very favorably with previous studies and it appears that the MAGIC study continues to be well positioned to produce new and more detailed information about the etiology of problem gambling.

Table 15 provides a description of previous cohort studies and how the MAGIC study compares. In presenting this information, we have dropped the Alberta LLLP from the comparison since the incidence rate from Wave 1 to Wave 2 in this study was not reported.

Table 15. Comparing Previous Cohort Studies and MAGIC

	Ontario, Canada QLS	Sweden Swelogs	Australia VGS	New Zealand NGS	Massachusetts MAGIC
Data collection period	2006-2011	2008-2014	2008-2012	2012-2018	2013-ongoing
Recruited sample	4,123	8,165	15,000	6,251	3,139
Assessment length	1-2 hour	15-25 min	15-25 min	45 min	15-40 min
Interval (months)	12	12[1]	12	12	16.5[2]
PG Measure	PPGM	CPGI 5+	CPGI 8+	CPGI 8+	PPGM
Incidence (Wave 1 – Wave 2)	1.4%[3]	0.8%[4]	0.12%[4]	0.28%[4]	2.4%[4]
Proportion of Wave 2 PGs that are new cases	49.0%	73.5%	33.3%	51.6%	60.6%

[1] Between Wave 1 and Wave 2; the interval between subsequent waves was 24 months.
[2] This is the average elapsed time from Wave 1 – Wave 2. The average elapsed time from Wave 2 – Wave 3 is 12.5 months.
[3] Unweighted
[4] Weighted

Discussion

This report presents results from a new cohort study of gambling and problem gambling underway in Massachusetts. While recent large-scale cohort studies have been carried out in Australia, Canada, New Zealand, and Sweden, there have been no major adult cohort studies of gambling in the United States. This report focused on Wave 3 data collection and changes in (1) gambling participation, (2) incidence of problem gambling, and (3) gambling risk categorization within the cohort across Wave 1 (2013/2014), Wave 2 (2015), and Wave 3 (2016). As this is a longitudinal cohort study, readers should exercise caution in generalizing findings to the population of Massachusetts.

Changes in Gambling Participation

Change in gambling participation within the cohort was examined by comparing the self-reported behaviors of the 2,428 members of the cohort who completed all three waves of the study to date. There was a statistically significant increase in daily lottery games, sports betting, and private betting from Wave 1 to Wave 2. The magnitude of these increases, however, was small.

From Wave 2 to Wave 3, there was a statistically significant increase in overall gambling participation, all lottery, traditional lottery, instant games, daily games, bingo, sports betting, and online gambling. Nonetheless, the magnitude of many of these changes was either small or medium. These increases (especially the larger increases) may be a result of changes in how the questions were asked from Wave 2 to Wave 3). For instance, the large increase in daily games may in part be due to a wording change in the question in Wave 3 which included more examples of daily games compared to Wave 2 (i.e., Wave 3 included Mass Cash and the Numbers Game).

It is notable that out-of-state casino gambling significantly decreased from Wave 2 (2015) to Wave 3 (2016) and the magnitude of this change was large. This decline occurred after the opening of Plainridge Park Casino in Plainville, Massachusetts. This piece of evidence suggests that Plainridge Park Casino has been successful in "recapturing" Massachusetts residents who were once gambling out-of-state and corroborates findings from the first patron survey at Plainridge Park Casino (Salame et al., 2017) (www.umass.edu/seigma/reports).

From Wave 1 to Wave 2, there was a statistically significant decrease in the average maximum frequency of gambling. The magnitude of this decrease, however, was small. This trend continued from Wave 2 to Wave 3 and, again, the magnitude of this change was small. From Wave 2 to Wave 3, there was a significant decrease in total gambling expenditures and the magnitude of this change was large. This change, however, was likely affected by outliers which skewed the estimate at Wave 2. From Wave 2 to Wave 3, there was a statistically significant increase in the average number of gambling formats engaged in. The size of this change, however, was small.

Incidence of Problem Gambling

The "natural" problem gambling incidence rate within the cohort between 2013/2014 to 2015, prior to the opening of casinos in Massachusetts, was 2.4% (95% CI [1.5%, 3.7%]). This rate is relatively high compared to other jurisdictions where longitudinal cohort studies have been conducted. Internationally, incidence rates have ranged from 0.12% to 1.4%. Possible methodological reasons for this difference are discussed below. In addition to incidence, it is interesting that remission within the cohort was also quite high, with half of the Problem Gamblers in Wave 1 no longer classified as such in Wave 2.

From Wave 2 to Wave 3, the incidence rate declined to 1.2% (95% CI [0.6%, 2.2%]) and the remission rate was 44.0% (95% CI [25.6%, 64.2%]). Again, the number of people becoming problem gamblers and remitting from problem gambling within the Massachusetts cohort were almost equal, with slightly more individuals remitting rather than becoming new problem gamblers. Indeed, while the high incidence rate declined, the high instance of remitting cases continued across Wave 2 and Wave 3. This finding corroborates the high remission rates found in other longitudinal studies. For instance, in two Canadian longitudinal studies, the remission rate was 52.7% (QLS) and 39.1% (LLLP) from Wave 1 to Wave 2 and 50.5% (QLS) and 41.7% (LLLP) from Wave 2 to Wave 3.

If the relatively high incidence rate from Wave 1 to Wave 2 was accurate, the basis for it is somewhat unclear given that there was no significant change in the actual availability of legal gambling opportunities in Massachusetts during this time. We examined several other data sources in an effort to triangulate this unexpected finding of higher incidence. No corroborating evidence supported the high incidence rate found from Wave 1 (2013/2014) to Wave 2 (2015).[15]

Part of the difference (and decline) in incidence rates between Wave 1 to Wave 2 and Wave 2 to Wave 3 could be explained by variation in the inter-assessment windows from Wave 1 to Wave 2 (an average of 16.5 months) and from Wave 2 to Wave 3 (an average of 12.5 months). While the questions assessing gambling behavior specified a 12 month recall window, the longer time between assessments may still have independently contributed to the relatively higher incidence rate from Wave 1 to Wave 2. In addition, the higher incidence rate from Wave 1 to Wave 2 may be the result of factors influencing retention between Wave 1 and Wave 2 which may not have been as strong between Wave 2 and Wave 3 (Volberg, Williams, Stanek, Zorn, et al., 2017).

Stability and Transitions of Gambling Behavior

Another goal of the present analyses is to determine the stability and transitions of gambling behavior. These results are similar to cohort studies in other jurisdictions, which have generally found Recreational Gamblers to be the most stable group, with Non-Gamblers being moderately stable, and At-Risk and Problem Gamblers the least stable. One difference between Massachusetts and gambling cohort studies in other jurisdictions is the somewhat larger proportion of the Massachusetts cohort that transitioned over assessments. In Victoria, for example, 4.3% of the cohort transitioned down while 5.6% transitioned up. In contrast, across three waves, 14.2% of the Massachusetts cohort transitioned to a higher PPGM status, 13.0% transitioned to a lower PPGM status, and 13.2% were 'in transition' with movement at both Wave 2 and Wave 3.

Some portion of the differences between the Massachusetts and Victoria transition rates may be due to differences in how problem gambling was measured (i.e., MAGIC used the PPGM and the Victoria study used the CPGI). Another difference is the longer time period from Wave 1 to Wave 2 (16.5 months) in the MAGIC study relative to most other studies (typically 12 months). Another important difference is

[15] We specifically examined whether there were significant differences in (a) the prevalence rate of problem gambling in the Baseline Targeted Survey in Plainville and surrounding communities in 2014 compared to the Follow-Up Targeted Population Survey in 2017; (b) the prevalence rate of problem gambling in Springfield and surrounding communities subsample of the Baseline General Population Survey in 2013/2014 compared to the Baseline Targeted Population Survey in Springfield and surrounding communities in 2015; (c) the incidence of problem gambling in MAGIC Wave 3 in 2016 relative to Wave 2 in 2015; and (d) any secondary data sources pertaining to problem gambling (i.e., Department of Public Health admissions data, Massachusetts Council on Compulsive Gambling helpline calls, Gamblers Anonymous chapters). No significant changes were found.

that the Massachusetts cohort study includes a much higher proportion of individuals selected from the baseline survey because of their high risk of developing gambling problems over the course of the study.

It is also important to understand the transitions demonstrated in the MAGIC study relative to changes in the understanding and assessment of addictions in the last 20 years, largely driven by longitudinal research. First, this research has shown that addictions are more unstable than historically thought. Addictions are chronic in the sense that there is a lifetime higher risk for relapse and continuation. Nonetheless, those experiencing addiction do not tend to have unremitting manifestations. In fact, the most typical course for manifestations of addiction is a year or two followed by remission followed by relapse. While all addictions are beset by high rates of relapse and chronicity, monetary constraints appear to preclude unremitting manifestations of the disorder in problem gambling.

This more recent understanding of gambling addiction is one of the reasons that the DSM introduced a "past 12-month" time frame for Disordered Gambling in DSM-5 in 2013 whereas it was previously a lifetime measure. This 12-month time frame change was previously adopted for Substance Use Disorders in the DSM-IV in 1994 (SUDs had only a lifetime framework in DSM-III). Understanding of problem gambling as more transitory also led to the change in the name of the diagnostic entity in the DSM-5 from "pathological gambling" (pathological means disease-like) to "gambling disorder" along with the introduction of an episodic/persistent specifier.

Second, there are people who merit clinical attention even though they do not meet the older, more stringent definitions of addictions. This continuum of harm is one of the reasons that the DSM has historically made a distinction between substance abuse and substance dependence. This is also why the number of criteria needed for Disordered Gambling in the DSM-5 was lowered from 5 to 4 and mild, moderate, and severe levels were introduced. As less severe forms of the disorder have been included, more recovery and therefore more instability are to be expected. It is worth noting that if analyses were restricted to the pathological gambling subtype, more chronicity would indeed be found. Table 16 demonstrates the higher stability of pathological gamblers compared to problem gamblers.

Table 16: Stability of Pathological Gamblers compared to Problem Gamblers

	Wave 1 → Wave 2	Wave 2 → Wave 3
Pathological Gambler → Problem/Pathological Gambler	12/21 = 57.1%	19/26 = 73.1%
Problem Gambler → Problem/Pathological Gambler	19/43 = 44.2%	21/52 = 40.4%

Ultimately, while the PPGM is the most sophisticated measure available to capture problem gambling at the population level, the construct of problem gambling is complex and difficult to measure. The reader should take this into account when interpreting results.

Limitations

Large-scale cohort studies using an ostensibly representative sample with weighting to correct for any known sampling biases are the best way of trying to establish incidence for a population. Cross-sectional studies can also be used, but in situations where the presence or absence of something is based on self-report (e.g., problem gambling), accurate incidence rates are dependent on accurate long-term retrospective reports, even though these are typically unreliable.

Nevertheless, cohort studies come with limitations. As a result, our estimates may be subject to biases and should be interpreted with caution. One important limitation concerns whether all sampling biases have been accounted for. The response rate to the BGPS/Wave 1 was 36.6%, the response rate to Wave 2 was 65.1%, and the retention rate to Wave 3 was 78.1%. This provides ample opportunity for differential rates of response for subgroups of the population despite our best efforts to identify and rectify any biases. The BGPS/Wave 1 was introduced as a survey of "health and recreation" in an effort to prevent participation bias related to respondents' attitudes toward gambling. In Wave 2 and Wave 3, however, eligible respondents were aware that the survey they were being invited to complete was about gambling. Therefore, their decision of whether to participate in Wave 2 and Wave 3 could have been shaped by knowing that the topic of the survey was gambling. In weighting the data, we made extensive efforts to control for this bias by accounting for gambling involvement in addition to other demographic variables which influenced response. Nevertheless, there may be other unknown factors influencing the likelihood of response.

Population mobility (i.e., people moving into the state since baseline who have no probability of being included in the cohort sample) and aging of the cohort may create additional biases in the estimates. While these factors are relatively minor concerns at this stage of the study, they will pose a growing challenge in future waves.

Another factor to consider is that repeated surveying is known to have some influence on self-report of behavior. More specifically, it is not uncommon for people with problems to progressively report fewer problems simply because of the desire to convey some improvement to the researchers. A related issue is that the survey itself might have a real impact on the person's behavior. For individuals who have never sought treatment for their problems, having to provide a comprehensive report on their behavior may cause them to re-evaluate their actions and potentially moderate their behavior.

An additional factor concerns the inter-assessment time interval, which was longer from Wave 1 to Wave 2 (16.5 months) than the 12.5 months used from Wave 2 to Wave 3 (i.e., the typical interval used in other gambling cohort studies is 12 months). Although the questions ask about behavior in the past 12 months, the last time reporting on their behavior often serves as an easier time marker for individuals. Even if people are reliably reporting on the past 12 months, the fact that more time has elapsed means that inherently unstable entities (e.g., problem gambling) have more time to both appear and remit (i.e., accentuating the ostensible rate of transitions).

A final issue is that observed changes over time are sensitive to the reliability of the measurement instrument. For less reliable instruments, repeated assessments typically lead to regression to the mean, resulting in some artifactual accentuation of transitions from more to less severe states. Unlike many clinical entities where highly reliable diagnostic measures are possible (e.g., diabetes, cancer), all measures of problem gambling have limitations in their reliability. This is due to the fact that the assessments are based on a person's self-reported perception of their behavior and mental state over the past year. The accuracy of this perception is compromised by incomplete recall, recency bias, self-deception, mood state, social desirability, the short period of time participants are given to answer the questions, and genuine uncertainty about whether they meet the criteria being asked about. Thus, the identification of the presence or absence of problem gambling as well as apparent transitions from one gambling category to another over time are partly a function of this measurement error. It is important to note that the present study employed the PPGM (Williams & Volberg, 2010, 2014) because of its superior classification accuracy in population-based research of problem gambling. It is also the case that this instrument has lower measurement error compared to the Canadian Problem Gambling Index

(CPGI) (Ferris & Wynne, 2001), which has been employed in most other longitudinal studies of gambling.[16] While this compromises potential comparisons between studies, it is worth noting that the PPGM includes all of the nine items that make up the CPGI.

Implications for Problem Gambling Prevention and Treatment

One of the main negative social impacts of expanded gambling availability is the potential for an increase in problem gambling (Williams, Rehm, & Stevens, 2011). Despite increases in the availability of gambling, the prevalence of problem gambling has stabilized or gone down in most Western jurisdictions since the late 1990s to early 2000s (Williams, Volberg, et al., 2012). Many people have taken this to mean that gambling-related harm is reducing and that further efforts to mitigate this harm may be unnecessary.

However, a stable prevalence rate over time can either be a result of: (a) ongoing unremitting problem gambling in the same group of individuals or (b) the rate of new cases is roughly equivalent to the rate of remission. These different scenarios have very different implications for problem gambling prevention and treatment. If problem gambling is a chronic condition and new cases are relatively uncommon, then it may be preferable to devote resources primarily to treatment rather than prevention. However, if both incidence and recovery from problem gambling are quite high, an argument can be made that a greater emphasis be placed on prevention in addition to treatment and recovery support. This would function to forestall the development of "new" problem gamblers and to support the continued remission of problem gamblers in recovery.

Relative to the overall rate of problem gambling, the proportion of new problem gamblers in Wave 2 (n=60, 60.6%) is higher than the number of ongoing unremitting cases (n=39, 39.4%). From Wave 1 to Wave 2, approximately twice the number of people became problem gamblers compared to those who remitted. While findings from Wave 1 to Wave 2 suggested a relatively high incidence rate of problem gambling (2.4%), this high rate has not continued from Wave 2 to Wave 3 (1.2%). In Wave 3, relative to the overall rate of problem gambling, the proportion of new problem gamblers (n=35, 46.7%) was lower than the number of ongoing unremitting cases (n=40, 53.3%). The relatively high remission rate continued from Wave 2 to Wave 3 as the number of new problem gamblers was almost equal to the number of remitting cases, with slightly more individuals remitting rather than becoming new problem gamblers. This suggests that additional prevention and treatment resources may be especially beneficial in further decreasing incidence and accelerating remission.

From Wave 2 to Wave 3, out-of-state casino gambling significantly decreased. This finding suggests that the opening of Plainridge Park Casino in Plainville, Massachusetts in June 2015 may have been successful in "recapturing" Massachusetts residents who were previously gambling in out-of-state casinos.

Examining stability and transitions within the cohort across the three waves also proved instructive. Overall, these findings suggest that both Problem/Pathological and At-Risk Gamblers—while likely to experience transitions—are unlikely to transition to become Non-Gamblers. When individuals move to

[16] The Reliable Change Index (RCI) was developed by Jacobson and Truax (1991) to detect genuine differences in scores above and beyond the natural variation in scores that are simply reflective of measurement error at each time point. The size of the difference between two scores that is needed to represent statistically significant change at $p < .05$ level (i.e., the RCI) is a function of the test-retest reliability of the instrument and the standard deviation of test scores. Applying the RCI in the five year Quinte Longitudinal Study of Gambling found only 7 out of 1,180 (0.6%) of gambling categorizations were changed, compared to 7.0% of CPGI categorizations (Williams et al., 2015).

less harmful gambling behaviors, this result suggests that they are unlikely to abstain from gambling altogether, but instead pursue more moderate forms of gambling behavior. While the majority of Recreational Gamblers remain Recreational Gamblers across all three waves, when individuals in this category do transition, they also seem unlikely to transition into Non-Gamblers.

These results are consistent with findings that "controlled" gambling may not be incompatible with recovery from Problem/Pathological Gambling (Slutske et al., 2010). More broadly, treatment providers may want to consider offering moderate consumption of gambling as a treatment goal since this may also increase the likelihood that those experiencing gambling problems will seek treatment (Ladouceur et al., 2009). Eventual transition to abstinence as a goal by the patient may also emerge from controlled consumption (Dowling & Smith, 2007). Overall, our findings corroborate evidence that Problem/ Pathological Gambling recovery tends to occur without abstinence. Nonetheless, these findings only represent three waves of data and, since gambling problems are transitory and episodic, we look forward to examining how our cohort members transition in future waves.

Future Directions

The goal of the MAGIC study is to uncover high-risk populations in Massachusetts and inform the development of effective and efficient prevention and treatment programming in the Commonwealth. The next MAGIC report will examine longitudinal predictors of problem gambling across waves, which will focus on differences in problem gambling incidence and problem gambling stability and transitions by race/ethnicity, income, gender, region, and the severity of the disorder. We are also interested in examining whether involvement with specific types of gambling in one wave is predictive of problem gambling status in subsequent waves. We will also examine the predictors of problem gambling remission and the extent to which accessing treatment is one of these factors. In later waves, we hope to conduct in-depth interviews with a cross-section of At-Risk and Problem/Pathological Gamblers who remit, do not remit, and are 'in transition' to more fully understand pathways to remission.

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Appendix A1: NORC Methodology Report

Appendix A1 describes in detail how the Wave 3 survey was fielded. This includes information about ethical and peer review, development and final content of the questionnaire, and how the survey was conducted. This section includes discussion of several obstacles encountered and addressed during data collection and concludes with a description of our data preparation procedures, including cleaning and weighting.

For a detailed discussion of how the Wave 2 survey was fielded, please see the Wave 2 report, *Analysis of MAGIC Wave 2: Incidence and Transitions* (Volberg, Williams, Stanek, Zorn, et al., 2017) (https://www.umass.edu/macohort/publications).

Section 1. Introduction and Background

1.1 Background

In November 2011, the state of Massachusetts passed new legislation permitting the introduction of casinos and slots parlors in Massachusetts for the first time (Chapter 194 of the Acts of 2011). As part of this legislation, the Massachusetts Gaming Commission (MGC) was created and was assigned the task of developing and conducting a research agenda that seeks to understand the social and economic impacts of gambling within the state. As part of this agenda, the University of Massachusetts Amherst (UMass Amherst) and NORC at the University of Chicago (NORC) conducted the Social and Economic Impacts of Gambling in Massachusetts (SEIGMA) study and its counterpart, the Massachusetts Gambling Impact Cohort (MAGIC) study.

SEIGMA (Wave 1)

Data collection for the Baseline General Population Survey of Massachusetts was conducted from September 2013 through May 2014. SEIGMA provided a unique opportunity to collect pre-casino baseline data on the status of resident health, participation in recreational activities including gambling, attitudes pertaining to the introduction of gambling within the state, and issues associated with problem gambling. Participants were selected by means of address-based sampling (ABS), a method that ensured that each Massachusetts household had an equal probability of selection into the sample, independent of their telephone status (i.e. landline, cell, or no telephone) (Iannacchione, 2011; Link et al., 2008). To achieve a random sample, the study targeted an adult in the household (18 years of age or older) who had the most recent birthday. Conducted in both English and Spanish, the survey was offered in three modes – web, mail, and telephone. Approximately 10,000 Massachusetts residents participated in the baseline study, which, moving forward, we refer to as Wave 1.

MAGIC (Wave 2)

In October 2013, the MGC recommended the addition of a longitudinal component to the research agenda to expand upon the research from the baseline survey. As a result, MAGIC was developed as the longitudinal component that would provide information on the etiology of gambling over time. The MAGIC study aims to collect data from a cohort of individuals within Massachusetts; Wave 2 started with a subset of participants who previously participated in Wave 1 (n=4,860). Similar to Wave 1, Wave 2 of the study was offered in three modes (web, mail, and telephone); however, interviews were conducted only in English for Wave 2. Those who completed the second wave of data collection formed the cohort for future rounds of data collection.

MAGIC (Wave 3)

The cohort of respondents that was identified in Wave 2 (n=3,139) was contacted again in April 2016 to complete Wave 3 of the study. In contrast to the data collection procedures used in previous waves, the MAGIC Wave 3 questionnaire was administered online (WEB) and via paper mail-in questionnaire (SAQ) only. Telephone dialing was conducted for the purposes of contacting respondents who had not yet completed the survey and prompting them to complete via the web instrument or to return their completed SAQ. As with Wave 2, the Wave 3 survey was fielded in English only. This methodology report details the core design and procedures of Wave 3, including an overview of the data collection procedures and the data cleaning and preparation processes.

Section 2. Questionnaire

2.1 Overview of the Questionnaire

The primary goal of the MAGIC study is to understand how gambling problems develop over time. The MAGIC study is a multi-year cohort study of gambling and problem gambling. NORC worked alongside UMass Amherst to finalize the questionnaire (see Appendix B for a copy of the Wave 3 questionnaire).

2.2 Questionnaire Development

The research team at UMass Amherst created the initial questionnaire for Wave 3. NORC reviewed the questionnaire and provided feedback on content, formatting, and overall layout. Upon receipt of the final questionnaire, NORC's Desktop Publishing staff formatted the self-administered questionnaires (SAQ) that would be mailed to respondents. NORC IT staff programmed the web survey and developed a prompting system for telephone prompting. Extensive testing was completed in order to verify the survey functioned as intended including checking question text, skip logic, case disposition assignment, and callback rules. NORC utilized Voxco, a commercial online case management system (CMS) that stores data for each case. The CMS was designed to manage telephone, web, and mixed-mode surveys in addition to allowing for extensive flexibility in manipulating test data to accommodate various testing scenarios. Following development, the research team conducted mock interviews to review the flow and logic of the survey and also to gauge completion time.

2.2.1 Questionnaire Content

The basis for the Wave 3 questionnaire was the Wave 2 questionnaire with several significant changes. Modifications included additional questions on leisure activity, physical health, mental health, substance use, and behavioral addictions. In Wave 3, a Lifetime Gambling measure and Levenson's Primary Psychopathy Scale were added. Other sensitive topics were added to the questionnaire, such as detailed questions on drug and alcohol use. As with all other waves, if respondents reported experiencing problems with any of these issues, contact information was provided for treatment providers.

Comorbidities

All respondents were asked general questions about their preferred recreational activities and their physical and mental health status before more specific questions were posed about their use of tobacco, alcohol, and illicit drugs. Additional questions in this section inquired about respondents' perception of their physical health, experience of stress, and overall level of happiness. Three additional questions were added:

- Prior to the past 12 month, do you have any significant history of mental health problems such as depression, post-traumatic stress, panic attacks, generalized anxiety, agoraphobia, obsessive-compulsive disorder, bipolar disorder, schizophrenia, bulimia, etc.? (Yes/No)
- Is there any significant history of mental health problems, drug or alcohol addictions, or behavioral addictions in your parents, siblings, or children? (Yes/No/Unsure)
- Were you abused as a child (physically, sexually, or emotionally)? (Yes/No)

Gambling Attitudes

All respondents were asked questions about their beliefs about the benefit versus harm of gambling, the morality of gambling, whether gambling should be legal, and their opinion about the availability of gambling opportunities in Massachusetts and in their own communities. Additional questions in this section assessed views about the anticipated impacts of expanded gambling in Massachusetts.

Past-Year Gambling Behavior
All respondents were asked about the frequency of their participation and their expenditure on 11 types of gambling, using questions with optimal wording for obtaining this information (Wood & Williams, 2007). Participation and expenditure were assessed for traditional, large jackpot lottery games, instant lottery tickets, daily lottery games, charitable raffles, sports events, bingo, casino gambling, pari-mutuel wagering on horse races, private wagering, high risk stocks and online gambling.

Gambling Motivation
All respondents who had gambled in the past year were asked one question about their primary motivation for gambling.

Gambling Recreation/Entertainment
All respondents who had gambled in the past year were asked about the importance to them of gambling as a recreational activity and whether gambling had replaced other recreational activities.

Gambling Context
All respondents who had gambled in the past year were asked about whether they gamble alone or with friends and the availability of gambling opportunities.

Lifetime Gambling
All respondents who had gambled in the past year were asked about the first time they gambled for money and whether family members had ever been regular gamblers or experienced problems.

Gambling Fallacies
All respondents who had gambled in the past year were asked about various gambling situations in relation to fallacious beliefs.

Prevention Awareness
All respondents were asked questions to assess their awareness of problem gambling prevention activities in Massachusetts. Prevention activities included media campaigns and programs offered in schools, workplaces, or in the community. Respondents were asked if they had participated in any problem gambling prevention programs and, if so, whether any of these programs had led them to alter their gambling behavior.

Gambling Problems (Others)
All respondents were asked questions about people in their own social circle who gambled regularly and whether there was anyone in their social circle who they felt gambled too much. Respondents who indicated that there was such a person were asked about that person's relationship to them and how that person's gambling had affected them.

Gambling Problems (Self)
All respondents who had engaged in one or more of the gambling activities included in the Gambling Behavior section once a month or more often or indicated that gambling was an important recreational activity or had replaced other recreational activities with gambling in the past five years were administered two validated problem gambling instruments.

The first nine questions of this section comprise the Problem Gambling Severity Index (PGSI) from the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001). The PGSI has very good internal consistency (alpha = .89) and good test-retest reliability (r = .78). Criterion validity is established by its correlation (r = .83) with the SOGS and DSM-IV. Construct validity of the PGSI is established by its significant correlations with gambling involvement.

The remaining questions in this section comprise the Problem and Pathological Gambling Measure (PPGM). The PPGM is a relatively new instrument with superior sensitivity, positive predictive power, diagnostic efficiency, and overall classification accuracy compared to the PGSI/CPGI, DSM-IV, and SOGS (Williams & Volberg, 2010, 2014). The PPGM serves as the primary problem gambling measure in both MAGIC and SEIGMA while the PGSI/CPGI provides a direct comparison to other gambling surveys conducted worldwide.

Several branching questions were added to many of the CPGI and PPGM questions if the person answered the "stem" question in the affirmative. These supplemental questions provide an important quantification of the social and economic impacts of gambling in Massachusetts by assessing the number of bankruptcies, health care visits, suicide attempts, incidents of domestic violence, divorces, cases of child welfare involvement, illegal acts, arrests, incarcerations, and lost work/school days attributable to problem gambling.

Social Functioning/Levenson's Primary Psychopathy Scale

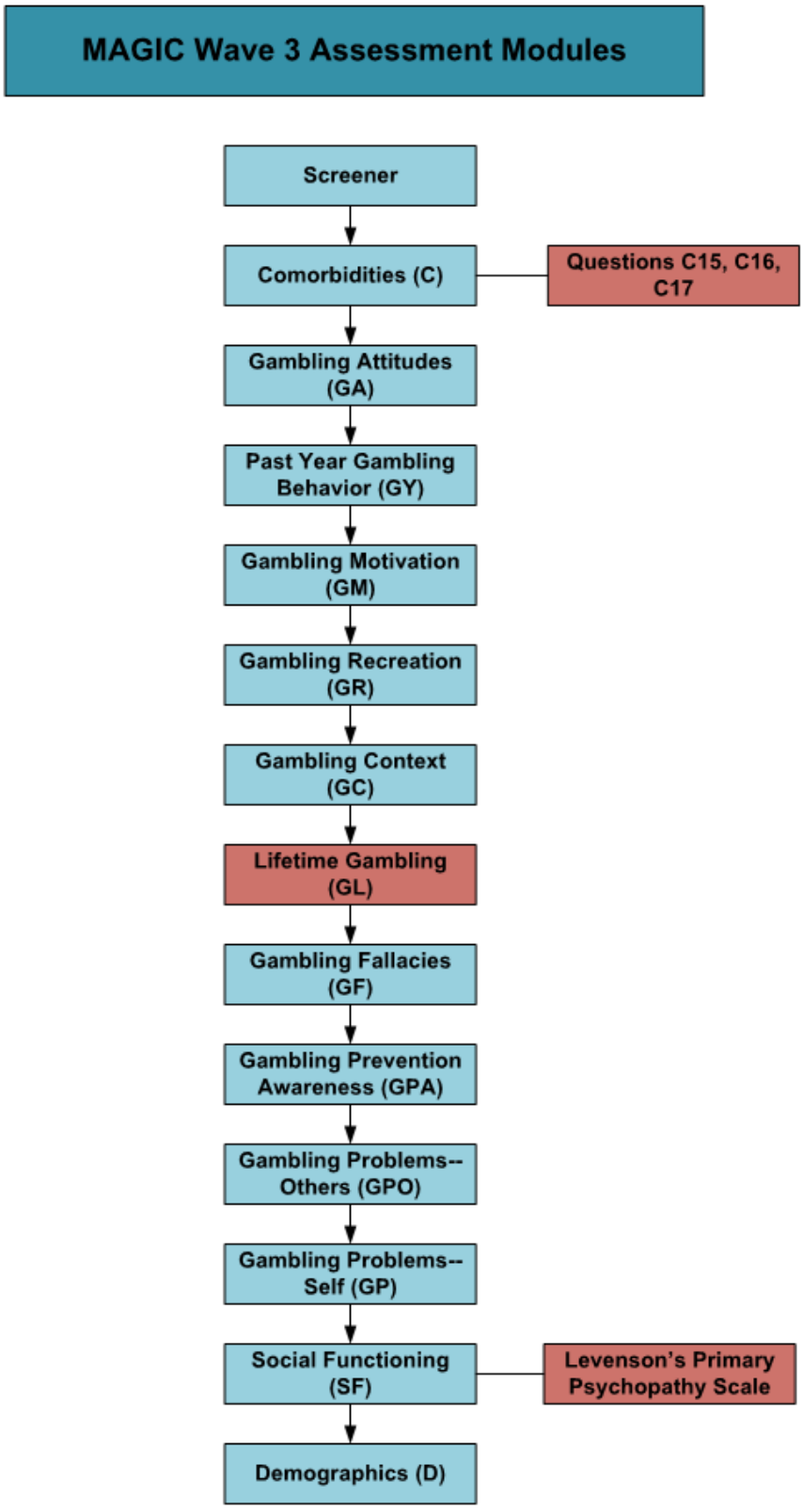
All participants were asked about family and social relationships and administered Levenson's Primary Psychopathy Scale (LSRP). The LSRP is regarded as the best instrument for assessing psychopathology—a personality disorder characterized by a lack of empathy for others—in non-institutionalized populations. The LSRP is comprised of two scales: 1) primary psychopathy (psychopathic emotional affect) and 2) secondary psychopathy (psychopathic lifestyle).

Demographics

All respondents were asked about gender, age, marital status, number of children in the household, highest level of education, employment status, veteran status, healthcare coverage, household income, household debt, immigrant status, Massachusetts residence status, and race/ethnicity. All respondents were also asked to provide contact information to allow the SEIGMA research team to reach them in the future and invite them to participate in related studies.

See Figure 6 below for a Wave 3 questionnaire module overview.

Figure 6: MAGIC Wave 3 Assessment Modules

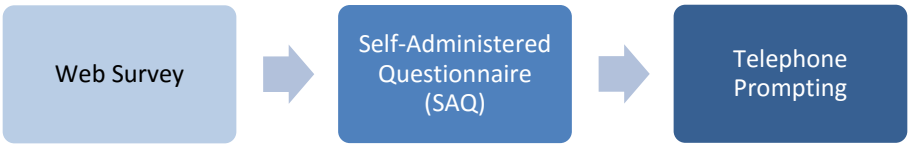


Section 3. Survey Design

3.1 Multi-Mode Process

In an effort to increase overall response rates, the survey was offered in two modes – web and mail; respondents who had not completed the survey via either mode were prompted to do so via telephone. Participants were introduced to these modes sequentially. Figure 7 below demonstrates the multi-mode approach that was employed for reaching sampled Wave 3 respondents.

Figure 7: Multi-Mode Data Collection Approach, Wave 3



3.2 Sample Size and Selection

As mentioned earlier, those who completed Wave 2 formed the cohort for future waves. Thus, 3,139 individuals comprised the study for Wave 3. The sample was divided into six risk groups based on the respondent's calculated problem gambling status at Wave 1. Table 17 below provides a breakdown of the different risk groups, including the target number of completes for each group.

Table 17: Sample Breakdown by Risk Groups

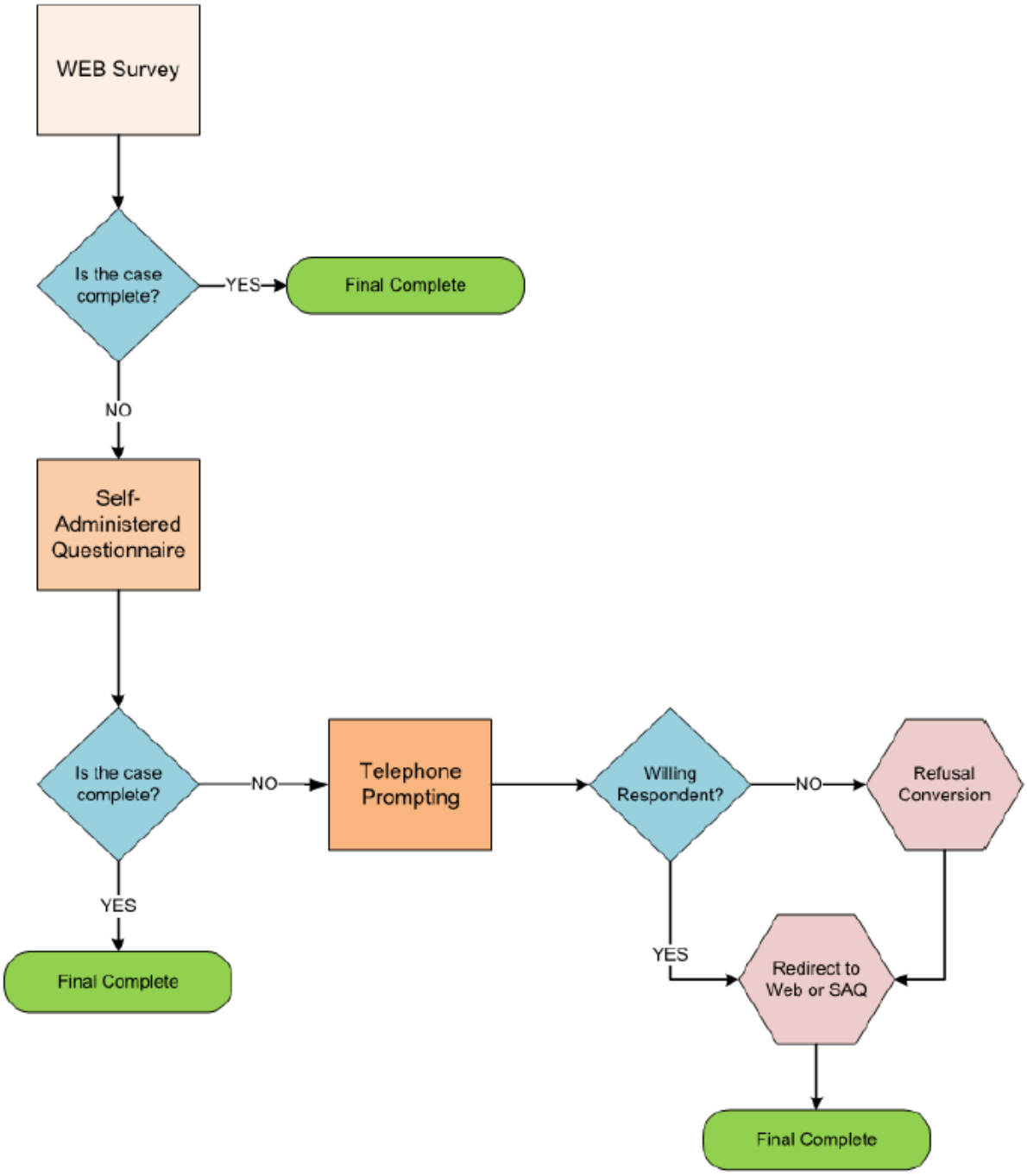
Group	Total Sample Number, Wave 3	Target Number of Completes, Wave 3
Group 1: ***Problem Gambler***	81	66
Group 2: ***At risk of becoming a Problem Gambler***	295	229
Group 3: ***Expends $1,200 or more annually***	726	575
Group 4: ***Gambling weekly***	534	410
Group 5: ***Served Sept 2001 or later***	37	27
Group 6: ***Low risk of problem gambling***	1,466	1,148
Total	3,139	2,455

3.3 Case Flow

Respondents were first invited to participate in the survey online.[17] If respondents did not complete the survey online, they were sent a hardcopy questionnaire with a postage-paid business reply envelope. Respondents who did not reply in the first two modes were contacted by telephone and reminded of the survey. Dialing was conducted for the purpose of prompting respondents to complete the survey over the web or to return their completed SAQ. Respondents who requested to be "taken off the list" or refused in a hostile manner were finalized immediately. Figure 8 below details the case flow lifecycle for Wave 3 sample cases.

[17] The web survey remained open throughout data collection.

Figure 8: MAGIC Wave 3 Case Flow Lifecycle



Section 4. Data Collection

Data collection began in April 2016 with the mailing of the first web invitation packet. Mailings were scheduled approximately two weeks apart to give respondents enough time to receive and complete the questionnaire, so that NORC could remove completed cases from follow-up mailings.

4.1 IRB Review

All data collection efforts were subject to approval by the Institutional Review Boards (IRB) from both NORC and UMass Amherst. NORC received IRB approval on February 24, 2016; UMass Amherst received approval shortly thereafter on March 11, 2016. As part of the IRB submission, NORC requested that the IRB waive the requirement of obtaining informed consent documentation in exchange for including informed consent statements in each survey mode. The informed consent statement read as follows:

"The University of Massachusetts is conducting a longitudinal study about gambling in Massachusetts. This survey is private and confidential. We have a Federal Certificate of Confidentiality that is designed to protect the confidentiality of your research data from a court order or subpoena. We can provide you with more information if you would like. Taking part is up to you. You don't have to answer any question you don't want to, and you can stop at any time. Almost everyone will be able to finish the survey within 15 to 20 minutes."

For web respondents, the informed consent statement was read as part of the screening process, with a hyperlink to the Federal Certificate of Confidentiality printed within the frequently asked questions (FAQs) document. If the respondent clicked 'Next' to move past the informed consent screen, he or she was presumed to be informed of his or her rights as a participant. For mail, the informed consent statement was printed on the inside cover of the hardcopy questionnaire with a printed link to the Federal Certificate of Confidentiality. Respondents returning a booklet with valid response data were considered to have provided consent.

NORC submitted all materials (letters, brochures, and questionnaire) to the IRB for review. As data collection progressed, any materials requiring modification or new materials not included in the original submission were sent as an amendment to the IRB for review.

4.2 Advance Letter Mailings

A series of mailings were scheduled to encourage respondent participation, to inform households about the survey and how they were selected, and to provide contact information for NORC and UMass Amherst. Following protocol outlined by Don Dillman and colleagues (2009), NORC utilized the following contacts:

- **Web invitation letter.** Respondents were first mailed a web packet asking them to complete the survey online. Enclosed with this mailing was a web invitation letter, survey brochure, web insert outlining how to access the web survey, and a list of Frequently Asked Questions (FAQs). The invitation letter informed respondents of the purpose of the study and provided a web link and Personal Identification Number (PIN) to access the survey. The letter also offered sending a $50 incentive check along with an additional $20 if the respondent completed the survey online by the Early Bird date printed on the letter.
- **Thank you/reminder postcard.** A reminder postcard was mailed thanking those who had previously completed the survey, while reminding non-responders to complete the survey online.

- **Initial questionnaire mailing.** Those who had not completed the survey via the web were sent a SAQ packet. The SAQ packet included a letter, hardcopy questionnaire, postage-paid business reply envelope (BRE), $50 incentive reminder language, and survey brochure. The letter provided instructions for completing the questionnaire online and for returning the hardcopy questionnaire.
- **Thank you/reminder postcard.** A second reminder postcard was mailed thanking those who had previously completed the survey while reminding non-responders to complete the survey.
- **Second questionnaire mailing.** The final mailing was a replacement questionnaire to the remaining non-responders with a letter emphasizing the importance of the study.
- **Last chance postcard.** Near the end of the data collection period, NORC sent pending non-respondents a final "last chance" postcard. This postcard alerted respondents that data collection would be ending July 29, 2016 and encouraged their participation before this date.

Prior to each mailing, households that had already completed the survey were removed from the mailing list. Letters were typed on project letterhead (displaying the MAGIC logo) with the signature of Dr. Rachel Volberg, Co-Principal Investigator. Each mailing provided the study's toll-free number and email address so that the respondents could contact NORC with questions or requests for assistance. Two versions of each letter were prepared to accommodate those cases where we did not have the respondent's full name. For these cases, the letter was addressed to the "MAGIC Participant."

The data collection schedule for the mailing component for Wave 3 is outlined in Table 18 below. NORC also sent several "ad hoc" mailings during the final month of data collection to individuals who requested another hardcopy questionnaire during the telephone prompting phase of data collection.

Table 18: Wave 3 Mailing Schedule

Mailing Item	2016						
	4/5	4/11	4/27	5/17	5/31	6/14	7/21
Web Packet 1							
Web Reminder Postcard							
Web Packet 2							
SAQ Packet 1							
SAQ Reminder Postcard							
SAQ Packet 2							
Last Chance Postcard							
SAQ Replacement Packet							

4.3 Web Survey Procedures

The first mailing packet that was sent to Wave 3 respondents included a web letter, a brochure about the survey, a web instruction card, and a list of frequently asked questions. The web letter outlined the purpose of the survey and requested that the individual who completed the Wave 2 questionnaire participate in Wave 3. The invitation letter included a link to the survey's website along with the respondent's unique Personal Identification Number (PIN) to use when accessing the survey. The

invitation letter also specified that all respondents will receive $50 upon completion of the survey, with an additional $20 available to those who completed by the Early Bird date. All respondents received a thank you/reminder postcard approximately one week after the initial mailing. The 14-day early bird extra incentive was offered with the initial web packet mailing and reminder postcard only.

Upon accessing the survey website, a welcome screen asked respondents to enter their assigned PIN. Respondents first were asked if they were the individual who completed the last round of MAGIC. If a respondent indicated that he/she was not that person, he/she was taken to an exit screen.

The survey also asked the respondents to confirm additional demographic information they had provided during the last round of MAGIC. These questions helped flag any cases where the new demographic information conflicted with past information. The process for investigating and resolving these cases is discussed in *Section 5: Validation Protocol*.

Eligible respondents progressed past the screener into the online instrument. Respondents could skip any question they did not wish to answer. If the web survey was completed within the 14 -day window, respondents were asked at the end of the survey if they would like to receive the $70 incentive check. If the respondent answered yes, the next screen displayed asked the respondent to confirm their contact information for the incentive mailing. Respondents who completed the survey after the 14-day period were similarly asked to confirm their mailing address; however, they received a $50 check.

4.4 Self-Administered Questionnaire (SAQ) or Mailed Survey Procedures

The first SAQ packet was mailed a little over a one month after the first web packet mailing. The letter asked respondents to complete the enclosed hardcopy questionnaire and to return it in the postage paid envelope. The letter also provided the URL and PIN for completing the questionnaire online. The letter also mentioned the $50 incentive upon completing the survey. The hardcopy questionnaire outlined instructions for completing the survey and contained the confidentiality statement. The back cover contained instructions for returning the completed questionnaire to NORC, the study's toll-free number to complete the survey over the phone, and the survey link and assigned PIN to complete online. This information was included in each mailing to provide respondents with several options for completing the survey. Respondents who received the first SAQ packet were sent a thank you/reminder postcard approximately two weeks after the mailing of the SAQ packet. Nonrespondents received a second, similar packet approximately four weeks after the initial SAQ packet.

The Telephone Survey and Support Operations (TSSO) department at NORC processed returned SAQs. A barcode was printed on each letter and SAQ allowing trained mail clerks to code each returned mailing efficiently. Completed or partially completed SAQs were sent to Data Services, Inc. (DSI) for data entry. NORC provided DSI with a set of data cleaning rules to follow when entering responses. DSI sent electronic data files to NORC each week followed by the returned hardcopy questionnaires. Electronic data files were shared safely using a Secure File Transfer Protocol (SFTP) site.

4.5 Web and Telephone Screening

Key to this study, and the overall validity of the data collected, was ensuring that the respondent who completed the Wave 3 questionnaire was the same respondent from Waves 1 and 2. In order to confirm that the same respondent was being screened into the Wave 3 survey, respondent demographic information (name, age, and gender) collected during Wave 1 (and validated during Wave 2) was preloaded into the main screener question. The screener question was programmed to use the available preload information when screening the Wave 3 respondent. Since several respondents from

Wave 1 and 2 did not provide all of the requested demographic information, the screener question had alternate text that would display based on the level of demographic information available. The Wave 2 interview month and year was also preloaded as a text fill within the screener question text in order to help respondent's recall. Below are the versions of the screener questions that were created to confirm that the Wave 3 respondent was the same respondent from Waves 1 and 2.

Screener Text 1: For cases that provided full name (first and last name), the following screener question was used:

- Web: Please confirm that you are [NAME], the individual who completed the Massachusetts Survey of Health and Recreation in [INTERVIEW MONTH AND YEAR].

Screener Text 2: Cases that did not provide adequate name information to use as a text fill, but previously provided gender and age information, were prompted with the following screener confirmation text:

- Web: Please confirm that you are [female respondent/male respondent/individual], who previously completed the Massachusetts Survey of Health and Recreation, which was conducted in [INTERVIEW MONTH AND YEAR]. [IF AGE AND GENDER WERE NOT MISSING THEN ASK: The person who filled out that survey told us [he was/she was/they were] [AGE] years old at the time of the survey.]

Screener Text 3: For cases that provided insufficient demographic information, a generic confirmation screener text was prompted at the screener question instead:

- Web: Please confirm that you are the individual who previously completed the Massachusetts Survey of Health and Recreation, which was conducted in [INTERVIEW MONTH AND YEAR].

Section 5. Validation Protocol

Two main approaches (internal vs. external) were developed with general scenarios within each to help confirm that the Wave 3 survey data was collected for the right person.

5.1 Internal Validation

Below were the set of scenarios and steps that were used when validating Wave 3 respondents. These approaches used existing demographic information that was collected for the case in previous waves of the project. The scenarios depended on the type of information that was available for the cases in order to determine the steps to take for validation.

Scenario 1: We have a complete first name and a last name preload for the respondent (these respondents were prompted the Respondent Confirmation Text #1 in the screener).

Scenario 1	First Name	Last Name	Overall	Action
1-A	Match	Match	Match	No Action Needed
1-B	Match	Non Match	Non Match	Follow Up Needed
1-C	Non Match	Match	Non Match	Follow Up Needed
1-D	Non Match	Non Match	Non Match	Follow Up Needed

1-A) If the respondent confirmed the preload first name and last name at the screener confirmation question, no further action was necessary for follow up.

1-B, 1-C, 1-D) If the respondent did not identify that the preload first and last names were correct, then the case was flagged for further review. If more than one of the items in the listed questions below contained conflicting information then the case was moved to the 'requires further review' bucket where further validating steps were taken in order to determine how best to proceed with the case (see Section 5.2.2 External Validation):

1. **Name:** Did the respondent provide a new first and/or last name?
    - Does the new name match any part of the preload name (for example: did the respondent provide initials instead of full name in the Wave 3 that match the full name in Wave 2)
2. **Address:** Did the respondent confirm their preload address and that they received the advance letter?
3. **Gender:** Did the respondent provide the same gender value as the value provided in previous waves?
4. **Age:** Did the respondent provide the same age value as the value provided in previous waves

Scenario 2: We did not have a complete first name and a last name preload for the respondent in Wave 3; however, we had preload age and gender values (these respondents were prompted the Respondent Confirmation Text #2 in the screener).

Scenario 2	Age	Gender	Overall	Action
2-A	Match	Match	Match	No Action Needed
2-B	Match	Non Match	Non Match	Follow Up Needed
2-C	Non Match	Match	Non Match	Follow Up Needed
2-D	Non Match	Non Match	Non Match	Follow Up Needed

2-A) If the respondent's gender and age values in MAGIC Wave 3 matched the preload values for those variables in previous waves, then no further action was necessary for follow up.

2-B, 2-C, 2-D) If the respondent provided gender and/or age values in the MAGIC Wave 3 questionnaire that conflicted with the preload values for those variables then the case was flagged for further review. If more than one of the items in the listed questions below contained conflicting information then the case gets moved to the 'requires further review' bucket where further validating steps taken in order to determine how best to proceed with the case (see Section 5.2.2 External Validation):

1. **Address:** Did the respondent confirm their preload address and that they received the study's advance letter?
2. **Gender:** Did the respondent provide the same gender value as the value provided in previous waves?
3. **Age:** Did the respondent provide the same age value as the value provided in in previous waves?

5.2 External Validation

Cases that were moved to the *'requires further review'* bucket were sent for further validation. Specially trained locators used Accurint® to search for, and locate, new information for the respondent. These locators could search for new contact information using a combination of respondent name with

address, phone number, gender, or age. For each case, Accurint® may provide one or more of the following pieces of information:

- New phone number for the respondent;
- New address for a given phone number or person;
- Any names associated with a phone number or address (and when they were associated).

Section 6. Data Preparation

6.1 Sample Disposition and Response Rate

NORC prepared weekly production reports throughout data collection, utilizing the standard AAPOR Response Rate 3 calculation. NORC also calculated the resolution rate, screener completion rate, and interview completion rate. At the end of data collection, each case was assigned a final disposition code, which identified the ending status of the case. Table 19 lists the available disposition codes and corresponding descriptions.

Table 19: Wave 3 Disposition Codes

Disposition Code	Description
U1	**Confirmed household, unconfirmed address (only for CATI)**
U2	**Assumed household/No contact**
U0	**Confirmed address, known household, unscreened**
NR	**Non-residential**
MM	**Mail received**
ER	**Eligible household, no member completes (only partial complete)**
C	**Complete**

6.2 Data Editing and Cleaning

A series of data editing and cleaning procedures were implemented in order to provide UMass Amherst with the most accurate and comprehensive data files. Throughout data collection, SAS programs were run to identify any errors that occurred in the Web system. This allowed NORC to reconcile inconsistencies in the data and fix system or questionnaire errors as they occurred, minimizing additional data cleaning that would be required at the end of data collection.

NORC worked alongside UMass Amherst to establish a series of data cleaning steps in order to ensure that the data files for delivery met the expected standards and criteria set out by UMass Amherst. Interview data from all data collection modes were combined into a single analytic file, which included a variable to indicate the mode of data collection used to complete each interview.

6.3 Coding of Verbatim Answers into Question Responses

Some questions in the survey offered an "Other" response category that, if selected, would direct the respondent to an open-end follow-up question to specify his or her answers. The UMass Amherst team conducted back-coding where verbatim responses for open-end questions were back-coded

into existing response categories. Both the original verbatim and the original response to the root question were maintained in the raw variables. Table 20 provides the variables which required back-coding.

Table 20: Wave 3 Variables Requiring Back-Coding

Question	Root Variable	Verbatim Variable	Question Type
Which internet sites do you most often use to play daily fantasy sports?	GY4E	GY4E_O	Check all that apply
Where did you seek help from?	GP23C	GP23C1	Check all that apply
What would you say have been the main cause or causes of your gambling problems?	GP24		Open ended
What would you say is responsible for this improvement?	GP25A	GP25B	Open ended

6.4 Derived Variables

Several derived variables were created for the final dataset in order to provide additional descriptive information for each household. For example, derived variables were created to indicate if a respondent was active in each mode – web, mail, and phone [Wave 1 and Wave 2 only]. SAS programs were written utilizing data from existing variables to create the derived variables.

Section 7. Strengths and Limitations of the Study

7.1 Strengths

One of the primary strengths to MAGIC is that as a longitudinal study, it allows NORC and UMass Amherst to follow a cohort of individuals at regular intervals over a period of five to ten years in order to determine the incidence of problem gambling in Massachusetts. Wave 1 offered a robust and unique contribution to the existing literature in that it was the first problem gambling survey to collect data in a state prior to the introduction of casino gambling. Wave 2 and Wave 3 were an extension of that contribution, which will allow researchers and policymakers to gain access to etiological information about how gambling problems develop and progress over time. The MAGIC study overall will allow researchers to understand what individual, social, and environmental variables (e.g., casino proximity, public attitudes, gambling advertising, media coverage) are most predictive of, and mediate the development of, future gambling and problem gambling. This in turn will provide a comprehensive understanding of the types of risks and protective factors that would help adapt and develop effective prevention, treatment, and recovery support services to the population.

Also of importance is the final response rate from Wave 2, as those who completed this wave formed the cohort for the future waves. The initial target response rate was 2,768 completes, or 57.0% of the overall sample. At the end of Wave 2, 3,139 individuals in the initial sample completed the survey. This higher than anticipated response not only provided additional data for analysis in Wave 2, but also helped establish a larger cohort of respondents moving forward in future waves of data collection.

The multi-mode data collection strategy offered was also a strength for Wave 2. Offering the survey in three modes (web, mail, and telephone) increased opportunity for response and allowed for a more expansive demographic to be included. For example, respondents without access to a computer or the internet were able to complete by hardcopy or phone. Due to budget restrictions in Wave 3, surveys were not completed by telephone, but telephone prompting was conducted to remind potential participants to complete the survey by either web or hardcopy.

Further, data validity was improved through the implementation of a screener question confirmation text as well as utilizing locators to find new respondent contact information. By confirming that the same respondent completed all three waves of the survey, further support was established for the overall validity of data collected across waves.

7.2 Limitations

A primary concern for MAGIC is maintaining high retention rates amongst the study cohort participants. In order to ensure that the research maintains both internal and external validity, retention of survey participants in the longitudinal study is of primary importance. Research has shown that males, young people, ethnic minorities, substance users, and individuals with mental health problems are generally more prone to have higher attrition (Claus et al., 2002; de Graaf et al., 2000; Eaton et al., 1992; Morrison et al., 1997). Many of these characteristics are typical amongst problem gamblers, which makes retention rates a particular challenge for studies such as MAGIC. By employing the right research methods, the UMass Amherst and NORC team has developed a methodological framework that borrows from past research (such as the Quinte Longitudinal Study) as well as past experiences on longitudinal studies that NORC has become proficient at employing (see NORC's National Longitudinal Surveys of Youth) in order to mitigate challenges associated with retention.

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Appendix A2: AAPOR Response Rates

Appendix A2 provides the final disposition report submitted by NORC to the SEIGMA research team with enough information to allow technical readers to calculate alternate response rates for the survey.

Table 21 below presents a summary of AAPOR response rate categories, descriptions, and counts following AAPOR standards. Table 22 presents the response rates for the MAGIC Wave 3 alone using AAPOR-recommended calculations. Table 23 presents the cumulative AAPOR standard rates for the first three waves. The AAPOR standard reference is https://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf.

Table 21: Counts by AAPOR Disposition Category

AAPOR Category	Description	AAPOR Dispositions Included*	MAGIC Wave 3	MAGIC Wave 2	SEIGMA Baseline 1	Note
I	Complete interview	1.1	2,455 (1,148 from Low risk group, and 1,307 from Other risk groups)	3,139 (1,466 from Low risk group, and 1,673 from Other risk groups)	9,581	
P	Partial interview	1.2	8 (3 from Low risk group, and 5 from Other risk groups)	16 (9 from Low risk group, and 7 from Other risk groups)	261	
R	Eligible household, refusal or break-off	2.1	0	0	0	MAGIC considered all identified eligible households to be "Partial interview".
NC	Eligible household, non-contact	2.2	522	1,665	0	MAGIC considered all unidentified households to be eligible non-contact.

AAPOR Category	Description	AAPOR Dispositions Included*	MAGIC Wave 3	MAGIC Wave 2	SEIGMA Baseline 1	Note
O	Eligible household, other	2.3	0	0	0	MAGIC considered all unidentified households to be eligible non-contact.
UH	Unknown if household/occupied HU	3.1	0	0	19,647	MAGIC considered all unidentified households to be eligible non-contact.
UO	Household, eligibility undetermined	3.2	0	0	923	MAGIC considered all unidentified households to be eligible non-contact.
e	Estimated proportion of cases of unknown eligibility that is eligible.		100%	100%	79.40%	Assume that all the sample selected from SEIGMA baseline survey is eligible
J**	Ineligible household	4.7	22 (9 from Low risk group, and 13 from Other risk groups)	0	10	
NR**	Non-residential or otherwise out of scope	4.50, 4.60	132 (57 from Low risk group, and 75 from Other risk groups)	40 (26 from Low risk group, and 14 from Other risk groups)	2,946	

AAPOR Category	Description	AAPOR Dispositions Included*	MAGIC Wave 3	MAGIC Wave 2	SEIGMA Baseline 1	Note

* Dispositions included in each AAPOR category taken from p. 40 of 2011 AAPOR Standard Definitions report. These dispositions are defined in Table 2 of that report.

** AAPOR does not include these categories on p. 40 of the 2011 AAPOR Standard Definitions report, but we include them here so as to have a complete accounting of all released cases. These are cases that are ineligible, either because they are not residential housing units or because there were no eligible members in the household.

Table 22: MAGIC AAPOR Response Rates, Wave 3

Response Rates	Formula	%
RR1	$\frac{I_3}{(I_3+P_3)+(R_3+NC_3+O_3)+(UH_3+UO_3)}$	82.2
RR2	$\frac{(I_2+P_2)}{(I_3+P_3)+(R_3+NC_3+O_3)+(UH_3+UO_3)}$	82.5
RR3**	$\frac{I_3}{(I_3+P_3)+(R_3+NC_3+O_3)+e_3(UH_3+UO_3)}$	82.2
RR4**	$\frac{(I_3+P_3)}{(I_3+P_3)+(R_3+NC_3+O_3)+e_3(UH_3+UO_3))}$	82.5
RR5**	$\frac{I_3}{(I_3+P_3)+(R_3+NC_3+O_3)}$	82.2
RR6**	$\frac{(I_3+P_3)}{(I_3+P_3)+(R_3+NC_3+O_3)}$	82.5

**MAGIC Wave 3 targeted individuals are completed interviews from MAGIC Wave 2 survey. From RR3 to RR6, we assume that everyone is eligible. Thus, RR3 and RR5 is the same as RR1; RR4 and RR6 is the same as RR2.

Table 23: MAGIC Cumulative AAPOR Response Rates, Cumulative Rates of Three Waves

Response Rates	Formula*	%
RR1	$\frac{I_3\ of\ Low\ risk\ group \times 3 + I_3\ of\ Other\ risk\ groups}{(I_1+P_1)+(R_1+NC_1+O_1)+(UH_1+UO_1)-(NR_2+NR_3+J_3)\ of\ Other\ risk\ groups-(NR_2+NR_3+J_3)\ of\ Low\ risk\ group \times 3}$	15.8
RR2	$\frac{(I_3+P_3)\ of\ Low\ risk\ group \times 3 + (I_3+P_3)\ of\ Other\ risk\ groups}{(I_1+P_1)+(R_1+NC_1+O_1)+(UH_1+UO_1)-(NR_2+NR_3+J_3)\ of\ Other\ risk\ groups-(NR_2+NR_3+J_3)\ of\ Low\ risk\ group \times 3}$	15.9
RR3	$\frac{I_3\ of\ Low\ risk\ group \times 3 + I_3\ of\ Other\ risk\ groups}{(I_1+P_1)+(R_1+NC_1+O_1)+e_1(UH_1+UO_1)-(NR_2+NR_3+J_3)\ of\ Other\ risk\ groups-(NR_2+NR_3+J_3)\ of\ Low\ risk\ group \times 3}$	18.4
RR4	$\frac{(I_3+P_3)\ of\ Low\ risk\ group \times 3 + (I_3+P_3)\ of\ Other\ risk\ groups}{(I_1+P_1)+(R_1+NC_1+O_1)+e_1(UH_1+UO_1)-(NR_2+NR_3+J_3)\ of\ Other\ risk\ groups-(NR_2+NR_3+J_3)\ of\ Low\ risk\ group \times 3}$	18.5

RR5**	$\frac{I_3\ of\ Low\ risk\ group \times 3 + I_3\ of\ Other\ risk\ groups}{(I_1 + P_1) + (R_1 + NC_1 + O_1) - (NR_2 + NR_3 + J_3)\ of\ Other\ risk\ groups - (NR_2 + NR_3 + J_3)\ of\ Low\ risk\ group \times 3}$	50.2
RR6**	$\frac{(I_3 + P_3)\ of\ Low\ risk\ group \times 3 + (I_3 + P_3)\ of\ Other\ risk\ groups}{(I_1 + P_1) + (R_1 + NC_1 + O_1) - (NR_2 + NR_3 + J_3)\ of\ Other\ risk\ groups - (NR_2 + NR_3 + J_3)\ of\ Low\ risk\ group \times 3}$	50.3

*The denominators are counts of SEIGMA baseline cases minus the number of non-residential and ineligible cases determined in MAGIC. Since we randomly sampled one third of the SEIGMA respondents in the "Low risk" group for MAGIC Wave 2, we weight any MAGIC respondents, partial completes, and NRs from the "Low risk" group by three.

**SEIGMA targeted households with adult age 18 and above. RR5 and RR6 assume that everyone not screened and not identified is ineligible, which is not a realistic assumption. Thus, it is not appropriate to use RR5 and RR6.

Appendix A3: Weighting Procedures

Appendix A3 describes the procedures used in weighting the MAGIC Wave 3 sample for analyses.

Details of the weighting procedures for the BGPS are available in the BGPS report (Volberg et al., 2017). Details of the weighting procedures for MAGIC Wave 2 are available in the Wave 2 report (Volberg et al., 2017).

Summary of Weighting for the MAGIC Wave 3 Longitudinal Survey

Prepared by Edward J. Stanek III

Introduction

The MAGIC study is a longitudinal investigation of adults aged 18 and over who were selected via probability sampling from respondents to an address-based probability sample in Massachusetts (the Baseline General Population Survey [BGPS]). A total of 4,860 addresses were selected for the MAGIC study from addresses for the 9,578 BGPS respondents. The 3,139 Wave 2 respondents define the MAGIC cohort. The surveys were completed between March 2015 and September 2015 and correspond to the Wave 2 MAGIC survey (MW2S).

The Wave 3 survey attempted to interview each member of the MAGIC cohort approximately one year later. A total of 2,450 surveys were completed between April 2016 and August 2016. This report provides a detailed description of the development of weights for Wave 3 respondents (MW3S). The weights for the third wave of the MAGIC survey, MW2S weights and BGPS weights are closely connected.

A weighting plan was developed and reviewed by the MGC's Research Review Committee (RRC). The steps in the weighting make use of weights from the BGPS that accounted for address based probability sampling and completion rates for the BGPS. Since the MAGIC cohort is defined by respondents to the Wave 2 MAGIC survey, the weights account for the probability sample rates for the MAGIC cohort and completion rates for the Wave 2 MAGIC respondents. Finally, the weights account for the completion rates for the Wave 3 survey, household size, and raking by region, age, gender, race, and education to align the respondents to the 2016 MA population.

Weight Accounting for Respondents to the BGPS Survey (MW3WT1)

The initial step in the weighting made use of weights from the BGPS that accounted for:

1. Baseline stratified sampling weight (Baseline Design weight: *WT1*)
2. Adjustment for unknown eligibility (Eligibility weight: *WT2*)
3. Adjustment for completion of the questionnaire (Completion weight : *WT3*)

The weights corresponded to inverse probability sampling weights that accounted for the BGPS design (*WT1*), adjustment for unknown eligibility (based on the frame variables for region, language, and address type) (*WT2*), and adjustment for survey completion (based on the variables for region, language, and last mode of contact (Web, SAQ, CATI) (*WT3*). The development of these weights ensures that the total weight in each region matches the number of addresses in each region, and similarly that totals match Massachusetts totals by type of address, language, and last mode of contact. Details on the development of weights for the BGPS are given in the *Gambling and Problem Gambling in Massachusetts: Results of a Baseline Population Survey* report, Appendix A3 (umass.edu/seigma/reports).

Using the completion weight for the BGPS (WT3), the total of the weight assigned to BGPS respondents is the total number of addresses in the Massachusetts sampling frame. Let $j = 1,...,J$ index addresses for the $J = 9,578$ BGPS respondents, and $w_{0,j}$ represent WT3 for respondent j. The sum of the respondent's weight totals to the number of addresses in the Massachusetts frame used to select the

BGPS sample, $\sum_{j=1}^{J} W_{0,j} = 2{,}714{,}193$. We refer to the weight $W_{0,j}$ by the variable MW3WT1 in the Wave 3 MAGIC survey. The weights were assigned to 29 address categories as illustrated in Table 1.

Table 1. Weights for 29 Address Classes from the BGPS

Obs	region	addtyp	langsp	mode_at	mw3wt1	mw3wt1_n	mw3wt1_sum
1	1=West	1=SFDU-SFam	0=Non-Span	1=Web	104.603	619	64749.55
2	1=West	1=SFDU-SFam	0=Non-Span	2=SAQ	107.057	1183	126648.58
3	1=West	1=SFDU-SFam	0=Non-Span	3=CATI	114.565	162	18559.52
4	1=West	2=MFDU-MFam	0=Non-Span	1=Web	129.270	151	19519.70
5	1=West	2=MFDU-MFam	0=Non-Span	2=SAQ	132.302	251	33207.75
6	1=West	2=MFDU-MFam	0=Non-Span	3=CATI	141.580	41	5804.78
7	1=West	9=PO Box	0=Non-Span	1=Web	147.148	10	1471.48
8	1=West	9=PO Box	0=Non-Span	2=SAQ	150.599	23	3463.79
9	1=West	9=PO Box	0=Non-Span	3=CATI	161.161	1	161.16
10	1=West	1=SFDU-SFam	1=Spanish	1=Web	174.320	41	7147.14
11	1=West	1=SFDU-SFam	1=Spanish	2=SAQ	180.437	132	23817.67
12	1=West	2=MFDU-MFam	1=Spanish	1=Web	207.681	34	7061.16
13	1=West	1=SFDU-SFam	1=Spanish	3=CATI	210.387	18	3786.96
14	1=West	2=MFDU-MFam	1=Spanish	2=SAQ	214.968	96	20636.96
15	1=West	2=MFDU-MFam	1=Spanish	3=CATI	250.650	11	2757.15
16	2=East	1=SFDU-SFam	0=Non-Span	1=Web	290.715	1373	399152.08
17	2=East	1=SFDU-SFam	0=Non-Span	2=SAQ	297.431	2608	775698.82
18	2=East	1=SFDU-SFam	0=Non-Span	3=CATI	322.187	454	146272.98
19	2=East	2=MFDU-MFam	0=Non-Span	1=Web	408.650	551	225166.24
20	2=East	2=MFDU-MFam	0=Non-Span	3=CATI	408.650	180	73557.03
21	2=East	2=MFDU-MFam	0=Non-Span	2=SAQ	418.154	987	412717.65
22	2=East	1=SFDU-SFam	1=Spanish	1=Web	429.747	61	26214.57
23	2=East	1=SFDU-SFam	1=Spanish	2=SAQ	445.834	170	75791.74
24	2=East	1=SFDU-SFam	1=Spanish	3=CATI	524.626	26	13640.28
25	2=East	9=PO Box	0.08695652	1.2174	550.791	23	12668.19
26	2=East	2=MFDU-MFam	1=Spanish	1=Web	559.237	75	41942.75
27	2=East	2=MFDU-MFam	1=Spanish	2=SAQ	559.237	203	113525.04
28	2=East	9=PO Box	0=Non-Span	2=SAQ	563.600	43	24234.81
29	2=East	2=MFDU-MFam	1=Spanish	3=CATI	682.704	51	34817.93
						9578	2714193.45

Weight Accounting for Respondents to the Wave 2 Survey (MW3WT2)

The MAGIC cohort is defined by respondents to a stratified probability sample of BGPS respondents. Two additional factors were used to adjust weights for the MAGIC cohort, given by

4. Adjust for the MAGIC probability sample design (MAGIC Design weight: MWT1)
5. Adjust for response rates to the MW2S study (MAGIC Wave 2 Completion weight: MWT2)

Details of the development of these weights are given in Appendix A3 to the report *Analysis of MAGIC Wave 2: Incidence and Transitions* (www.umass.edu/seigma/reports).

The MAGIC sample was selected from completed respondents of the 2014 BGPS who were stratified into six risk groups according to gambling behaviors, $k = 1,\ldots,6$. The weight adjusting for the MAGIC sampling design is formed by multiplying the weight MW3WT0 by the inverse of the probability of selection π_k for each of six strata. The probability of selection of the i^{th} address from each of the first

five risk groups is $\pi_k = 1$ for $k = 1,\ldots,5$. The probability of selection of the low risk group is $\pi_6 = \frac{2348}{7066}$. We represent the BGPS weight $w_{0,j}$ for respondent j as $w_{0,ik}$, the weight assigned to the respondent's address i in risk group k. The weight adjusted for the MAGIC sampling design is defined by

$$w^*_{1,ik} = \left(\frac{1}{\pi_k}\right) w_{0,ik} .$$

The total of the weights $w^*_{1,ik}$ for the 4,860 MAGIC sample subjects is 2,721,061.67. We multiply $w^*_{1,ik}$ by 2,714,193.45/2,721,061.67 to preserve the total weight, such that

$$w_{1,ik} = \left(\frac{2{,}714{,}193.45}{2{,}721{,}061.67}\right) w^*_{1,ik} .$$

Table 2 summarizes the number of sample addresses in each of the six strata by characteristics of the addresses used in the BGPS non-response adjustment. Notice that the total number of sample addresses is 4,860.

Table 2. Number of Respondents in MAGIC Wave 2 Sample by Risk Class and Address Characteristics from the BGPS

Massachusetts Region: REGION	Language (Pooled): LANGSP2	Attempted Mode: MODE_AT	Type of Address: ADDTYP	PG	At Risk	$1200 per y	Gamb Weekly	Vet 2001+	Low Risk	All
1=West	0=Non-Span	1=Web	1=SFDU-SFam	7	19	49	71	7	147	300
1=West	0=Non-Span	1=Web	2=MFDU-MFam	3	4	11	7	1	51	77
1=West	0=Non-Span	1=Web	9=PO Box	0	2	2	0	0	3	7
1=West	0=Non-Span	2=SAQ	1=SFDU-SFam	15	55	183	108	6	253	620
1=West	0=Non-Span	2=SAQ	2=MFDU-MFam	8	11	21	25	1	65	131
1=West	0=Non-Span	2=SAQ	9=PO Box	1	0	3	3	0	7	14
1=West	0=Non-Span	3=CATI	1=SFDU-SFam	0	6	14	19	1	36	76
1=West	0=Non-Span	3=CATI	2=MFDU-MFam	0	1	2	1	1	12	17
1=West	0=Non-Span	3=CATI	9=PO Box	0	0	0	0	0	1	1
1=West	1=Spanish	1=Web	1=SFDU-SFam	1	3	2	4	0	8	18
1=West	1=Spanish	1=Web	2=MFDU-MFam	2	3	3	4	0	8	20
1=West	1=Spanish	2=SAQ	1=SFDU-SFam	1	11	15	10	5	38	80
1=West	1=Spanish	2=SAQ	2=MFDU-MFam	1	8	9	12	0	27	57
1=West	1=Spanish	3=CATI	1=SFDU-SFam	0	1	3	2	0	2	8
1=West	1=Spanish	3=CATI	2=MFDU-MFam	0	2	0	1	0	0	3
2=East	0=Non-Span	1=Web	1=SFDU-SFam	10	65	121	116	8	362	682
2=East	0=Non-Span	1=Web	2=MFDU-MFam	6	29	39	26	5	140	245
2=East	0=Non-Span	2=SAQ	1=SFDU-SFam	34	118	353	201	7	625	1338
2=East	0=Non-Span	2=SAQ	2=MFDU-MFam	21	44	113	80	4	242	504
2=East	0=Non-Span	3=CATI	1=SFDU-SFam	4	14	56	39	2	113	228
2=East	0=Non-Span	3=CATI	2=MFDU-MFam	3	8	17	14	1	47	90
2=East	2=Any Lang	1=Web	9=PO Box	0	0	1	1	0	2	4
2=East	2=Any Lang	2=SAQ	9=PO Box	1	1	7	5	0	12	26
2=East	2=Any Lang	3=CATI	9=PO Box	0	0	0	0	0	0	0
2=East	1=Spanish	1=Web	1=SFDU-SFam	1	6	4	3	0	17	31
2=East	1=Spanish	1=Web	2=MFDU-MFam	2	6	2	4	0	19	33
2=East	1=Spanish	2=SAQ	1=SFDU-SFam	2	8	24	15	0	42	91
2=East	1=Spanish	2=SAQ	2=MFDU-MFam	8	14	24	11	0	52	109

2=East	1=Spanish	3=CATI	1=SFDU-SFam	0	3	4	3	0	9	19
2=East	1=Spanish	3=CATI	2=MFDU-MFam	2	7	6	7	0	8	30
2=East	2=Any Lang	1=Web	9=PO Box	0	1	0	0	0	0	1
2=East	2=Any Lang	2=SAQ	9=PO Box	0	0	0	0	0	0	0
				133	450	1088	792	49	2348	4860

We summarize the average weight assigned to the Wave 2 sample addresses after accounting for the Wave 2 survey design in Table 3.

Table 3. Average BGPS weight for Sample Addresses in the MAGIC Wave 2 Sample after accounting for Wave 2 Sample Design

Massachusetts Region: REGION	Language (Pooled): LANGSP2	Attempted Mode: MODE_AT	Type of Address: ADDTYP	PG	At Risk	$1200 per y	Gamb Weekly	Vet 2001+	Low Risk
1=West	0=Non-Span	1=Web	1=SFDU-SFam	104	104	104	104	104	314
1=West	0=Non-Span	1=Web	2=MFDU-MFam	129	129	129	129	129	388
1=West	0=Non-Span	1=Web	9=PO Box	0	147	147	0	0	442
1=West	0=Non-Span	2=SAQ	1=SFDU-SFam	107	107	107	107	107	321
1=West	0=Non-Span	2=SAQ	2=MFDU-MFam	132	132	132	132	132	397
1=West	0=Non-Span	2=SAQ	9=PO Box	150	0	150	150	0	452
1=West	0=Non-Span	3=CATI	1=SFDU-SFam	0	114	114	114	114	344
1=West	0=Non-Span	3=CATI	2=MFDU-MFam	0	141	141	141	141	425
1=West	0=Non-Span	3=CATI	9=PO Box	0	0	0	0	0	484
1=West	1=Spanish	1=Web	1=SFDU-SFam	174	174	174	174	0	523
1=West	1=Spanish	1=Web	2=MFDU-MFam	207	207	207	207	0	623
1=West	1=Spanish	2=SAQ	1=SFDU-SFam	180	180	180	180	180	542
1=West	1=Spanish	2=SAQ	2=MFDU-MFam	214	214	214	214	0	645
1=West	1=Spanish	3=CATI	1=SFDU-SFam	0	210	210	210	0	632
1=West	1=Spanish	3=CATI	2=MFDU-MFam	0	250	0	250	0	0
2=East	0=Non-Span	1=Web	1=SFDU-SFam	290	290	290	290	290	873
2=East	0=Non-Span	1=Web	2=MFDU-MFam	408	408	408	408	408	1,227
2=East	0=Non-Span	2=SAQ	1=SFDU-SFam	297	297	297	297	297	893
2=East	0=Non-Span	2=SAQ	2=MFDU-MFam	417	417	417	417	417	1,255
2=East	0=Non-Span	3=CATI	1=SFDU-SFam	321	321	321	321	321	967
2=East	0=Non-Span	3=CATI	2=MFDU-MFam	408	408	408	408	408	1,227
2=East	2=Any Lang	1=Web	9=PO Box	0	0	549	549	0	1,653
2=East	2=Any Lang	2=SAQ	9=PO Box	562	562	562	562	0	1,692
2=East	2=Any Lang	3=CATI	9=PO Box	0	0	0	0	0	0
2=East	1=Spanish	1=Web	1=SFDU-SFam	429	429	429	429	0	1,290
2=East	1=Spanish	1=Web	2=MFDU-MFam	558	558	558	558	0	1,679
2=East	1=Spanish	2=SAQ	1=SFDU-SFam	445	445	445	445	0	1,338
2=East	1=Spanish	2=SAQ	2=MFDU-MFam	558	558	558	558	0	1,679
2=East	1=Spanish	3=CATI	1=SFDU-SFam	0	523	523	523	0	1,575
2=East	1=Spanish	3=CATI	2=MFDU-MFam	681	681	681	681	0	2,049
2=East	2=Any Lang	1=Web	9=PO Box	0	549	0	0	0	0
2=East	2=Any Lang	2=SAQ	9=PO Box	0	0	0	0	0	0

The second adjustment to weights for Wave 2 accounts for four factors (education [HS or less, some college or college grad, some post-graduate education], presence of children [none/some], housing [own/rent], and past year frequency of gambling [none, some]) that were related to Wave 2 response rates. When cross-classified, these variables were used to classify the Wave 2 sample addresses into 25 groups (including one group where one or more variables were missing). Wave 2 response rates were calculated and ranged from 31% to 79% between groups. Smaller groups were combined with other

groups with similar response rates to form 19 groups for non-response adjustment. We change the indices for the sample addresses representing the weight for address i in risk group k, $w_{1,ik}$, now by sample address $j = 1,\ldots,n_m$ in group $m = 1,\ldots,M = 19$, $w_{1,jm}$. The total number of sample addresses in Wave 2 is $\sum_{m=1}^{M=19} n_m = 4{,}860$.

The adjustment to the weights for Wave 2 non-response is made using the design weight $w_{1,jm}$ for sample addresses in each of the $m = 1,\ldots,M = 19$ groups. Let c_{jm} to be an indicator variable that has a value of 1 if subject j completes the survey, and 0 otherwise. The completion adjusted weights are given by

$$w_{2,jm} = \left(\frac{T_m}{C_m}\right) w_{1,jm}$$

where $C_m = \sum_{j=1}^{n_m} c_{jm} w_{1,jm}$ and $T_m = \sum_{j=1}^{n_m} w_{1,jm}$. We refer to the weight $w_{2,jm}$ as MW3WT2.

Table 4 describes the number of addresses with respondents to the MAGIC Wave 2 survey by characteristics of the addresses used to account for non-response in the BGPS.

Table 4. Number of Respondent Addresses in the MAGIC Wave 2 Sample by Risk Class and Address Characteristics from the BGPS

Massachusetts Region: REGION	Language (Pooled): LANGSP2	Attempted Mode: MODE_AT	Type of Address: ADDTYP	PG	At Risk	$1200 per y	Gamb Weekly	Vet 2001+	Low Risk	All
1=West	0=Non-Span	1=Web	1=SFDU-SFam	6	13	42	54	5	116	236
1=West	0=Non-Span	1=Web	2=MFDU-MFam	2	3	9	5	1	29	49
1=West	0=Non-Span	1=Web	9=PO Box	0	2	1	0	0	3	6
1=West	0=Non-Span	2=SAQ	1=SFDU-SFam	7	34	132	70	5	153	401
1=West	0=Non-Span	2=SAQ	2=MFDU-MFam	5	9	13	14	1	28	70
1=West	0=Non-Span	2=SAQ	9=PO Box	1	0	1	2	0	3	7
1=West	0=Non-Span	3=CATI	1=SFDU-SFam	0	4	7	15	1	21	48
1=West	0=Non-Span	3=CATI	2=MFDU-MFam	0	0	1	0	0	6	7
1=West	0=Non-Span	3=CATI	9=PO Box	0	0	0	0	0	0	0
1=West	1=Spanish	1=Web	1=SFDU-SFam	1	2	2	3	0	5	13
1=West	1=Spanish	1=Web	2=MFDU-MFam	1	3	3	2	0	5	14
1=West	1=Spanish	2=SAQ	1=SFDU-SFam	1	8	11	6	5	20	51
1=West	1=Spanish	2=SAQ	2=MFDU-MFam	0	4	4	7	0	16	31
1=West	1=Spanish	3=CATI	1=SFDU-SFam	0	1	0	1	0	1	3
1=West	1=Spanish	3=CATI	2=MFDU-MFam	0	2	0	0	0	0	2
2=East	0=Non-Span	1=Web	1=SFDU-SFam	8	53	95	95	6	277	534
2=East	0=Non-Span	1=Web	2=MFDU-MFam	4	15	26	18	2	94	159
2=East	0=Non-Span	2=SAQ	1=SFDU-SFam	22	78	224	136	5	397	862
2=East	0=Non-Span	2=SAQ	2=MFDU-MFam	11	23	66	53	3	122	278
2=East	0=Non-Span	3=CATI	1=SFDU-SFam	1	8	33	16	2	59	119
2=East	0=Non-Span	3=CATI	2=MFDU-MFam	2	7	13	9	1	23	55
2=East	2=Any Lang	1=Web	9=PO Box	0	0	0	0	0	2	2
2=East	2=Any Lang	2=SAQ	9=PO Box	1	1	4	4	0	8	18
2=East	2=Any Lang	3=CATI	9=PO Box	0	0	0	0	0	0	0
2=East	1=Spanish	1=Web	1=SFDU-SFam	1	6	4	2	0	11	24
2=East	1=Spanish	1=Web	2=MFDU-MFam	1	3	1	3	0	8	16

2=East	1=Spanish	2=SAQ	1=SFDU-SFam	2	1	17	8	0	23	51
2=East	1=Spanish	2=SAQ	2=MFDU-MFam	3	10	15	7	0	26	61
2=East	1=Spanish	3=CATI	1=SFDU-SFam	0	0	2	1	0	6	9
2=East	1=Spanish	3=CATI	2=MFDU-MFam	1	4	0	3	0	4	12
2=East	2=Any Lang	1=Web	9=PO Box	0	1	0	0	0	0	1
2=East	2=Any Lang	2=SAQ	9=PO Box	0	0	0	0	0	0	0
				81	295	726	534	37	1466	3139

Table 5 gives the average weight assigned to addresses where there was a Wave 2 response. The total weight over all 3,139 addresses is 2,714,193.

Table 5. Average weight for Wave 2 Respondent Addresses in the MAGIC study after accounting for Wave 2 Non-Response

Massachusetts Region: REGION	Language (Pooled): LANGSP2	Attempted Mode: MODE_AT	Type of Address: ADDTYP	PG	At Risk	$1200 per y	Gamb Weekly	Vet 2001+	Low Risk
1=West	0=Non-Span	1=Web	1=SFDU-SFam	170	156	154	151	161	455
1=West	0=Non-Span	1=Web	2=MFDU-MFam	204	364	226	219	228	681
1=West	0=Non-Span	1=Web	9=PO Box	0	232	182	0	0	621
1=West	0=Non-Span	2=SAQ	1=SFDU-SFam	160	172	160	169	162	481
1=West	0=Non-Span	2=SAQ	2=MFDU-MFam	226	215	211	228	224	719
1=West	0=Non-Span	2=SAQ	9=PO Box	214	0	230	222	0	672
1=West	0=Non-Span	3=CATI	1=SFDU-SFam	0	175	170	183	184	509
1=West	0=Non-Span	3=CATI	2=MFDU-MFam	0	0	245	0	0	974
1=West	0=Non-Span	3=CATI	9=PO Box	0	0	0	0	0	0
1=West	1=Spanish	1=Web	1=SFDU-SFam	247	403	317	255	0	845
1=West	1=Spanish	1=Web	2=MFDU-MFam	406	395	372	359	0	1,265
1=West	1=Spanish	2=SAQ	1=SFDU-SFam	318	287	272	274	257	937
1=West	1=Spanish	2=SAQ	2=MFDU-MFam	0	410	389	395	0	1,122
1=West	1=Spanish	3=CATI	1=SFDU-SFam	0	322	0	322	0	968
1=West	1=Spanish	3=CATI	2=MFDU-MFam	0	434	0	0	0	0
2=East	0=Non-Span	1=Web	1=SFDU-SFam	420	447	431	425	429	1,299
2=East	0=Non-Span	1=Web	2=MFDU-MFam	957	816	674	673	580	2,029
2=East	0=Non-Span	2=SAQ	1=SFDU-SFam	485	483	445	456	458	1,389
2=East	0=Non-Span	2=SAQ	2=MFDU-MFam	926	735	699	795	667	2,060
2=East	0=Non-Span	3=CATI	1=SFDU-SFam	457	495	487	482	399	1,564
2=East	0=Non-Span	3=CATI	2=MFDU-MFam	759	687	709	960	798	1,911
2=East	2=Any Lang	1=Web	9=PO Box	0	0	0	0	0	2,202
2=East	2=Any Lang	2=SAQ	9=PO Box	1,101	800	774	1,014	0	2,397
2=East	2=Any Lang	3=CATI	9=PO Box	0	0	0	0	0	0
2=East	1=Spanish	1=Web	1=SFDU-SFam	690	856	716	600	0	2,522
2=East	1=Spanish	1=Web	2=MFDU-MFam	968	961	1,791	1,065	0	3,106
2=East	1=Spanish	2=SAQ	1=SFDU-SFam	930	633	671	740	0	2,027
2=East	1=Spanish	2=SAQ	2=MFDU-MFam	952	1,132	1,094	1,671	0	3,245
2=East	1=Spanish	3=CATI	1=SFDU-SFam	0	0	774	909	0	2,951
2=East	1=Spanish	3=CATI	2=MFDU-MFam	1,334	1,638	0	1,334	0	4,076
2=East	2=Any Lang	1=Web	9=PO Box	0	842	0	0	0	0
2=East	2=Any Lang	2=SAQ	9=PO Box	0	0	0	0	0	0

Weight Accounting for Respondents to the Wave 3 Survey (MW3WT3)

The third adjustment to the weights accounts for differential non-response in Wave 3. All 3,139 MAGIC cohort subjects were attempted to be interviewed in Wave 3. The results of the interviews are summarized in Table 6 which provides the completion status for each subject.

Table 6. Completion Status for MAGIC Cohort Subjects in Wave 3

	Wave3: MW3WT2	
	N in Cohort	Total MW3WT2
Disposition		
C: Completed Survey	2,450	2,079,611
C1: Different resp	5	4,743
ER: Not Complete	8	6,710
J: Deceased/ineligible	22	14,742
NR:Undeliverable	132	142,457
UO:Confirmed HH, unscreened	23	20,301
U2:No contact	499	445,629
All	3,139	2,714,193

Completed surveys were obtained from 2,450 of the 3,139 subjects in the MAGIC cohort. The first step in adjusting the weights for response is to drop from the cohort the 22 subjects who were deceased/ineligible. The total number of addresses represented by the remaining 3,117 Wave 3 cohort members is 2,699,451. Among these 3,117 cohort members, completed response was obtained for 2,450 (78.6%) individuals.

A stepwise logistic regression was used to determine the most significant variables related to the rate of response. Variables included in the model, along with p-values of the test of homogeneity of response rates, are given in Table 7.

For eight variables (gender, age, race, education, children in household, home ownership, US born, and disability), when the response was missing in Wave 2, the response from the BGPS was used, if available. For other variables (employment, marital status, and family issues around gambling) as well as gambling variables (saliency of gambling, frequency of gambling, and number of gambling formats), the Wave 2 response was used. Finally, four variables from the address frame were examined for differential response rates. Many of these variables were statistically significant in relation to the response rate for Wave 3.

Table 7. Variables Used to Identify Groups of Sample Addresses with Different Response Rates for Wave 2

Variable	Source	Categories	Variable Name	P-Value (excluding Missing Values)
Gender	Wave-2, if Missing BGPS	Male, Female	Gender_W2	0.0258
Age	Wave-2, if Missing BGPS	19-34;35-49;50-64;65+	AGE_w2	0.7686
Race	Wave-2, if Missing BGPS	Black, Hispanic, Asian, White/other	Race_Magic	0.0001
Education	Wave-2, if Missing BGPS	HS or less; some college/grad; some post-grad	Education_d6	0.0001
Children	Wave-2, if Missing BGPS	none; some	Children_d5	0.0976
Home Ownership	Wave-2, if Missing BGPS	own; rent/other	Own_d9	0.0029
Born in US	Wave-2, if Missing BGPS	Yes; No	D12_RMC	0.0001
Disabilities	Wave-2, if Missing BGPS	Yes; No	C12_RMC	0.0001
Employment	Wave-2	employed; other	D7A_RM	0.4119
Marital Status	Wave-2	Never married; living with partner; married; separated; divorced; widowed	D4_RM	0.0084
Family Gambling Issues around gambling	Wave-2	Yes; No	GPo2_RM	0.8791
Saliency of Gambling	Wave-2	Very harmful; harmful; neutral; beneficial; very beneficial	GA5_RM	0.1226
Frequency of Gambling	Wave-2	none; in past year; monthly; weekly	ANYGAMEF1	0.0515
# of Gambling Formats	Wave-2	0-2 or 3+	NGAMBF_r	0.0102
Region	BGPS	East; West	REGION	0.5299
Type of Address	BGPS	Single Family; Multiple Family; PO Box	ADDTYP	0.1113
Language	BGPS	Non-Spanish; Spanish; Other	LANGSP2	0.734
BGPS Mode Attempt	BGPS	Web; SAQ; CATI	MODE_AT	0.0001
Source: gmed18p11.sas				
Table in MAGIC2018-documentation-stanek.xlsx				

The non-response adjustment is an adjustment to the weights (*MW3WT2*) to compensate for differences in completed response rates across subgroups for addresses selected in the MW3S. The weights are adjusted to account for varying completion rates. The adjustment is made by forming non-response adjustment cells (ℓ).

A stepwise logistic regression analysis was used to determine the variables most strongly related to completing the MW3S survey. The dependent variable of interest was whether a survey was completed. The independent variables used in the logistic regression are the 18 variables summarized in Table 7. Nearly all variables (except region and type of address) were significantly related to response rates at the 0.10 level, and five variables (given in order of inclusion as BGPS mode attempt, US born, education, disability, and number of gambling formats) were significant at the 0.05 level. Addresses where one or more of the variables was missing (n=179) were not included in the logistic analysis.

We limit subsequent investigation of non-response to cells formed by a cross-classification of the five variables that were significantly related to response at the 0.05 level. Our goal in this investigation was to define non-response adjustment cells, each of which had a minimum of 50 sample addresses, where the response rates for the addresses were homogeneous.

Among the 5 variables that were statistically significantly related to non-response, one or more of the variables was missing for n=10 of the addresses at Wave 2.

Completed questionnaires at Wave 3 were obtained for 4 of these addresses, resulting in a 40% response rate. We examined the response rates for the 3,107 cohort addresses for the five variables

(with no missing data) that were significant at the 0.05 level in the logistic regression model. A description of these rates is given in Table 8.

Table 8. Completion Status for MAGIC Cohort Subjects in Wave 3

	Wave3 Complete	
	N in Cohort	Percent Complete
BGPS Mode Attempt		
1=Web	1,048	85.78%
2=SAQ	1,808	76.71%
3=CATI	251	63.75%
US Born?		
No	352	65.91%
Yes	2,755	80.36%
Education		
HS	577	71.06%
College	1,674	79.27%
Grad	856	82.83%
Disability?		
No	2,856	79.62%
Yes	251	68.53%
# Gambling Formats		
0-2	1,620	76.79%
3-10	1,487	80.83%

We note that the lowest completion rates occurred for addresses where the BGPS contact was via telephone (CATI) (63.75%), where the respondent was not born in the US (65.91%), and where the respondent reported a disability (68.53%). We developed address groups based on response to the five variables (last mode of attempted interview in the BGPS, born in the US, education, disability, and number of gambling formats participated in) that had different response rates in Wave 3. A total of 18 address groups with 50 or more sample addresses were developed, as summarized in Table 9.

Table 9. Response Rates By Address Groups Formed from 5 Variables for Wave 3

Wave 3 Non-response Groups: GROUPW3	N Sample Addresses	N Response	Percent Response
1= CATI BornUS?=N Any Edu Disab=Y Any#Formats	87	42	48.28%
7= Web BornUS?=Y MixedEd Disab=Y Mixed Fmts	83	51	61.45%
3= SAQ BornUS?=N HS/Coll Disab=N Any#Formats	142	90	63.38%
6= Web BornUS?=N Any Edu Disab=N 0-2 Formats	80	52	65.00%
4= CATI BornUS?=Y Oth Edu Disab=N Any#Formats	127	83	65.35%
8= Web BornUS?=Y HS Disab=N 0-2 Formats	146	105	71.92%
11= Web BornUS?=Y HS AnyDisab 3+Formats	193	140	72.54%
2= SAQ BornUS?=N Grad Disab=N Any#Formats	58	43	74.14%
9= Web BornUS?=Y College Disab=N 0-2 Formats	349	267	76.50%
5= CATI BornUS?=Y College Disab=N 3+Formats	53	41	77.36%
12= Web BornUS?=Y College AnyDisab 3+Formats	452	370	81.86%
10= Web BornUS?=Y Grad AnyDisab 0-2 Fmts	237	197	83.12%
14= Web BornUS?=Y HS Mixed Any#Formats	89	75	84.27%
18= Web BornUS?=Y Grad Mixed 3+Formats	135	116	85.93%
13= Web BornUS?=Y Grad Disab=N 3+Formats	138	119	86.23%
15= Web BornUS?=Y College Mixed 0-2 Formats	243	210	86.42%
16= Web BornUS?=Y College Mixed 3+Formats	319	281	88.09%
17= Web BornUS?=Y Grad Mixed 0-2 Formats	186	168	90.32%
	3117	2450	

The smallest group had 53 sampled addresses. The response rate ranged from 48.28% to 90.32% between the groups.

The adjustment to the weights for the completion status is made using the Wave 2 weight (MW3WT2) for sample addresses in each of the $p = 1,...,\mathrm{P} = 18$ groups. Let $W_{1,jp}$ represent the MW3WT2 weight for the j^{th} sample subject in group p, where $j = 1,...,n_p$ indexes the subjects in group p. Also, define c_{jp} to be an indicator variable that has a value of 1 if subject j completes the Wave 3 survey, and 0 otherwise. The completion adjusted weights are given by

$$W_{3,jp} = \left(\frac{S_p}{R_p} \right) W_{2,jp}$$

where $R_p = \sum_{j=1}^{n_p} c_{jp} W_{2,jp}$ and $S_p = \sum_{j=1}^{n_p} W_{2,jp}$.

The ratios, $\frac{S_p}{R_p}$, determine how different the Wave 2 weight, $W_{1,jp}$ i.e. MW3WT2, is from the weight adjusted for Wave 3 non-response, $W_{3,jp}$ i.e. MW3WT3. The reciprocal of this ratio is closely related to the completion rate (i.e. the proportion of sample addresses where a Wave 3 survey was completed). When there are few sample subjects in a group, the relative standard deviation of the completion rate is large. This is particularly true when the completion rate is low, leading to large ratios $\frac{S_p}{R_p}$. Table 10 illustrates the non-response weight ratios and relative standard deviation.

Table 10. Non response weighting for wave 3

	Wave3 BGPS Mode	Born US?	Edu	Disab?	# Fmts	Total Sample mw3wt2: MW3WT2_S	Total Complete mw3wt2: MW3WT2C_S	Wave 3 Non-Response Adj Ratio: RATIO_W3	N Sample: MW3WT2_N	N Complete: MW3WT2C_N	Wave 3 Response Rate: RESP_W3	Relative SE in MW3WT3 weight
1	CATI	N	Any	Y	Any	97,231	45,492	2.14	87	42	48.3%	11.1%
2	SAQ	N	Grad	N	Any	66,551	51,493	1.29	58	43	74.1%	7.8%
3	SAQ	N	HS/Co	N	Any	156,164	93,158	1.68	142	90	63.4%	6.4%
4	CATI	Y	Oth	N	Any	133,784	86,569	1.55	127	83	65.4%	6.5%
5	CATI	Y	Coll	N	3+	38,502	29,869	1.29	53	41	77.4%	7.4%
6	Web	N	AnyEdu	N	0-2	114,849	73,386	1.57	80	52	65.0%	8.2%
7	Web	Y	Mixed	Y	Mix	72,010	46,564	1.55	83	51	61.4%	8.7%
8	Web	Y	HS	N	0-2	118,076	81,900	1.44	146	105	71.9%	5.2%
9	Web	Y	Coll	N	0-2	357,462	271,198	1.32	349	267	76.5%	3.0%
10	Web	Y	Grad	Any	0-2	248,891	206,275	1.21	237	197	83.1%	2.9%
11	Web	Y	HS	Any	3+	117,948	86,440	1.36	193	140	72.5%	4.4%
12	Web	Y	Coll	Any	3+	285,684	229,435	1.25	452	370	81.9%	2.2%
13	Web	Y	Grad	N	3+	89,009	77,167	1.15	138	119	86.2%	3.4%
14	Web	Y	HS	Mix	Any	70,438	54,960	1.28	89	75	84.3%	4.6%
15	Web	Y	Coll	Mix	0-2	242,168	209,800	1.15	243	210	86.4%	2.5%
16	Web	Y	Coll	Mix	3+	193,368	168,689	1.15	319	281	88.1%	2.1%
17	Web	Y	Grad	Mix	0-2	198,803	180,042	1.10	186	168	90.3%	2.4%
18	Web	Y	Grad	Mix	3+	98,513	87,173	1.13	135	116	85.9%	3.5%

We note that none of the relative standard deviations are greater than 30%, indicating adequate stability in the response-weight adjustment. A summary of the weights adjusting for non-response is given in Table 11.

We define the MAGIC Wave 3 weight adjusted for non-response groups $p = 1,...,\mathrm{P} = 18$ as $w_{3,j}$, where $j = 1,...,2,450$ indexes the MAGIC Wave 3 sample subjects who completed the questionnaire.

Table 11. Wave 3 Non-response Adjusted Weights

Wave3 Non-Resp Groups						N Sample	Total Sample	N Wave 3	Total Complete
BGPS Mode	Born US?	Edu	Disab?	# Fmts		Address: MW3WT2_N	mw3wt2: MW3WT2_S	Complete: MW3WT3_N	mw3wt3: MW3WT3C_S
1	CATI	N	Any	Y	Any	87	97,231	42	97,231
2	SAQ	N	Grad	N	Any	58	66,551	43	66,551
3	SAQ	N	HS/Co	N	Any	142	156,164	90	156,164
4	CATI	Y	Oth	N	Any	127	133,784	83	133,784
5	CATI	Y	Coll	N	3+	53	38,502	41	38,502
6	Web	N	AnyEdu	N	0-2	80	114,849	52	114,849
7	Web	Y	Mixed	Y	Mix	83	72,010	51	72,010
8	Web	Y	HS	N	0-2	146	118,076	105	118,076
9	Web	Y	Coll	N	0-2	349	357,462	267	357,462
10	Web	Y	Grad	Any	0-2	237	248,891	197	248,891
11	Web	Y	HS	Any	3+	193	117,948	140	117,948
12	Web	Y	Coll	Any	3+	452	285,684	370	285,684
13	Web	Y	Grad	N	3+	138	89,009	119	89,009
14	Web	Y	HS	Mix	Any	89	70,438	75	70,438
15	Web	Y	Coll	Mix	0-2	243	242,168	210	242,168
16	Web	Y	Coll	Mix	3+	319	193,368	281	193,368
17	Web	Y	Grad	Mix	0-2	186	198,803	168	198,803
18	Web	Y	Grad	Mix	3+	135	98,513	116	98,513
						3,117	2,699,451	2,450	2,699,451

Adjustment for Household Size (MW3WT4)

The fourth adjustment in the weights is for household size. The number of persons 18 years or older living the household was recorded in the MAGIC survey or recovered from the Wave 2 or the BGPS if missing in Wave 3. The distribution of household size (truncated to a maximum of 7) for completed respondents is given in Table 12.

Table 12. Number of 18+ persons in HH by Region with Completed Wave 3 Survey

Frequency	1=West	2=East	Total
.	23	49	72
1	207	409	616
2	382	870	1252
3	99	240	339
4	27	96	123
5	5	35	40
6	0	5	5
7	0	3	3
Total	743	1707	2450

In Western MA, the total number of persons age 19+ based on the 2016 PUMS data is 650,287, while the total weight (MW3WT3, which is equal to the number of addresses, or households) for addresses with a Wave 3 respondent in Western MA is 352,709. We use age 19 and older for the PUMS data since the MAGIC cohort will have aged one year since it was established in Wave 2. This corresponds to an average household size of $1.84 = \frac{650,287}{352,709}$. In Eastern MA, the total number of persons age 19+ based on the 2016 PUMS data is 4,675,299 (see gmed18p016.sas), while the total weight (MW3WT3, which is equal to the number of addresses, or households) for addresses with a Wave 3 respondent in Western MA is 2,346,742. This corresponds to an average household size of $1.99 = \frac{4,675,299}{2,346,742}$. We assign an average household size of 2 to addresses of respondents where the household size was missing. We further truncated the household size, represented by h_j for respondent j, to a maximum of 4 in an effort to limit the variability of the survey weights. The weight adjusted for household size is given by

$$w^*_{4,j} = h_j w_{3,j} .$$

The average weight assigned by household size and region is given in Table 13.

Table 13. Initial Household Size (Max=4) Adjusted Weight for MAGIC Wave 3 by Region

	Massachusetts Region: REGION							
	1=West			2=East			All	
	N	Ave MW3WT4A	Sum MW3WT4A	N	Ave MW3WT4A	Sum MW3WT4A	N	Ave MW3WT4A	Sum MW3WT4A
HH Size									
1.00	207	535	110,779	409	1,567	640,755	616	1,220	751,534
2.00	405	900	364,554	919	2,621	2,408,609	1324	2,095	2,773,162
3.00	99	1,451	143,672	240	4,099	983,787	339	3,326	1,127,459
4.00	32	1,470	47,050	139	5,000	695,017	171	4,340	742,067
All	743	896	666,055	1707	2,770	4,728,167	2450	2,202	5,394,222

We compare the total weight in Western MA and Eastern MA with the number of persons 19+ years of age based on the 2016 PUMS data by region. In Western MA, the 2016 PUMS total is 650,287, while the total weight accounting for household size is 666,055. In order to have the weights total to the MA PUMS total in Western MA, we multiply the household size adjusted weights in Western MA by $k_w = \frac{650,287}{666,055}$. As a result, the household size adjusted weight in Western MA is given by

$$\begin{aligned} W_{4,j} &= k_w W^*_{4,j} \\ &= k_w h_j W_{3,j} \end{aligned}.$$

Similarly, in Eastern MA, the 2016 PUMS total is 4,675,299, while the total weight accounting for household size is 4,728,167. In order to have the weights total to the MA PUMS total in Eastern MA, we multiply the household size adjusted weights in Eastern MA by $k_e = \frac{4,675,299}{4,728,167}$. As a result, the household size adjusted weight in Eastern MA is given by

$$\begin{aligned} W_{4,j} &= k_e W^*_{4,j} \\ &= k_e h_j W_{3,j} \end{aligned}.$$

With these adjustments, the total weight of 5,394,222 matches the 19+ year old MA population in 2016.

Adjusting weights using raking based on cross-classified pairs of the variables region, age, gender, age, race/ethnicity, education (MW3WT5)

We adjusted weights assigned to respondents to more closely align with the distribution of 19+ year old persons in MA by region (Western, Eastern MA), age (19-34, 35-49, 50-64, 65+), gender (male, female), race/ethnicity (Hispanic, Black [only], Asian [only], White and other), and education (high school or less, some college/college graduate, some post graduate education). We determined raking variables via a preliminary analysis of the 2016 one-year American Community Survey Public Use Microdata Sample (PUMS) files. In an ideal setting, reliable PUMS data for population totals would be available for a full

cross-classification of adjustment variables. In practice, estimates of the population in the PUMS data are based on an approximate 1% sample of the MA population, and the PUMS data themselves are weighted to estimate the number of subjects in each post-stratum. For this reason, we did not use a cross-classification of all 5 variables to define post-strata for weighting. Instead, we constructed pairs of variables, using 10 pairs (i.e., region x age, region x gender, etc.).

The maximum coefficient of variation of the mean statistical weight for subjects in a stratum was 48.2% (for n=176 Western MA, Asian PUMS respondents). The coefficient of variation for all other strata (except Black respondents with some graduate education, cvm=31.02% n=245) was less than 30% and all strata had more than 200 subjects. We elected to rake on pairs of primary variables and to use all possible pairs of the primary variables as raking variables. By cross-classifying pairs of primary variables, a large number of PUMS respondents were in each cell for the cross classifications. Smaller numbers of subjects were present in cells based on subjects with completed MAGIC surveys.

Raking by pairs of the primary variables guarantees a representative weight (i.e., a weight that matches the population weight) for each pair. This means that fitted models using weighting will properly represent the population distribution for up to two-way interactions with the primary outcome variables.

Region was reported for all respondents, but each of the other variables was missing for one or more respondents. Age was missing on 13 respondents (0.53%), race was missing on 10 respondents, while there was no missing data for gender or education. A summary of the respondents by a detailed cross-classification of the raking variables is given in Table 14a and Table 14b.

Table 14a. Summary of age, race, gender, and education for Magic Wave 3 Respondents

Massachusetts Region: REGION=1=West

		1=<=HS		2=Col.		3=Grad		
Age		1=Male	2=Fem.	1=Male	2=Fem.	1=Male	2=Fem.	All
	RACE_PS							
1=19-34	1=Hisp.	.	2	2	4	.	1	9
	2=White	.	2	9	15	4	8	38
	3=Black	.	.	.	.	.	1	1
	4=Asian	.	.	.	1	.	.	1
2=35-49	1=Hisp.	1	3	1	2	.	2	9
	2=White	3	9	27	34	14	18	105
	3=Black	1	.	2	1	1	.	5
	4=Asian	.	.	1	.	.	3	4
	5=Miss	.	.	.	1	.	.	1
3=50-64	1=Hisp.	2	2	1	9	.	.	14
	2=White	16	29	65	80	12	24	226
	3=Black	1	.	4	3	1	3	12
	4=Asian	.	.	.	.	.	2	2
	5=Miss	.	.	1	.	.	.	1
4=65+	1=Hisp.	1	1	1	1	.	.	4
	2=White	40	44	71	66	45	31	297
	3=Black	.	2	2	2	.	.	6
	4=Asian	.	.	.	.	1	1	2
5=Miss	2=White	.	1	.	4	.	1	6
All		65	95	187	223	78	95	743

Table 14b. Summary of age, race, gender, and education for Magic Wave 3 Respondents

Massachusetts Region: REGION=2=East

		1=<=HS		2=Col.		3=Grad		
Age		1=Male	2=Fem.	1=Male	2=Fem.	1=Male	2=Fem.	All
1=19-34	RACE_PS							
	1=Hisp.	1	2	2	4	.	3	12
	2=White	1	5	28	36	15	24	109
	3=Black	.	.	3	3	1	1	8
	4=Asian	.	.	3	5	5	1	14
2=35-49	1=Hisp.	1	1	1	4	1	5	13
	2=White	7	6	69	77	39	69	267
	3=Black	1	.	5	2	.	1	9
	4=Asian	.	.	7	3	7	8	25
	5=Miss	.	.	.	.	.	2	2
3=50-64	1=Hisp.	1	2	4	4	.	1	12
	2=White	34	35	133	156	77	93	528
	3=Black	1	2	5	1	3	1	13
	4=Asian	2	3	1	4	1	3	14
	5=Miss	.	.	.	1	.	1	2
4=65+	1=Hisp.	4	1	1	2	.	1	9
	2=White	63	75	176	156	115	55	640
	3=Black	3	4	3	4	.	1	15
	4=Asian	1	.	1	.	2	1	5
	5=Miss	.	.	.	.	2	1	3
5=Miss	2=White	.	.	.	2	.	.	2
	3=Black	.	.	.	.	1	.	1
	4=Asian	.	.	.	1	.	2	3
	5=Miss	.	.	.	.	1	.	1
All		120	136	442	465	270	274	1707

We allowed for missing values for the primary variables when defining cells for raking. For example the first raking variable, V1, was region x age. If each of the primary variables was known on each respondent, V1 would have 8 categories corresponding to a cross-classification of the region x age categories=2 x 4. Since age was not reported by all respondents, we added a 5th category to age corresponding to "missing age." As a result, the variable V1 used for raking had 10=2 x 5 categories.

With 5 primary variables, there are 10 ways of pairing primary variables to form raking variables. Each raking variable corresponds to a different pair of primary variables. Raking was accomplished in steps, by consecutively using each of the raking variables to align the sample weighted marginal to the population marginal. We refer to the consecutive raking of all 10 raking variables as an iteration. This process was continued until the sample weights converged to the population weights for each of the raking variables.

Each of the MAGIC respondents was assigned a survey weight, MW3WT4, based on other characteristics prior to raking. The weights were assigned so that the total weight for the respondents matched the PUMS 2016 weight for MA.

Description of a Step in the Raking

Raking was accomplished using a SAS program written for this purpose. We summarize the process here using the first raking variable, V1, corresponding to region x age. The first step was to evaluate the total weight (MW3WT4) in each of the 2 x 5 =10 cells for the sample. Let us refer to these weights by x_{ij} for $i=1,...,2$ (corresponding to regions), and $j=1,...,5$ (corresponding to age categories, where j=5 corresponds to 'missing age'). The population weights, p_{ij} , were based on the 2016 PUMS data (created by gmed17p017.sas). Among the population data, there were no missing values. Using the categories of region and age, the total population was the sum over 2 x 4 = 8 cells, $p_{++}=\sum_{i=1}^{2}\sum_{j=1}^{4}p_{ij}$. As a result, when raking by the variable V1, we first re-allocated PUMS data to form categories representing "missing age."

Forming Adjusted Population Weights Accounting for Missing Values in Primary Variables

We illustrate the process of forming adjusted population weights using the adjustment for V1, region x age, as an example. Let the total sample and population weight in region i be given by $x_{i+}=\sum_{j=1}^{5}x_{ij}$ and $p_{i+}=\sum_{j=1}^{4}p_{ij}$, respectively. We assign population weights to cells in a region where age is missing proportional to the weight assigned to these cells in the sample in the region, $p_{i5}^{*}=p_{i+}\left(\frac{x_{i5}}{x_{i+}}\right)$. We refer to these population weights as 'adjusted' weights, since they are adjusted for missing values in the primary variables. Population weights for individual cells with age known in a region are adjusted to preserve the overall population weight in the region, p_{i+} , such that $p_{ij}^{*}=p_{ij}\left(\frac{p_{i+}-p_{i5}^{*}}{p_{i+}}\right)$, for $i=1,...,2$ and $j=1,...,4$.

We illustrate this for V1, corresponding to Region x Age in Table 15. The first column contains the initial 2016 PUMS data, while the second column has the PUMS totals adjusted for missing data. The third column contains the totals based on MW3WT4 prior to accounting for missing values.

Table 15. PUMS and MWT3 Weight Totals For Wave 2 MAGIC Respondents Adjusting for Missing Data for V1

	1=PUMS Original	2=PUMS Adjusted	3=Sample
1=W 18-34	189,633	187,644	56,203
2=W 35-49	143,445	141,941	126,360
3=W 50-64	174,293	172,465	215,495
4=W 65+	142,916	141,417	245,408
5=W Miss	0	6,820	6,820
6=E 18-34	1,356,969	1,347,487	608,192
7=E 35-49	1,145,751	1,137,745	906,996
8=E 50-64	1,239,045	1,230,387	1,657,371
9=E 65+	933,534	927,011	1,470,070
10=E Miss	0	32,670	32,670
All	5,325,586	5,325,586	5,325,586

A similar process was followed to adjust the population weights for missing values with other primary variables.

Matching Sample to Population Marginals for Steps with Raking Variables 1-10

The total sample weight assigned to a cell for a raking variable is the sum of MWT4 assigned to respondents in that cell. We index categories for the 5 primary variables by $i=1,2$ for region, $j=1,...,5$ for age, $k=1,...,2$ for gender, $l=1,...,5$ for race, and $m=1,...,3$ for education. Respondents within a cell are indexed by $q=1,...,n_{ijklm}$. The total sample weight assigned to a cell for the first raking variable, V1, is given by

$$x_{ij} = \sum_{k=1}^{2}\sum_{l=1}^{5}\sum_{m=1}^{3} x_{ijklm} = \sum_{k=1}^{2}\sum_{l=1}^{5}\sum_{m=1}^{3}\left(\sum_{q=1}^{n_{ijklm}} x_{ijklmq}\right)'$$

where $x_{ijklm} = \sum_{q=1}^{n_{ijklm}} x_{ijklmq}$. The first step in an iteration of raking aligns the sample marginal to the population marginal by forming the new weight for cells based on the full cross-classification of the five variables, such that

$$x^{(1)}_{ijklm} = x_{ijklm}\left(\frac{p^{*}_{ij}}{x_{ij}}\right).$$

Using these weights, the total weight is evaluated for each cell corresponding to the next raking variable, V2 (corresponding to region x sex), i.e. $x^{(1)}_{ik} = \sum_{j=1}^{5}\sum_{l=1}^{5}\sum_{m=1}^{3} x^{(1)}_{ijklm}$. Once again, using the population marginal weights, we align the sample marginal to the population marginal for V2, such that

$$x^{(2)}_{ijklm} = x^{(1)}_{ijklm}\left(\frac{p^{*}_{ik}}{x^{(1)}_{ik}}\right).$$

This process is continued for each of the 10 raking variables, resulting in the marginal total weights in each cell after one iteration given by $r^{1}_{ijklm} = x^{(10)}_{ijklm}$. Table 16 summarizes the sample and aligned population weights prior to raking for each of the 10 raking variables.

Table 16a. Magic (Wave 3) Sample and Aligned Population Weights Prior to Raking on 10 Variables

Step 1: Region x Age		Western MA					Eastern MA				
		18-34	35-49	50-64	65+	Missing	18-34	35-49	50-64	65+	Missing
Pop	Margin	187,644	141,941	172,465	141,417	6,820	1,347,487	1,137,745	1,230,387	927,011	32,670
Samp	Margin	56,203	126,360	215,495	245,408	6,820	608,192	906,996	1,657,371	1,470,070	32,670

Step 2: Region x Sex		Western MA		Eastern MA	
		Male	Female	Male	Female
Pop	Margin	307,577	342,710	2,240,193	2,435,106
Samp	Margin	248,515	401,772	2,141,689	2,533,610

Step 3: Region x Race		Western MA					Eastern MA				
		Hispanic	White	Black	Asian	Missing	Hispanic	White	Black	Asian	Missing
Pop	Margin	84,037	513,644	33,694	17,118	1,794	431,982	3,580,778	305,895	318,476	38,168
Samp	Margin	77,866	523,050	33,019	14,557	1,794	265,226	3,933,230	175,770	262,905	38,168

Step 4: Region x Edu		Western MA			Eastern MA		
		LE HS	College	Grad	LE HS	College	Grad
Pop	Margin	249,671	319,531	81,085	1,546,418	2,301,156	827,725
Samp	Margin	154,827	351,389	144,071	680,923	2,482,987	1,511,389

Step 5: Age x Sex		18-34		35-49		50-64		65+		Miss	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Pop		766,352	768,782	625,162	654,475	677,118	725,740	460,247	608,221	13,405	26,086
Samp		231,057	433,338	417,520	615,837	786,426	1,086,440	941,796	773,682	13,405	26,086

Table 16b. Magic (Wave 3) Sample and Aligned Population Weights Prior to Raking on 10 Variables

Step 6: Age x Race

	18-34					35-49				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	220,950	1,058,311	118,262	129,518	0	156,944	922,222	93,093	100,632	13,194
Samp	98,888	447,311	40,808	77,387	0	85,839	798,344	32,831	103,149	13,194

	50-64					65+				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	92,194	1,159,522	79,925	63,821	6,918	43,146	933,084	46,592	40,012	7,755
Samp	83,921	1,662,442	59,324	60,262	6,918	74,445	1,538,264	74,517	20,497	7,755

	Miss Age				
	Hisp	White	Black	Asian	Miss
Pop	0	9,919	1,309	16,167	12,096
Samp	0	9,919	1,309	16,167	12,096

Step 7: Age x Edu

	18-34			35-49			35-49		
	HS	Coll	Grad	HS	Coll	Grad	HS	Coll	Grad
Pop	438,381	904,480	192,273	373,664	628,661	277,312	493,766	668,196	240,895
Samp	55,510	426,762	182,123	85,306	535,095	412,955	293,680	1010262	568,925

	65+			Missing		
	HS	Coll	Grad	HS	Coll	Grad
Pop	476,960	399,917	191,591	1,420	15,669	22,401
Samp	399,833	846,589	469,056	1,420	15,669	22,401

Step 8: Sex x Race

	Male					Female				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	251,790	1,956,012	162,626	158,223	16,287	264,117	2,138,348	177,006	177,501	23,675
Samp	114,208	2,020,766	123,518	115,425	16,287	228,885	2,435,514	85,271	162,037	23,675

Table 16c. Magic (Wave 3) Sample and Aligned Population Weights Prior to Raking on 10 Variables

Step 9: Sex x	Male			Female		
	HS	Coll	Grad	HS	Coll	Grad
Pop	927,529	1,203,367	416,874	868,560	1,417,320	491,936
Samp	346,721	1,254,382	789,101	489,029	1,579,994	866,359

Step 10: Race x Edu	Hisp			White			Black		
	HS	Coll	Grad	HS	Coll	Grad	HS	Coll	Grad
Pop	295,179	189,625	31,103	1,247,287	2,104,904	742,170	146,235	164,864	28,533
Samp	108,683	183,517	50,893	660,552	2,400,181	1,395,546	39,771	139,057	29,961

	Asian			Missing		
	HS	Coll	Grad	HS	Coll	Grad
Pop	93,910	141,629	100,185	0	3,093	36,869
Samp	26,744	108,529	142,190	0	3,093	36,869

Iterating Raking

We repeat the process of aligning the marginals over the 10 raking variables using the raked marginal, $r_{ijklm}^{(t-1)}$, until the marginal totals based on the raked weights, i.e. $r_{ij}^{t} = \sum_{k=1}^{3}\sum_{l=1}^{5}\sum_{m=1}^{4} r_{ijklm}^{t}$ for cells in V1-V10 at iteration t, are sufficiently close to the population marginal weights, p_{ij}^{*}. The criterion for closeness is the maximum (over all cells) of the percent difference in weight between the raked sample weight and the population weight. This criterion is determined by evaluating the maximum percent difference in marginal weight for each raking variable, given by

$$\mathrm{m}_1^t = \max\left[100\left(\frac{r_{ij}^t - p_{ij}^*}{p_{ij}^*}\right); i=1,2; \mathrm{j}=1,\ldots,5\right]$$

for V1, $\mathrm{m}_2^t = \max\left[100\left(\frac{r_{ik}^t - p_{ik}^*}{p_{ik}^*}\right); i=1,2; \mathrm{k}=1,\ldots,3\right]$ for V2, etc., and then taking the maximum of these percent differences, given by $\mathrm{m}^t = \max\left(m_1^t, m_2^t, m_3^t, \ldots, m_{10}^t\right)$.

The raking procedure stops when m^t is below a value that is set as the largest possible acceptable percent difference between sample and population marginal weights. This difference is set at $m(\max) = 10\%$, implying that the maximum difference between the raked weights and the population weights is at most 10%.

The criterion for stopping iterations for raking is based in part on the coefficient of variation for population values for the marginals and in part on the performance of the raking procedure using the 10 raking variables. The population marginals are constructed from PUMS data, which in turn are based on a weighted one percent sample of MA subjects. Using the basic PUMS data, we calculated the coefficient of variation of the total for each marginal population cell. While most of the coefficients of variation are less than 1 or 2 percent, the coefficient of variation for "Asians in Western MA " is 5.9% (based on 202 respondents in the PUMS 2015 data). A value of $m(\max) = 10\%$ is large enough to account for this level of population variability.

The second factor leading to setting $m(\max) = 10\%$ is based on experience with the raking program. We initially set the raking to evaluate 50 iterations, stopping when $m(\max) < 10\%$. After 50 iterations, the maximum percent difference was $m = 5.24\%$ (for 35-49 year old Asians). The final raked weight totals are summarized in Table 17.

Table 17a. MAGIC (Wave 3) Comparison of Raking Variable Weights with Population Weights

Step 1: Region x Age

	Western MA					Eastern MA				
	18-34	35-49	50-64	65+	Missing	18-34	35-49	50-64	65+	Missing
Pop Margin	187,644	141,941	172,465	141,417	6,820	1,347,487	1,137,745	1,230,387	927,011	32,670
Samp Margin	186,963	141,707	172,308	141,334	6,685	1,345,560	1,138,370	1,231,996	928,565	32,098

Step 2: Region x Sex

	Western MA		Eastern MA	
	Male	Female	Male	Female
Pop Margin	307,577	342,710	2,240,193	2,435,106
Samp Margin	307,486	342,801	2,239,553	2,435,746

Step 3: Region x Race

	Western MA					Eastern MA				
	Hispanic	White	Black	Asian	Missing	Hispanic	White	Black	Asian	Missing
Pop Margin	84,037	513,644	33,694	17,118	1,794	431,982	3,580,778	305,895	318,476	38,168
Samp Margin	84,061	513,582	33,704	17,136	1,803	432,074	3,580,031	305,964	318,881	38,349

Step 4: Region x Edu

	Western MA			Eastern MA		
	LE HS	College	Grad	LE HS	College	Grad
Pop Margin	249,671	319,531	81,085	1,546,418	2,301,156	827,725
Samp Margin	248,201	318,171	83,915	1,534,033	2,286,440	854,827

Step 5: Age x Sex

	18-34		35-49		50-64		65+		Miss	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Pop	766,352	768,782	625,162	654,475	677,118	725,740	460,247	608,221	13,405	26,086
Samp	769,494	768,364	625,606	651,913	678,828	724,197	461,434	606,955	13,233	25,562

Table 17b. MAGIC (Wave 3) Comparison of Raking Variable Weights with Population Weights

Step 6: Age x Race

	18-34					35-49				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	220,950	1,058,311	118,262	129,518	0	156,944	922,222	93,093	100,632	13,194
Samp	224,257	1,067,422	119,482	123,972	0	157,680	920,743	93,101	95,360	12,752

	50-64					65+				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	92,194	1,159,522	79,925	63,821	6,918	43,146	933,084	46,592	40,012	7,755
Samp	92,970	1,161,958	80,229	60,989	6,711	43,403	932,781	46,654	38,123	7,506

	Miss Age				
	Hisp	White	Black	Asian	Miss
Pop	0	9,919	1,309	16,167	12,096
Samp	0	10,243	1,350	15,842	12,055

Step 7: Age x Edu

	18-34			35-49			35-49		
	HS	Coll	Grad	HS	Coll	Grad	HS	Coll	Grad
Pop	438,381	904,480	192,273	373,664	628,661	277,312	493,766	668,196	240,895
Samp	438,201	900,174	188,665	377,858	632,947	275,280	496,198	668,556	237,627

	65+			Missing		
	HS	Coll	Grad	HS	Coll	Grad
Pop	476,960	399,917	191,591	1,420	15,669	22,401
Samp	480,292	400,940	189,358	1,438	15,790	22,263

Step 8: Sex x Race

	Male					Female				
	Hisp	White	Black	Asian	Miss	Hisp	White	Black	Asian	Miss
Pop	251,790	1,956,012	162,626	158,223	16,287	264,117	2,138,348	177,006	177,501	23,675
Samp	249,678	1,948,404	161,975	165,150	16,392	262,533	2,135,154	176,721	185,694	23,885

Table 17c. MAGIC (Wave 3) Comparison of Raking Variable Weights with Population Weights

Step 9: Sex x	Male			Female		
	HS	Coll	Grad	HS	Coll	Grad
Pop	927,529	1,203,367	416,874	868,560	1,417,320	491,936
Samp	921,532	1,200,908	422,498	864,395	1,416,831	499,421

Step 10: Race x Edu	Hisp			White			Black		
	HS	Coll	Grad	HS	Coll	Grad	HS	Coll	Grad
Pop	295,179	189,625	31,103	1,247,287	2,104,904	742,170	146,235	164,864	28,533
Samp	296,930	190,423	30,012	1,257,406	2,118,384	717,726	147,128	165,586	27,538

	Asian			Missing		
	HS	Coll	Grad	HS	Coll	Grad
Pop	93,910	141,629	100,185	0	3,093	36,869
Samp	94,626	143,127	97,262	0	3,167	36,273

Trimming of weights by setting the minimum weight to be the average weight/8 and the maximum weight to be average weight x 8 (MW3WT6)

The process of weighting to account for the sample design and response rates leads to different weights for different respondents. The weights ensure that if the expected value of response (such as the prevalence of problem gambling) varies between respondents with different weights, the overall weighted estimator is an unbiased estimate for the population mean. An additional consequence of varying weights is a decrease in the precision of the estimator. When there is a weak relationship between the variables used for weighting and the expected value of response, reducing the range of weights can increase the precision of the estimator, while not creating appreciable bias. Such a reduction in the range of weights is accomplished by reducing the maximum weight and increasing the minimum weight. This process is called weight trimming. By trimming weights appropriately, a more accurate estimator may be constructed.

We first review the impact of raking on MW3WT4. Raking will increase or decrease a weight in an effort to make the marginal weights based on the raking variables more closely match the PUMS 2016 data. For some groups of subjects, this may alter the weight by a large amount. Table 18 lists the most extreme (less than 0.333, or more than 3) alterations in the ratio of total weights (rMW3WT4_S/MW3WT4_S = Raked total/MW3Wt4 total) by respondent group characteristics.

Table 18. List of the Smallest and Largest Raking Weight factors

region	age_ps	sex_ps	race_ps	edu_ps	Multiplier for Raked MW3WT5: RMW3WT5M	Total MW3WT4 for cell: MW3WT4_S	Total Raked rMW3WT4 for cell: RMW3WT4_S
2=East	3=50-64	1=Male	4=Asian	3=Grad	0.013	6,301	82
2=East	3=50-64	1=Male	4=Asian	2=Col.	0.018	2,765	49
2=East	3=50-64	2=Fem.	4=Asian	3=Grad	0.021	9,048	192
2=East	3=50-64	2=Fem.	4=Asian	2=Col.	0.030	13,789	413
1=West	4=65+	1=Male	3=Black	2=Col.	0.030	1,873	56
2=East	4=65+	1=Male	3=Black	2=Col.	0.032	29,131	924
1=West	3=50-64	2=Fem.	4=Asian	3=Grad	0.035	3,048	106
2=East	4=65+	1=Male	4=Asian	2=Col.	0.116	3,093	359
2=East	4=65+	1=Male	4=Asian	3=Grad	0.117	10,638	1,241
1=West	4=65+	2=Fem.	3=Black	2=Col.	0.177	2,026	360
1=West	4=65+	1=Male	1=Hisp.	2=Col.	0.184	2,299	424
1=West	4=65+	1=Male	4=Asian	3=Grad	0.198	947	187
2=East	4=65+	2=Fem.	3=Black	2=Col.	0.255	8,589	2,190
2=East	4=65+	1=Male	1=Hisp.	2=Col.	0.291	12,914	3,761
2=East	4=65+	1=Male	2=White	3=Grad	0.293	257,742	75,545
1=West	4=65+	1=Male	2=White	3=Grad	0.293	29,226	8,574
1=West	4=65+	1=Male	2=White	2=Col.	0.304	48,923	14,871
2=East	4=65+	1=Male	2=White	2=Col.	0.309	349,075	107,965
1=West	2=35-49	2=Fem.	1=Hisp.	3=Grad	0.311	4,097	1,273
1=West	4=65+	2=Fem.	1=Hisp.	1=<=HS	0.327	1,098	359
1=West	1=19-34	1=Male	1=Hisp.	2=Col.	3.051	3,922	11,967
2=East	2=35-49	2=Fem.	2=White	1=<=HS	3.128	23,574	73,735
1=West	2=35-49	1=Male	1=Hisp.	1=<=HS	3.148	4,594	14,461
2=East	3=50-64	1=Male	4=Asian	1=<=HS	3.247	4,854	15,760
2=East	1=19-34	2=Fem.	3=Black	2=Col.	3.319	18,902	62,735
2=East	1=19-34	2=Fem.	1=Hisp.	1=<=HS	3.327	22,543	75,004
1=West	1=19-34	2=Fem.	3=Black	3=Grad	3.407	248	846
1=West	1=19-34	2=Fem.	1=Hisp.	1=<=HS	3.429	2,122	7,276
2=East	1=19-34	1=Male	2=White	2=Col.	3.537	89,973	318,261
1=West	1=19-34	2=Fem.	4=Asian	2=Col.	3.618	2,602	9,415
1=West	1=19-34	1=Male	2=White	3=Grad	3.664	4,467	16,364
2=East	2=35-49	1=Male	1=Hisp.	1=<=HS	5.690	12,096	68,823
2=East	3=50-64	1=Male	3=Black	1=<=HS	5.827	2,350	13,694
1=West	2=35-49	1=Male	2=White	1=<=HS	7.045	3,100	21,836
1=West	3=50-64	1=Male	3=Black	1=<=HS	7.369	439	3,235
1=West	1=19-34	1=Male	2=White	2=Col.	7.568	9,172	69,415
2=East	3=50-64	2=Fem.	3=Black	1=<=HS	7.735	3,734	28,883
2=East	1=19-34	2=Fem.	2=White	1=<=HS	8.051	24,022	193,391
2=East	2=35-49	1=Male	2=White	1=<=HS	8.200	11,851	97,178
1=West	1=19-34	2=Fem.	2=White	1=<=HS	12.882	2,601	33,512
2=East	1=19-34	1=Male	1=Hisp.	1=<=HS	21.806	3,164	68,994
1=West	2=35-49	1=Male	3=Black	1=<=HS	22.315	215	4,806
2=East	4=65+	1=Male	4=Asian	1=<=HS	23.833	1,432	34,140
2=East	2=35-49	1=Male	3=Black	1=<=HS	26.907	1,986	53,429
2=East	1=19-34	1=Male	2=White	1=<=HS	57.618	1,058	60,962

The largest adjustment down (i.e. 0.013) in the weight occurred for Asian, male, age 50-64 respondents with graduate education in Eastern MA, while the largest adjustment up (i.e. 57.618) occurred for male, white, HS or less educated, 19-34 year old respondents in Eastern MA.

The distribution of weights for the 2,450 respondents is summarized in Table 19 for each step in the weight development. Notice the large differences that occur in the maximum weight when accounting for household size, or aligning the weights to the Massachusetts population (using the raked weights).

Table 19. Description of MAGIC Wave 3 Weights Prior to Trimming

Weight	Min	Median	Mean	Max
MW3WT1- BGPS	105	297	274	683
MW3WT2- Wave2	130	573	849	5,294
MW3WT3- Wave3	143	730	1102	8,875
MW3WT4- HHSize	140	1417	2174	22,279
MW3WT5- Raked	15	980	2174	96,949

Trimming Raked Weights

We describe the procedure for trimming raked weights next. Let $w_{\min}$ represent the minimum weight, w_{mean} represent the mean weight and $w_{\max}$ represent the maximum weight. We define trimmed weight by setting the minimum and maximum weight to be a simple multiplier, m , times the average weight, w_{mean} . The initial trimmed weight is given by

$$w_{i,\mathrm{m}}^{0} = \begin{cases} w_{\max,m} \text{ if } w_i \geq w_{\max,m} \\ w_i \\ w_{\min,m} \text{ if } w_i \leq w_{\min,m} \end{cases} .$$

where $w_{\max,m} = m\left(w_{mean}\right)$ and $w_{\min,m} = \left(w_{mean}\right)/m$. By changing the minimum and maximum weight, the total weight is changed. In order to insure that the total weight is equal to the total population size in each region (which is equal to $T_{4R} = \sum_{j \in \mathrm{Region}} w_{4,j}$, where j indexes the respondents in region R) we adjust the initial trimmed weight by a factor $\frac{T_{4R}}{T_{mR}}$, where $T_{mR} = \sum_{j \in \mathrm{Region}} w_{6j}^{(m)}$ represents the total trimmed raked weight in a region. The final step in forming the trimmed weight is to multiply the initial trimmed weight in region R by $\frac{T_{4R}}{T_{mR}}$ to form the trimmed weight

$$w_{6j} = \left(\frac{T_{4R}}{T_{mR}}\right) w_{5,j}^{(m)} .$$

Determining the Extent of Trimming

We used the same criteria for weight trimming that was used in the BGPS and the Wave 2 MAGIC survey. Using the average weight $\bar{W} = 2{,}174$, we truncated weights so they fell in the range determined by (min, max), where $\min = \frac{\bar{W}}{8} = 272$, and $\max = 8\bar{W} = 17{,}390$. This resulted in adjusting 324 weights up to the minimum and adjusting 29 weights down to the maximum. The total weight in each region based on weights adjusted for household size (MW3WT4) and trimmed raked weights (MW3WT5) are given in Table 20.

Table 20.Total weight by region for Wave 3 Respondents

	Magic-W3 HH Size Aligned weight: MW3WT4	Magic-W3 Raked Weight: MW3WT5	Magic-W3 Trimmed Wt before centering: MW3WT6
	Sum	Sum	Sum
Massachusetts Region: REGION			
1=West	650,287	648,997	671,779
2=East	4,675,299	4,676,589	4,196,439
All	5,325,586	5,325,586	4,868,218

After adjusting the weights so that the average total weight, when multiplied by the number of respondents, will equal the total MA population based on the 2016 PUMS. We note that the weight aligned to HH size is calibrated to match the 2016 PUMS weight by region. The final weight is called MW3WT7, with a minimum of 263 and a maximum of 19,374. The weight MW3WT7 is the weight that should be used in analyses of the MAGIC Wave 3 data.

Table 21. Description of MAGIC Wave 3 Weights After Trimming

Weight	Min	Median	Mean	Max
MW3WT1- BGPS	105	297	274	683
MW3WT2- Wave2	130	573	849	5,294
MW3WT3- Wave3	143	730	1102	8,875
MW3WT4- HHSize	140	1417	2174	22,279
MW3WT5- Raked	15	980	2174	96,949
MW3WT7- Final	263	1051	2174	19,374

Demographic Characteristics of the Cohort

Table 24 compares key demographic characteristics of the cohort with information about the Massachusetts adult population. The comparison summarizes the success of weighting in aligning the cohort with the Massachusetts adult population.

Comparison of percentages in the Wave 2 weighted column and the PUMS 2015 column and the Wave 3 weighted column and the PUMS 2016 column in Table 24 shows that the weighted sample is a relatively close match for gender, age, race/ethnicity, and education. This is to be expected since these factors were used in the weighting. However, the age and education categories reported in Table 24 are more detailed than the categories used for weighting, revealing the limitations of the weighting procedure.

Table 24: Demographics of MAGIC Wave 2 and Wave 3 Sample

		WAVE 2				WAVE 3			
		PUMS 2015[1]		MAGIC 2015		PUMS 2016[2]		MAGIC 2016	
		%	SE	%	SE	%	SE	%	SE
Gender	Male	47.9	0.3	47.0	1.6	47.9	0.3	47.0	1.8
	Female	52.1	0.3	53.0	1.6	52.1	0.3	53.0	1.8
Age	1=18-20	5.6	0.1	*1.6*	*0.6*	5.9	0.1	---	
	2=21-24	7.3	0.1	6.3	1.1	7.1	0.1	5.2	1.2
	3=25-34	17.4	0.2	19.8	1.5	17.5	0.2	19.4	1.7
	4=35-54	33.6	0.2	33.8	1.5	32.9	0.2	33.3	1.7
	5=55-64	16.8	0.2	18.9	1.1	16.8	0.2	20.0	1.3
	6=65-79	13.9	0.2	14.3	0.8	14.5	0.2	16.1	1.0
	7=80+	5.3	0.1	5.2	0.5	5.3	0.1	4.9	0.6
Ethnicity	1=Hispanic	9.6	0.2	8.2	1.0	9.9	0.2	7.7	1.2
	2=white alone	75.5	0.2	76.3	1.5	75.0	0.2	79.0	1.7
	3=black alone	6.4	0.1	5.9	0.9	6.4	0.1	5.1	1.0
	4=asian alone	6.4	0.1	6.5	0.9	6.4	0.1	6.4	1.1
	5=some other race alone	0.8	0.1	*0.8*	*0.3*	0.9	0.1	*0.4*	*0.1*
	6=two or more races	1.3	0.1	2.3	0.5	1.5	0.1	1.4	0.3
Education	1=less than high school	9.7	0.2	5.3	0.8	9.7	0.2	4.0	0.8
	2=HS or GED	25.5	0.2	25.7	1.6	24.8	0.2	24.0	1.8
	3=some college	26.2	0.2	23.8	1.3	26.0	0.2	22.9	1.4
	4=BA	22.4	0.2	27.4	1.4	22.8	0.2	29.4	1.7
	5=Graduate or professional degree	13.7	0.2	14.2	0.8	14.4	0.2	15.9	1.0
	6=PHD	2.4	0.1	3.6	0.4	2.4	0.1	3.9	0.5
Income	1=Less than $15,000	6.9	0.1	10.4	1.2	6.6	0.1	8.6	1.2
	2=$15,000-<$30,000	8.7	0.2	12.9	1.3	7.8	0.1	8.7	1.1
	3=$30,000-<$50,000	12.6	0.2	15.2	1.3	12.3	0.2	16.5	1.6
	4=$50,000-<$100,000	27.9	0.2	30.6	1.6	27.4	0.2	32.8	1.9
	5=$100,000-<$150,000	20.6	0.2	16.0	1.2	20.4	0.2	17.3	1.3
	6=$150,000 and more	23.2	0.2	15.0	1.1	25.6	0.2	16.1	1.2

[1] Source: Census Bureau, 2015 American Community Survey PUMS

[2] Source: Census Bureau, 2016 American Community Survey PUMS

Note: Italics indicate estimates are unreliable, relative standard error > 30%

If cell size is 5 or less, results are set to dash (---)

For example, the youngest age category used in weighting the Wave 2 and Wave 3 sample is 18-24. The percentage of MA adults in this category is 12.9% and 13% for 2015 and 2016, respectively. This is compared to 7.9% for the weighted Wave 2 sample and 6.4% for the weighted Wave 3 sample. This is not surprising since the cohort had aged on average 18 months since the baseline survey and another 12 months since Wave 2. Since our cohort is aging, we have less than 5% of our sample 18-20 years of age by Wave 3. The difference in percentages is in the opposite direction for 25-34 year olds, with 17.4% and 17.5% of the MA adults in this category in 2015 and 2016, compared with 19.8% and 19.4% of the weighted Wave 2 and Wave 3 sample. This illustrates that using the broader age category of 18-34 fails to properly adjust for the more detailed age distribution.

A similar situation arises for education, where the category of high school or less education (35.2% and 34.5% of the PUMS 2015 and 2016 sample and 31.0% and 28.0% of the weighted Wave 2 and Wave 3 sample) fails to account for the larger difference in the category of less than high school education (9.7% of the PUMS 2015/2016 sample versus 5.3% and 4.0% of the weighted Wave 2 and Wave 3 sample).

The under-representation of persons 18-24 years old and persons with less than a high school education in the weighted Wave 2 and Wave 3 samples suggests that households with lower income might also be under-represented since younger individuals and those with lower education typically have lower incomes. However, this is not the case, as a comparison of the distribution of household income in the weighted Wave 2 and Wave 3 sample and PUMS 2015 and 2016 sample demonstrates. The Wave 2 and Wave 3 weighted samples over-represent adults in lower income households compared to the PUMS samples and under-represent adults in higher income households. The impact of these differences will be examined further in future analyses of the data.

Appendix A4: Item Response Rate by Mode and Wave

Appendix A4 presents response rates for each question in the survey separately by mode of data collection (online, SAQ and, telephone [Wave 1 and Wave 2 only]).

Item response rate by data collection mode across waves

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
d1_R RECODED: How many members of your household, including yourself, are 18 years of age or older?	98.4	1.6	100.0	98.7	95.7	97.6	99.4	96.8
d2_R RECODED: Are you male or female?	99.5	98.8	100.0	99.9	99.8	100.0	99.5	99.3
c1_RBC RECODED AND BACKCODED: Which of the following is your preferred recreational activity? Would you say…?	99.9	98.3	98.4	100.0	99.3	100.0	NA	
c2_R RECODED: Do you enjoy participating in extreme sports such as hang gliding or sky diving?	99.9	99.7	100.0	99.9	100.0	100.0	NA	
c2a_R RECODED: Do you have an internet connection either at home or at work?	NA			99.8	99.5	99.4	99.8	98.5
c2b_R RECODED: Overall, how often do you use the Internet?	NA			99.9	99.0	100.0	99.8	97.6
C3_R RECODED: Over the past 12 months, would you say that in general your health has been…?	99.9	99.9	100.0	99.8	99.8	99.4	99.9	99.3
C4_R RECODED: In the past 12 months, how would you rate your overall level of stress?	99.6	99.9	99.5	99.6	99.6	99.4	100.0	99.2
C4A_1_R RECODED: Check off any events that have happened to you in the past 12 months. -- Started school	NA			NA			79.6	83.0
C4A_2_R RECODED: Check off any events that have happened to you in the past 12 months. -- Experienced significant difficulties at school	NA			NA			79.6	83.0
C4A_3_R RECODED: Check off any events that have happened to you in the past 12 months. -- Dropped out of school	NA			NA			79.6	83.0
C4A_4_R RECODED: Check off any events that have happened to you in the past 12 months. -- Started a new job	NA			NA			79.6	83.0
C4A_5_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had a significant change in work hours, work demands, or work type	NA			NA			79.6	83.0
C4A_6_R RECODED: Check off any events that have happened to you in the past 12 months. -- Received an important promotion	NA			NA			79.6	83.0
C4A_7_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflict(s) at work	NA			NA			79.6	83.0
C4A_8_R RECODED: Check off any events that have happened to you in the past 12 months. -- Suffered a significant business loss or failure	NA			NA			79.6	83.0
C4A_9_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had difficulty finding employment	NA			NA			79.6	83.0
C4A_10_R RECODED: Check off any events that have happened to you in the past 12 months. -- Was laid off or fired	NA			NA			79.6	83.0
C4A_11_R RECODED: Check off any events that have happened to you in the past 12 months. -- Retired	NA			NA			79.6	83.0

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
C4A_12_R RECODED: Check off any events that have happened to you in the past 12 months. -- Moved to new location/house	NA			NA			79.6	83.0
C4A_13_R RECODED: Check off any events that have happened to you in the past 12 months. -- Became pregnant (or spouse became pregnant)	NA			NA			79.6	83.0
C4A_14_R RECODED: Check off any events that have happened to you in the past 12 months. -- Experienced a miscarriage or abortion	NA			NA			79.6	83.0
C4A_15_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had a new addition to the family through birth or adoption	NA			NA			79.6	83.0
C4A_16_R RECODED: Check off any events that have happened to you in the past 12 months. -- Son or daughter left home	NA			NA			79.6	83.0
C4A_17_R RECODED: Check off any events that have happened to you in the past 12 months. -- Started a relationship with a new boyfriend/girlfriend	NA			NA			79.6	83.0
C4A_18_R RECODED: Check off any events that have happened to you in the past 12 months. -- Got married	NA			NA			79.6	83.0
C4A_19_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflicts or difficulties with spouse or partner	NA			NA			79.6	83.0
C4A_20_R RECODED: Check off any events that have happened to you in the past 12 months. -- Broke up with boyfriend/girlfriend	NA			NA			79.6	83.0
C4A_21_R RECODED: Check off any events that have happened to you in the past 12 months. -- Separated or divorced	NA			NA			79.6	83.0
C4A_22_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflicts with family members	NA			NA			79.6	83.0
C4A_23_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflicts with close friend(s)	NA			NA			79.6	83.0
C4A_24_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflicts with neighbor(s)	NA			NA			79.6	83.0
C4A_25_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had serious conflicts with ex-spouse	NA			NA			79.6	83.0
C4A_26_R RECODED: Check off any events that have happened to you in the past 12 months. -- Death of spouse or partner	NA			NA			79.6	83.0
C4A_27_R RECODED: Check off any events that have happened to you in the past 12 months. -- Death of other close family member	NA			NA			79.6	83.0
C4A_28_R RECODED: Check off any events that have happened to you in the past 12 months. -- Death of close friend	NA			NA			79.6	83.0
C4A_29_R RECODED: Check off any events that have happened to you in the past 12 months. -- Serious illness or injury in family member or close friend	NA			NA			79.6	83.0
C4A_30_R RECODED: Check off any events that have happened to you in the past 12 months. -- Death of important family pet	NA			NA			79.6	83.0
C4A_31_R RECODED: Check off any events that have happened to you in the past 12 months. -- Suffered a significant financial loss	NA			NA			79.6	83.0

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
C4A_32_R RECODED: Check off any events that have happened to you in the past 12 months. -- Declared bankruptcy	NA			NA			79.6	83.0
C4A_33_R RECODED: Check off any events that have happened to you in the past 12 months. -- Went on social support or welfare	NA			NA			79.6	83.0
C4A_34_R RECODED: Check off any events that have happened to you in the past 12 months. -- Suffered a significant loss or damage of property	NA			NA			79.6	83.0
C4A_35_R RECODED: Check off any events that have happened to you in the past 12 months. -- Borrowed a significant amount of money (e.g., mortgage)	NA			NA			79.6	83.0
C4A_36_R RECODED: Check off any events that have happened to you in the past 12 months. -- Had a significant financial improvement	NA			NA			79.6	83.0
C4A_37_R RECODED: Check off any events that have happened to you in the past 12 months. -- Arrested or charged with a crime	NA			NA			79.6	83.0
C4A_38_R RECODED: Check off any events that have happened to you in the past 12 months. -- Placed in jail	NA			NA			79.6	83.0
C4A_39_R RECODED: Check off any events that have happened to you in the past 12 months. -- Became involved in lawsuit	NA			NA			79.6	83.0
C4A_40_R RECODED: Check off any events that have happened to you in the past 12 months. -- Received serious threats or harassment	NA			NA			79.6	83.0
C4A_41_R RECODED: Check off any events that have happened to you in the past 12 months. -- Was assaulted	NA			NA			79.6	83.0
C4A_42_R RECODED: Check off any events that have happened to you in the past 12 months. -- Was robbed	NA			NA			79.6	83.0
C4A_43_R RECODED: Check off any events that have happened to you in the past 12 months. -- Was a victim of some other crime	NA			NA			79.6	83.0
C4A_44_R RECODED: Check off any events that have happened to you in the past 12 months. -- Caused a serious accident that injured or killed someone	NA			NA			79.6	83.0
C4A_45_R RECODED: Check off any events that have happened to you in the past 12 months. -- Witnessed a serious accident that injured or killed someone	NA			NA			79.6	83.0
C4A_46_R RECODED: Check off any events that have happened to you in the past 12 months. -- Suffered a serious injury as a result of an accident	NA			NA			79.6	83.0
C4A_47_R RECODED: Check off any events that have happened to you in the past 12 months. -- Became seriously overweight or underweight	NA			NA			79.6	83.0
C4A_48_R RECODED: Check off any events that have happened to you in the past 12 months. -- Developed a serious physical illness	NA			NA			79.6	83.0
C4A_49_R RECODED: Check off any events that have happened to you in the past 12 months. -- Developed a serious mental illness	NA			NA			79.6	83.0
C4A_50_R RECODED: Check off any events that have happened to you in the past 12 months. -- Developed a drug or alcohol addiction	NA			NA			79.6	83.0
c4b_1_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Recurrent intrusive distressing memories of the event	NA			NA			62.1	60.3

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
c4b_2_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Recurrent distressing dreams about the event	NA			NA			62.1	60.3
c4b_3_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Flashbacks, in which you felt you were reliving the event	NA			NA			62.1	60.3
c4b_4_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Intense psychological distress to reminders of the event	NA			NA			62.1	60.3
c4b_5_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Intense physical reactions to reminders of the event	NA			NA			62.1	60.3
c4b_6_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Avoidance of distressing memories, thoughts, or feelings about the event	NA			NA			62.1	60.3
c4b_7_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Avoidance of external reminders (people, places, etc.) that might lead to memories, thoughts, or feelings	NA			NA			62.1	60.3
c4b_8_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Inability to remember an important part of the event	NA			NA			62.1	60.3
c4b_9_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g.,	NA			NA			62.1	60.3
c4b_10_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Persistent, distorted beliefs about the cause or consequences of the event that has led you to blame y	NA			NA			62.1	60.3
c4b_11_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Persistent negative emotions (fear, horror, anger, guilt, shame)	NA			NA			62.1	60.3
c4b_12_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Markedly decreased interest or participation in activities	NA			NA			62.1	60.3
c4b_13_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Feelings of detachment from others	NA			NA			62.1	60.3
c4b_14_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Persistent inability to experience positive emotions	NA			NA			62.1	60.3
c4b_15_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Irritable behavior and angry outbursts	NA			NA			62.1	60.3
c4b_16_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Reckless or self-destructive behavior	NA			NA			62.1	60.3
c4b_17_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Over-vigilance or over-alertness	NA			NA			62.1	60.3
c4b_18_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Exaggerated startled response	NA			NA			62.1	60.3

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
c4b_19_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Difficulty concentrating	NA			NA			62.1	60.3
c4b_20_R RECODED: Did any of the following symptoms occur for at least a month as a result of… -- Difficulty sleeping	NA			NA			62.1	60.3
C5_R RECODED: In the past 12 months, how would you rate your overall level of happiness?	99.6	99.7	99.5	99.1	99.6	100.0	99.9	98.3
C6A_R RECODED: Have you smoked at least 100 cigarettes in your entire life?	99.9	99.3	99.5	99.9	99.2	99.4	NA	
C6B_R RECODED: Would you say you now smoke cigarettes…	99.9	97.2	99.5	99.8	96.8	99.4	NA	
C6C_R RECODED: Do you currently smoke cigars, pipe tobacco, or hookah tobacco (shisha), or use dipping tobacco (including snus), chewing tobacco, or snuff…?	99.8	99.2	100.0	99.8	99.4	100.0	NA	
C6D_R RECODED: During the past 30 days, how many days would you estimate you have used any form of tobacco?	98.4	93.8	100.0	98.4	91.8	99.4	NA	
C7A_R RECODED: Have you used alcohol in the past 12 months?	99.9	99.7	100.0	99.8	99.5	100.0	NA	
C7C_R RECODED: One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did y	96.6	98.1	93.2	95.2	97.5	95.3	NA	
C7_R RECODED: How often have you used alcohol in the past 12 months?	NA			NA			99.9	99.5
C8_R RECODED: In the past 12 months have you used any marijuana, hallucinogens (such as LSD, mushrooms, or PCP), cocaine, heroin or opium, or any other drugs not intended for medical use?	99.6	98.6	100.0	99.7	99.7	100.0	NA	
C8_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months how often have you used any marijuana, hallucinogens (such as LSD, mushrooms, or PCP), cocaine, heroin or opium, or any other drugs not inte	NA			NA			99.4	98.5
C9A_R RECODED: Have you had any problems with drugs or alcohol in the past 12 months? By this we mean difficulties in controlling their use that have led to negative consequences for you or other people	99.7	98.7	100.0	99.5	98.9	100.0	NA	
C9A_1_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Often taken in larger amounts or over a longer period than intended.	NA			NA			38.3	44.1
C9A_2_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- A persistent desire or unsuccessful efforts to cut down or control use	NA			NA			38.3	44.1
C9A_3_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- A great deal of time spent in activities necessary to obtain the substance	NA			NA			38.3	44.1
C9A_4_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Strong cravings for the substance	NA			NA			38.3	44.1
C9A_5_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Recurrent use resulting in a failure to fulfull major role obligations at wo	NA			NA			38.3	44.1

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
C9A_6_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Continued use despite the substance causing or worsening social or interpers	NA			NA			38.3	44.1
C9A_7_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Continued use despite the substance causing or worsening a physical or psych	NA			NA			38.3	44.1
C9A_8_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Important social, occupational, or recreational activities given up or reduc	NA			NA			38.3	44.1
C9A_9_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Recurrent use in situations in which it was physically dangerous	NA			NA			38.3	44.1
C9A_10_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Tolerance to the substance (needing more of it to have the same effect)	NA			NA			38.3	44.1
C9A_11_R RECODED: In the past 12 months has your use of alcohol or other drugs been associated with any of the following? -- Withdrawal symptoms when not using the substance	NA			NA			38.3	44.1
C9B_R RECODED: During the past 12 months, have you sought help for your use of alcohol or drugs?	99.7	98.7	100.0	99.5	98.9	100.0	98.8	44.1
C9C_R RECODED: Prior to the past 12 months, have you had any significant problems with overuse of drugs or alcohol?	NA			NA			99.6	99.7
C10A_R RECODED: In the past 12 months, have you had problems with other behavior such as overeating, sex or pornography, shopping, exercise, Internet chat lines, or other things?	99.4	98.8	99.5	99.5	99.1	98.8	99.7	99.3
C10b_1_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with overeating?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_1_R RECODED: Which specific behaviors have you had problems with? -- Overeating	NA			NA			100.0	99.5
C10b_2_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with sex or pornography?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_2_R RECODED: Which specific behaviors have you had problems with? -- Sex or pornography	NA			NA			100.0	99.5
C10b_3_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with exercise?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_3_R RECODED: Which specific behaviors have you had problems with? -- Exercise	NA			NA			100.0	99.5
C10b_4_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with shopping?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_4_R RECODED: Which specific behaviors have you had problems with? -- Shopping	NA			NA			100.0	99.5
C10b_5_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with Internet chat lines?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_5_R RECODED: Which specific behaviors have you had problems with? -- Internet chat lines	NA			NA			100.0	99.5

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
C10b_6_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with video or Internet gaming?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_6_R RECODED: Which specific behaviors have you had problems with? -- Video or Internet gaming	NA			NA			100.0	99.5
C10b_91_R RECODED and backcoded: Which specific behaviors have you had problems with? Have you had problems with other activities?	99.3	98.6	99.5	99.5	99.1	98.8	NA	
C10b_91_R RECODED: Which specific behaviors have you had problems with? -- Other activities	NA			NA			100.0	99.5
c10c_RX RECODED (BEWARE W PRIOR WAVES): Prior to the past 12 months, have you had any significant problems with excessive involvement in overeating, sex or pornography, shopping, exercise, Internet ch	NA			NA			99.8	98.1
C11A_R RECODED: In the past 30 days, have you had any serious problems with depression, anxiety or other mental health problems?	99.5	98.5	98.9	99.6	99.3	99.4	NA	
C11A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, was there ever a period of 2 weeks or longer where you had a depressed mood most of the day nearly every day and/or a loss of interest or	NA			NA			99.7	98.8
C11B_R RECODED: How about in the last 12 months?	98.9	90.3	98.9	99.3	92.2	98.8	NA	
C11B_1_R RECODED: Check off any of the following that occurred during this time period. -- Significant weight loss or weight gain or an increase or decrease in appetite	NA			NA			99.7	99.5
C11B_2_R RECODED: Check off any of the following that occurred during this time period. -- Problems sleeping or excessive sleeping nearly every day	NA			NA			99.7	99.5
C11B_3_R RECODED: Check off any of the following that occurred during this time period. -- Physical agitation or being slowed down nearly every day	NA			NA			99.7	99.5
C11B_4_R RECODED: Check off any of the following that occurred during this time period. -- Fatigue or loss of energy nearly every day	NA			NA			99.7	99.5
C11B_5_R RECODED: Check off any of the following that occurred during this time period. -- Feelings of worthlessness or excessive or inappropriate guilt	NA			NA			99.7	99.5
C11B_6_R RECODED: Check off any of the following that occurred during this time period. -- Decreased ability to think or concentrate or indecisiveness nearly every day	NA			NA			99.7	99.5
C11B_7_R RECODED: Check off any of the following that occurred during this time period. -- Recurrent thoughts of death or suicide	NA			NA			99.7	99.5
C11D_R RECODED: During the past 12 months, did you ever seriously consider attempting suicide?	99.5	98.8	98.9	99.6	88.8	99.4	NA	
C11E_R RECODED: During the past 12 months, did you actually attempt suicide?	99.5	98.8	98.9	99.6	88.8	99.4	NA	
C12_R RECODED: Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?	99.8	98.8	100.0	99.6	99.2	100.0	NA	

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
C12a_R RECODED: Would you describe yourself as chronically anxious (i.e., having excessive anxiety and worry most days about a variety of things)?	NA			NA			99.7	98.5
C12b_R RECODED: Does this anxiety cause significant distress or impairment in your social functioning, employment, or other areas?	NA			NA			99.5	98.1
C12c_1_R RECODED: Do you also have any of the following symptoms? -- Restlessness or feeling keyed up or on edge	NA			NA			99.4	98.0
C12c_2_R RECODED: Do you also have any of the following symptoms? -- Easily fatigued	NA			NA			99.4	98.0
C12c_3_R RECODED: Do you also have any of the following symptoms? -- Difficulty concentrating or mind going blank	NA			NA			99.4	98.0
C12c_4_R RECODED: Do you also have any of the following symptoms? -- Irritability	NA			NA			99.4	98.0
C12c_5_R RECODED: Do you also have any of the following symptoms? -- Muscle tension	NA			NA			99.4	98.0
C12c_6_R RECODED: Do you also have any of the following symptoms? -- Difficulty sleeping	NA			NA			99.4	98.0
C13_R RECODED: How would you describe your childhood?	99.7	98.6	100.0	99.7	99.3	99.4	NA	
C13a_R RECODED: In the past 12 months have you had recurrent unexpected panic attacks during which 4 or more of the following symptoms occur: pounding heart, sweating, trembling, shortness of breath,	NA			NA			99.6	98.1
C13b_R RECODED: Have these attacks been followed by either a persistent worry about having additional attacks and/or avoidance of activities (e.g., exercise) or unfamiliar places?	NA			NA			99.6	97.6
C14_R RECODED: In the past 12 months have you had any other significant mental health problem that has not been mentioned (e.g., bipolar disorder, schizophrenia, bulimia, obsessive-compulsive disorder	NA			NA			99.6	98.5
C15_R RECODED: Prior to the past 12 months, do you have any significant history of mental health problems such as depression, post-traumatic stress…?	NA			NA			99.2	98.8
C16_R RECODED: Is there any significant history of mental health problems, drug or alcohol addictions, or behavioral addictions in your parents, siblings, or children?	NA			NA			99.9	98.7
C17_R RECODED: Were you abused as a child (physically, sexually, or emotionally)?	NA			NA			99.7	98.3
GA1_R RECODED: Which best describes your belief about the benefit or harm that gambling has for society?	99.3	97.5	93.2	99.6	97.3	90.6	99.2	97.3
GA2_R RECODED: Do you believe that gambling is morally wrong?	99.6	98.1	100.0	99.7	98.2	100.0	99.8	98.5
GA3A_R RECODED: Which of the following best describes your opinion about legalized gambling?	99.6	96.9	94.2	99.7	97.8	95.9	99.8	98.5
ga3b_1_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? Lottery? (CATI)	99.6	49.7	84.7	99.7	97.8	84.1	NA	

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
ga3b_2_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? Instant Ticket? (CATI)	99.6	46.3	84.7	99.7	97.8	84.1	NA	
ga3b_3_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? KENO? (CATI)	99.6	46.0	84.7	99.7	97.8	84.1	NA	
ga3b_4_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? BINGO? (CATI)	99.6	46.1	84.7	99.7	97.8	84.1	NA	
ga3b_5_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? SLOT MACHINES (CATI)	99.6	51.8	84.7	99.7	97.8	84.1	NA	
ga3b_6_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? VIDEO POKER MACHINES (CATI)	99.6	46.0	84.7	99.7	97.8	84.1	NA	
ga3b_7_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? CASINO TABLE GAMES (CATI)	99.6	51.9	84.7	99.7	97.8	84.1	NA	
ga3b_8_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? POKER (CATI)	99.6	47.5	84.7	99.7	97.8	84.1	NA	
ga3b_9_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? horse racing (does not include cruelity to animals or fighting)	99.6	52.2	84.7	99.7	97.8	84.1	NA	
ga3b_10_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? dog racing (does not include cruelity to animals or fighting)	99.6	53.4	84.7	99.7	97.8	84.1	NA	
ga3b_11_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? sports betting (sports, bookies, not state run)	99.6	50.4	84.7	99.7	97.8	84.1	NA	
ga3b_12_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? High risk stocks	99.6	45.9	84.7	99.7	97.8	84.1	NA	
ga3b_13_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? online gambling	99.6	46.9	84.7	99.7	97.8	84.1	NA	
ga3b_14_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? Harm to animals or humans	62.6	58.2	48.4	69.7	64.4	52.9	NA	
ga3b_15_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? Don't know	41.5	46.9	37.9	41.5	48.2	37.1	NA	
ga3b_91_R RECODED and BACKCODED: Which types of gambling do you believe should be illegal? Other	89.4	81.7	84.2	99.7	97.8	84.1	NA	
GA4_R RECODED: Which of the following best describes your opinion about gambling opportunities in Massachusetts?	98.5	97.4	93.2	99.2	97.0	92.9	99.1	98.0
GA5_R RECODED: There may be 3 new casinos and a slot parlor built in Massachusetts in the next few years. What sort of overall impact do you believe these may have?	99.7	98.8	96.3	99.7	99.2	95.9	NA	
GA6A_RBC RECODED AND BACKCODED: What do you believe will be the single most positive impact for Massachusetts? Would you say…	99.7	98.8	95.3	99.6	99.5	98.2	NA	
GA6B_RBC RECODED AND BACKCODED: What do you believe will be the single most negative impact for Massachusetts? Would you say…	99.4	99.0	94.2	99.5	98.4	97.1	NA	
GA7_R RECODED: What sort of overall impact do you believe a new casino or slot parlor would have for your own community?	99.3	99.2	97.9	99.5	98.9	97.6	NA	

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GY1A_R RECODED: In the past 12 months, how often have you purchased lottery tickets such as Megabucks…?	100.0	99.7	100.0	99.8	99.5	100.0	99.9	99.8
GY2A_R RECODED: In the past 12 months, how often have you purchased instant tickets or pull tabs?	99.6	99.3	99.5	99.5	99.3	97.6	99.8	99.3
GY2C_R RECODED: In the past 12 months, how often have you purchased raffle tickets?	99.6	98.8	100.0	99.8	98.6	98.8	99.7	99.7
GY3A_R RECODED: In the past 12 months, how often have you purchased daily lottery games such as Keno or Jackpot Poker?	99.6	98.6	100.0	99.6	98.9	100.0	NA	
GY3A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how often have you purchased daily lottery games such as Mass Cash, Keno, Jackpot Poker, Numbers Game?	NA			NA			99.4	99.5
GY4A_R RECODED: In the past 12 months, how often have you bet money on sporting events (this includes sports pools)?	99.6	99.8	100.0	99.4	99.6	100.0	NA	
GY4A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how often have you bet money or gambled on sports (this includes social betting, online betting, and fantasy sports)?	NA			NA			99.7	98.7
gy4c_1_R RECODED: What type of sports betting did you engage in? -- Office sports pools or social betting against friends or family	NA			NA			98.9	97.6
gy4c_2_R RECODED: What type of sports betting did you engage in? -- Placing bets with a legal land-based sportsbook outside of Massachusetts	NA			NA			98.9	97.6
gy4c_3_R RECODED: What type of sports betting did you engage in? -- Placing bets with an illegal/underground land-based sportsbook or bookmaker in Massachusetts	NA			NA			98.9	97.6
gy4c_4_R RECODED: What type of sports betting did you engage in? -- Placing bets on sporting events with an online sportsbook	NA			NA			98.9	97.6
gy4c_5_R RECODED: What type of sports betting did you engage in? -- Online fantasy sports	NA			NA			98.9	97.6
gy4d_R RECODED: Do you play traditional fantasy sports (where results are determined at the end of the season) or daily fantasy sports (where results are determined on a daily or weekly basis)?	NA			NA			98.9	97.6
gy4e_1_R RECODED: Which internet sites do you most often use to play daily fantasy sports? -- DraftKings	NA			NA			98.8	97.5
gy4e_2_R RECODED: Which internet sites do you most often use to play daily fantasy sports? -- FanDuel	NA			NA			98.8	97.5
gy4e_3_R RECODED: Which internet sites do you most often use to play daily fantasy sports? -- DraftDay	NA			NA			98.8	97.5
gy4e_91_R RECODED: Which internet sites do you most often use to play daily fantasy sports? -- Other	NA			NA			98.8	97.5
GY4f_R RECODED: In the past 30 days, on the days that you played, how many hours on average did you spend on daily fantasy sports?	NA			NA			98.9	97.5
GY4g_R RECODED: In the past 30 days, what has your usual balance been in your daily fantasy sports account(s)?	NA			NA			98.9	97.5
GY4h_R RECODED: In the past 30 days, how much have you deposited into your daily fantasy sports account(s)?	NA			NA			98.9	97.5

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GY4i_R RECODED: In the past 30 days, how much money have you cashed out from your daily fantasy sports account(s)?	NA			NA			98.9	97.5
GY4j_R RECODED: Considering all the time you spend on all your gambling activities, what percentage of time involves playing daily fantasy sports?	NA			NA			98.9	97.5
GY5A_R RECODED: In the past 12 months, how often have you gone to a bingo hall to gamble?	99.6	99.2	99.5	99.6	98.9	100.0	NA	
GY5A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how often have you played bingo either in person or online?	NA			NA			99.7	98.7
GY5c_1_R RECODED: How and where do you play bingo? -- In person at a bingo hall in Massachusetts	NA			NA			99.2	97.1
GY5c_2_R RECODED: How and where do you play bingo? -- In person at a bingo hall outside Massachusetts	NA			NA			99.2	97.1
GY5c_3_R RECODED: How and where do you play bingo? -- At an online bingo site	NA			NA			99.2	97.1
GY8A_R RECODED: In the past 12 months, how many times have you gambled at a casino, racino, or slots parlor outside of Massachusetts?	99.6	90.5	100.0	99.8	90.3	100.0	NA	
GY8A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how often have you spent money on electronic gambling machines (i.e., slot machines, video lottery terminals, electronic casino table gam	NA			NA			99.7	99.3
GY8C_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months how often have you bet money on any casino table game such as poker, blackjack, baccarat, roulette, craps, mah-jong, sic-bo, pai gow, eith	NA			NA			99.8	98.8
gy8d_rbc - RECODED and BACKCODED:Please Specify the State	99.9	90.7	100.0	99.9	91.8	100.0	NA	
GY8E_Rbc RECODED and BACKCODED: Which specific casino, racino, or slots parlor do you most often go to? (CATI)	99.4	89.2	98.4	99.7	91.2	98.8	NA	
GY8E_1_R RECODED: Where did you play these electronic gambling machines and/or casino table games? -- At the Plainridge Park Casino in Plainville, Massachusetts	NA			NA			97.5	94.1
GY8E_2_R RECODED: Where did you play these electronic gambling machines and/or casino table games? -- At a land-based casino, slot parlor, slots at racetrack, or card room outside of Massachusetts	NA			NA			97.5	94.1
GY8E_3_R RECODED: Where did you play these electronic gambling machines and/or casino table games? -- At an online casino or card/poker room	NA			NA			97.5	94.1
GY8E_4_R RECODED: Where did you play these electronic gambling machines and/or casino table games? -- At an underground/illegal casino, slot parlor, or card room in Massachusetts	NA			NA			97.5	94.1
GY8E_5_R RECODED: Where did you play these electronic gambling machines and/or casino table games? -- At a private residence	NA			NA			97.5	94.1
GY8f_1_R RECODED: Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? -- Plainridge Park Casino in Plainville, Massachusetts	NA			NA			74.8	84.5
GY8f_2_R RECODED: Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? -- Land-based casino, slot parlor, slots at racetrack, or	NA			NA			74.8	84.5

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GY8f_3_R RECODED: Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? -- Online casino or card/poker room	NA			NA			74.8	84.5
GY8f_4_R RECODED: Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? -- Underground/illegal casinos, slot parlor, or card room	NA			NA			74.8	84.5
GY8f_5_R RECODED: Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? -- At a private residence	NA			NA			74.8	84.5
GY8G_R RECODED: Have you gambled at any underground casino or slots parlor in Massachusetts in the past 12 months?	NA			99.8	99.5	100.0	NA	
GY8G_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how many times have you played electronic gambling machines or casino table games at a casino, slots parlor, slots at racetrack, or card	NA			NA			99.9	99.2
GY8H_R RECODED: The Plainridge Park Casino recently opened in Plainville, Massachusetts. Have you gambled at this new casino?	NA			0.4		73.5	NA	
GY8H_RX RECODED (BEWARE W PRIOR WAVES): Roughly how much money do you spend on gambling per visit in out of state casinos, slots parlors, slots at racetracks, and card rooms?	NA			NA			81.1	86.5
GY8I_R RECODED: How many times have you gambled at the Plainridge Park Casino?	NA			0.4		73.5	NA	
GY8I_RX RECODED (BEWARE W PRIOR WAVES): Roughly how much money do you spend on nongambling activities (such as food, travel, lodging, entertainment) per visit in out of state casinos, slots parlors, s	NA			NA			99.4	98.7
GY8J_R RECODED: Which specific casino or slots parlor do you most often go to?	NA			NA			99.9	93.4
GY8L_R RECODED: Is this a rewards card for a Massachusetts casino?	NA			NA			94.2	89.7
GY8M_R RECODED: Have you used the Play Management System on your card (allowing you to put limits on your time and expenditure)?	NA			NA			94.2	89.7
GY8N_R RECODED: Have you found these features useful in managing your gambling?	NA			NA			94.2	89.7
GY9A_R RECODED: In the past 12 months, how often have you bet on a horse race at either a horse race track or an off-track site?	99.6	99.4	100.0	99.8	99.6	100.0	NA	
GY9A_R RECODED: In the past 12 months, how often have you bet on a horse race at either a horse race track or an off-track site?	99.6	99.4	100.0	99.8	99.6	100.0	NA	
GY9A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months, how often have you bet on a horse race or dog racing at either in person, by phone, or online?	NA			NA			99.6	99.0
GY9B_RX RECODED (BEWARE W PRIOR WAVES): Roughly how much money do you spend on horse or dog racing in a typical month?	NA			NA			97.0	94.3
gy9C_RBC- RECODED and BACKCODED:Please specify where you go most often?	99.8	98.5	100.0	99.9	98.6	100.0	NA	
GY9C_RX RECODED (BEWARE W PRIOR WAVES): Where do you most often go to bet on horse or dog racing?	NA			NA			99.6	98.8

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GY10A_R RECODED: In the past 12 months, how often have you gambled or bet money against other people on things such as card games; golf, pool, darts, bowling; video games; board games, or poker outsid	99.6	98.6	100.0	99.7	99.5	99.4	NA	
GY10A_RX RECODED (BEWARE W PRIOR WAVES): In the past 12 months how often have you gambled or bet money on other types of gambling that have not yet been mentioned, such as betting on card games other	NA			NA			99.7	98.3
GY10B_1_R RECODED: What are these other types of gambling you bet money on? -- Non-casino card games	NA			NA			99.4	98.7
GY10B_2_R RECODED: What are these other types of gambling you bet money on? -- Board games	NA			NA			99.4	98.7
GY10B_3_R RECODED: What are these other types of gambling you bet money on? -- Television events	NA			NA			99.4	98.7
GY10B_4_R RECODED: What are these other types of gambling you bet money on? -- Political events	NA			NA			99.4	98.7
GY10B_5_R RECODED: What are these other types of gambling you bet money on? -- Video games	NA			NA			99.4	98.7
GY10B_6_R RECODED: What are these other types of gambling you bet money on? -- Cock fights	NA			NA			99.4	98.7
GY10B_7_R RECODED: What are these other types of gambling you bet money on? -- Dog fights	NA			NA			99.4	98.7
GY10B_8_R RECODED: What are these other types of gambling you bet money on? -- Financial indices betting	NA			NA			99.4	98.7
GY10B_91_R RECODED: What are these other types of gambling you bet money on? -- Other	NA			NA			99.4	98.7
GY10C_1_R RECODED: Did you make these bets in person or remotely via computer, phone, television, or other device? -- In person	NA			NA			99.5	98.3
GY10C_2_R RECODED: Did you make these bets in person or remotely via computer, phone, television, or other device? -- Remotely via a computer, phone, television, or other device	NA			NA			99.5	98.3
GY11A_R RECODED: In the past 12 months, how often did you purchase high risk stocks, options or futures or day trade on the stock market?	99.6	98.3	100.0	99.6	99.0	98.2	NA	
GY11A_RX RECODED (BEWARE W PRIOR WAVES): Do you personally manage most of your own stock market investments (i.e., make your own decisions and purchases of stocks, bonds, etc. independent of a financi	NA			NA			99.6	96.5
GY11B_1_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Mutual funds	NA			NA			95.8	92.9
GY11B_2_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Bonds	NA			NA			95.8	92.9
GY11B_3_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Individual stocks	NA			NA			95.8	92.9

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GY11B_4_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Penny stocks	NA			NA			95.8	92.9
GY11B_5_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Options	NA			NA			95.8	92.9
GY11B_6_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Futures	NA			NA			95.8	92.9
GY11B_7_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Other derivatives	NA			NA			95.8	92.9
GY11B_8_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Shorting stocks	NA			NA			95.8	92.9
GY11B_9_R RECODED: In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in? -- Day trading	NA			NA			95.8	92.9
GM0_R RECODED: To what extent do you agree with the statement: Wealth is a good measure of success in life?	NA			NA			99.8	97.1
GY12A_R RECODED: In the past 12 months, have you gambled online?	99.3	98.3	100.0	99.6	99.3	98.8	NA	
GY12C_RBC- RECODED and BACKCODED:What is the main type of online gambling you engage in?	99.6	98.1	100.0	99.9	99.3	98.8	NA	
GY12_R RECODED: How often do you use automatic teller machines at casinos, slot parlors, racetracks, or bingo halls?	NA			NA			99.5	99.7
GY13A_R RECODED: In the past 12 months what was the largest amount of money you have won gambling in a single day?	NA			NA			98.5	94.6
GY13B_R RECODED: In the past 12 months what was the largest amount of money you have lost gambling in a single day?	NA			NA			98.2	94.4
GM1_RBC- RECODED and BACKCODED:What would you say is the main reason that you gamble?	95.1	90.0	96.8	96.0	91.4	92.9	NA	
GM1_R RECODED: What would you say is the main reason that you gamble?	NA			NA			95.6	90.1
GR1_R RECODED: How important is gambling to you as a recreational activity?	99.4	98.6	98.9	99.7	99.2	98.2	99.2	96.5
GR2A_R RECODED: Has gambling replaced other recreational activities for you in the past year?	99.5	98.3	98.9	99.6	98.6	98.8	99.1	97.3
GC1_R RECODED: Do you typically gamble alone or with friends?	NA			NA			90.0	82.7
GC2_R RECODED: How available are gambling opportunities at your workplace or school?	NA			NA			94.3	84.3
GC3_R RECODED: How close is the nearest casino to you?	NA			NA			99.2	90.4
GL1_R RECODED: At what age do you recall gambling for money for the first time?	NA			NA			84.3	75.3

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GL2A_R RECODED: Have any of your parents, brothers or sisters, or children ever been regular gamblers?	NA			NA			99.7	99.0
GL2B_R RECODED: Have any of your parents, brothers or sisters, or children ever been problem gamblers (i.e., had difficulty controlling their gambling to the extent that it caused significant problems	NA			NA			99.6	98.7
GF1_R RECODED: The next set of questions will ask your opinion about various gambling situations.Which of the following set of lottery numbers has the greatest probability of being selected as the win	NA			NA			98.0	94.3
GF2_R RECODED: Which gives you the best chance of winning the jackpot on a slot machine?	NA			NA			97.4	91.1
GF3_R RECODED: How lucky are you? If 10 people's names were put into a hat and one name drawn for a prize, how likely is it that your name would be chosen?	NA			NA			99.4	96.8
GF4_R RECODED: If you were to buy a lottery ticket, which would be the best place to buy it from?	NA			NA			99.1	97.0
GF5_R RECODED: A positive attitude or doing good deeds increases your likelihood of winning money when gambling.	NA			NA			99.1	97.0
GF6_R RECODED: A gambler goes to the casino and wins 75% of the time. How many times has he or she likely gone to the casino?	NA			NA			98.4	95.1
GF7_R RECODED: You go to a casino with $100 hoping to double your money. Which strategy gives you the best chance of doing this?	NA			NA			97.7	95.1
GF8_R RECODED: Which game can you consistently win money at if you use the right strategy?	NA			NA			98.5	96.1
GF9_R RECODED: Your chances of winning a lottery are better if you are able to choose your own numbers.	NA			NA			98.1	95.1
GF10_R RECODED: You have flipped a coin and correctly guessed 'heads' 5 times in a row. What are the odds that heads will come up on the next flip. Would you say…	NA			NA			98.4	96.1
PA1_R RECODED: In the past 12 months have you seen or heard any media campaigns to prevent problem gambling in Massachusetts?	99.0	98.2	98.9	99.5	98.5	98.2	99.6	98.3
PA2A_R RECODED: In the past 12 months have you been aware of any programs to prevent problem gambling (other than media campaigns) offered at your school, your place of work, in your community or else	98.9	98.9	99.5	99.6	99.3	98.2	99.2	98.1
PA2B_R RECODED: Did you participate in any of the problem gambling prevention programs that you heard of in the past 12 months?	99.6	100.0	98.9	100.0	99.9	97.6	99.8	99.2
PA3_R RECODED: Did any of these media campaigns or programs cause you to alter your own gambling behavior?	99.3	99.5	98.4	99.5	99.6	98.2	99.3	95.5
GPO1_R RECODED: What portion of your close friends and family members are regular gamblers?	99.6	98.8	96.8	99.8	99.0	97.6	99.5	97.5
GPO2_R RECODED: During the last 12 months, has there been a person in your life that you consider gambles too much?	99.3	99.1	97.9	99.8	99.6	97.1	99.5	98.1
GPO3_RBC- RECODED and BACKCODED:Please specify this persons relationship to you.	99.3	99.0	97.4	99.7	99.3	95.9	NA	
GPO3_R RECODED: What is this person's relationship to you?	NA			NA			99.4	92.8

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GPO4_1_Rbc RECODED and backcoded: In what ways has this persons gambling affected you during the last 12 months? Reduced time spent socializing? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_2_Rbc RECODED and backcoded: In what ways has this persons gambling affected you during the last 12 months? Not fullfilled household or family duties? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_3_Rbc RECODED and backcoded:In what ways has this persons gambling affected you during the last 12 months? Failed to do something they had promised or were supposed to do (including work-related	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_4_Rbc RECODED and backcoded: In what ways has this persons gambling affected you during the last 12 months? Emotional pain, neglect, concern, or frustration? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_5_Rbc RECODED and backcoded: In what ways has this persons gambling affected you during the last 12 months? Financial strife, borrowing, or difficulty covering household expenses? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_6_Rbc RECODED and backcoded:In what ways has this persons gambling affected you during the last 12 months? Stolen money or valuables? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO4_91_Rbc RECODED and backcoded: In what ways has this persons gambling affected you during the last 12 months? Other ways? (CATI)	99.3	87.6	94.7	99.8	99.7	93.5	NA	
GPO5_R RECODED: Overall, on a scale from 1 to 10 how much has this person's gambling affected you negatively during the last 12 months?	99.2	98.3	97.9	99.7	99.1	97.1	NA	
GP1_R RECODED: In the past 12 months, have you bet more than you could really afford to lose?	99.7	99.5	99.5	99.6	99.8	98.2	93.5	96.0
GP2_R RECODED: In the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble?	99.4	99.5	98.4	99.7	99.8	98.2	93.5	96.0
GP3_R RECODED: In the past 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement?	99.2	99.5	98.4	99.7	99.7	98.2	93.4	95.8
GP4_R RECODED: In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost?	99.1	99.4	98.4	99.5	99.6	97.1	93.6	96.0
GP5A_R RECODED: In the past 12 months, have you borrowed money or sold anything to get money to gamble?	99.6	99.4	98.4	99.5	99.6	97.6	93.4	96.0
GP5B_R RECODED: In the past 12 months, about how much money have you borrowed or obtained from selling possessions in order to gamble?	99.9	99.9	98.4	99.9	99.6	97.6	NA	
GP6A_R RECODED: In the past 12 months, has your gambling caused any financial problems for you or your household?	99.5	99.0	98.4	99.7	99.4	97.1	93.4	95.6
GP6B_R RECODED: In the past 12 months, have you filed for bankruptcy because of gambling?	99.9	100.0	98.4	99.9	99.8	97.6	NA	
GP7A_R RECODED: In the past 12 months, has your gambling caused you any health problems, including stress or anxiety?	99.3	99.4	98.4	99.6	99.5	97.1	93.6	95.5
GP7B_R RECODED: In the past 12 months have these health problems caused you to seek medical or psychological help?	99.9	99.9	98.4	99.9	99.9	97.1	NA	
GP8_R RECODED: In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?	99.6	99.4	98.4	99.7	99.7	97.6	93.6	95.5

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GP9_R RECODED: In the past 12 months, have you felt that you might have a problem with gambling?	99.4	99.4	98.4	99.8	99.6	97.6	93.5	95.5
GP10A_R RECODED: Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months?	99.3	99.5	98.4	99.7	99.6	97.1	93.4	95.5
GP10B_R RECODED: In the past 12 months, have you thought of committing suicide because of gambling?	99.9	99.7	98.4	99.9	99.6	96.5	NA	
GP10C_R RECODED: In the past 12 months, have you attempted suicide because of gambling?	99.9	100.0	98.4	99.9	99.9	96.5	NA	
GP10D_R RECODED: Would you like to know about the free gambling and mental health treatment services in your local area?	99.9	99.8	98.4	99.9	99.9	96.5	NA	
GP11A_R RECODED: Has your involvement in gambling caused significant problems in your relationship with your spouse/partner or important friends or family in the past 12 months?	99.1	99.2	97.9	99.3	99.1	97.1	93.3	95.6
GP11B_R RECODED: In the past 12 months, has your involvement in gambling caused an instance of domestic violence in your household?	99.9	100.0	98.4	99.9	99.9	97.1	NA	
GP11C_R RECODED: In the past 12 months, has your involvement in gambling resulted in separation or divorce?	99.9	100.0	98.4	99.9	99.9	97.1	NA	
GP12A_R RECODED: In the past 12 months, has your involvement in gambling caused you to repeatedly neglect your children or family?	99.1	99.3	98.4	99.6	99.4	97.1	93.4	95.6
GP12B_R RECODED: In the past 12 months, has child welfare services become involved because of your gambling?	99.9	100.0	98.4	99.9	99.9	97.1	NA	
GP13A_R RECODED: Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time of	99.0	99.4	98.4	99.7	99.6	97.1	93.3	95.1
GP13B_R RECODED: In the past 12 months, about how many work or school days have you lost due to gambling?	99.9	99.9	98.4	99.9	99.7	97.1	NA	
GP13C_R RECODED: In the past 12 months, have you lost your job or had to quit school due to gambling?	99.9	100.0	98.4	99.9	99.9	97.1	NA	
GP13D_R RECODED: In the past 12 months, did anyone in this household receive public assistance or other welfare payments as a result of losing your job because of gambling?	99.9	100.0	98.4	99.9	99.9	97.1	NA	
GP13E_R RECODED: Roughly how much money did you receive from public assistance in the past 12 months?	99.9	100.0	98.4	99.9	99.8	97.1	NA	
GP14A_R RECODED: In the past 12 months, has your involvement in gambling caused you or someone close to you to write bad checks, take money that didn't belong to you or commit other illegal acts to su	99.2	99.4	98.4	99.5	99.4	95.9	93.3	95.5
GP14B_R RECODED: In the past 12 months, about how much money have you illegally obtained in order to gamble?	99.9	99.9	98.4	99.9	99.9	96.5	NA	
GP14C_R RECODED: In the past 12 months, has your gambling been a factor in your committing a crime for which you have been arrested?	99.9	99.9	98.4	99.9	99.9	96.5	NA	
GP14D_R RECODED: Were you convicted for this crime?	99.9	100.0	98.4	99.9	99.9	96.5	NA	
GP14G_R RECODED: Were you incarcerated for this crime?	99.9	100.0	98.4	99.9	99.9	96.5	NA	

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GP14H_R RECODED: For how many days were you incarcerated?	99.9	100.0	98.4	99.9	99.9	96.5	NA	
GP15_R RECODED: In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to?	99.3	98.3	98.4	99.7	98.9	97.1	93.5	95.3
GP16A_R RECODED: In the past 12 months, have you made attempts to either cut down, control or stop gambling?	99.1	97.6	97.9	99.4	98.5	95.9	93.2	95.3
GP16B_R RECODED: Were you successful in these attempts to cut down, control or stop gambling?	99.9	99.8	97.9	99.9	99.7	95.9	93.6	96.1
GP17_R RECODED: In the past 12 months, is there anyone else who would say that you had difficulty controlling your gambling, regardless of whether you agreed with them or not?	99.3	98.5	98.4	99.4	98.7	95.3	93.4	95.5
GP18_R RECODED: In the past 12 months, would you say you have been preoccupied with gambling?	99.3	98.5	98.4	99.5	98.6	95.3	93.4	96.0
GP19_R RECODED: In the past 12 months, when you did try cutting down or stopping did you find you were very restless or irritable or that you had strong cravings for it?	98.3	97.0	97.4	98.7	97.6	92.4	92.7	95.1
GP20_R RECODED: In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement?	99.0	98.3	97.9	99.5	98.8	94.1	93.4	95.5
GP21_R RECODED: Are there particular types of gambling that have contributed to your problems more than others?	99.6	99.3	98.4	99.7	99.1	97.1	93.7	96.1
GP22_1_RBC recoded and backcoded: Which types of gambling have contributed to your problems? Lottery	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_1_R RECODED: Which types of gambling have contributed to your problems? -- Lottery	NA			NA			93.7	96.1
GP22_2_RBC recoded and backcoded: Which types of gambling have contributed to your problems? Instant tickets	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_2_R RECODED: Which types of gambling have contributed to your problems? -- Instant Tickets	NA			NA			93.7	96.1
GP22_3_RBC recoded and backcoded: Which types of gambling have contributed to your problems? Keno	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_3_RX RECODED (BEWARE W PRIOR WAVES): Which types of gambling have contributed to your problems? -- Daily Lotteries	NA			NA			93.7	96.1
GP22_4_RBC recoded and backcoded: Which types of gambling have contributed to your problems? Bingo	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_4_R RECODED: Which types of gambling have contributed to your problems? -- Bingo	NA			NA			93.7	96.1
GP22_5_RBC recoded and backcoded: Which types of gambling have contributed to your problems? slot machines	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_5_RX RECODED (BEWARE W PRIOR WAVES): Which types of gambling have contributed to your problems? -- Slot Machines or Video Lottery Terminals	NA			NA			93.7	96.1
GP22_6_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Video Poker	98.6	96.8	96.3	98.6	96.8	96.5	NA	

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GP22_7_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Casino Table Games (i.e., Blackjack, Baccarat, Roulette, Craps, etc.?	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_7_R RECODED: Which types of gambling have contributed to your problems? -- Casino Table Games	NA			NA			93.7	96.1
GP22_8_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Poker	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_8_R RECODED: Which types of gambling have contributed to your problems? -- Poker	NA			NA			93.7	96.1
GP22_9_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Horse racing	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_9_RX RECODED (BEWARE W PRIOR WAVES): Which types of gambling have contributed to your problems? -- Horse Racing or Dog Racing	NA				NA		93.7	96.1
GP22_10_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Dog racing	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_10_R RECODED: GP22_10	NA			NA			92.5	94.3
GP22_11_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Sports betting	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_11_R RECODED: Which types of gambling have contributed to your problems? -- Sports Betting	NA			NA			93.7	96.1
GP22_12_RBC recoded and backcoded: Which types of gambling have contributed to your problems?High risk stocks	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_13_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Online	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_13_R RECODED: Which types of gambling have contributed to your problems? -- Online Gambling	NA			NA			93.7	96.1
GP22_91_RBC recoded and backcoded: Which types of gambling have contributed to your problems?Other	98.6	96.8	96.3	98.6	96.8	96.5	NA	
GP22_91_R RECODED: Which types of gambling have contributed to your problems? -- Other	NA			NA			93.7	96.1
GP23A_R RECODED: Have you wanted help for gambling problems in the past 12 months?	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23B_R RECODED: Have you sought help for gambling problems in the past 12 months?	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_1_R RECODED: Where did you seek help from? -- Friends or family	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_2_R RECODED: Where did you seek help from? -- Gamblers Anonymous	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_3_R RECODED: Where did you seek help from? -- Gam Anon	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_4_R RECODED: Where did you seek help from? -- Family Doctor	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_5_R RECODED: Where did you seek help from? -- Private Psychologist/Psychiatrist/Counselor	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
GP23c_6_R RECODED: Where did you seek help from? -- Problem Gambling Treatment Center/Clinic	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_7_R RECODED: Where did you seek help from? -- Pastor/Minister/Priest/Etc.	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_8_R RECODED: Where did you seek help from? -- Telephone Help/Hotline	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_9_R RECODED: Where did you seek help from? -- Online Help	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23c_10_R RECODED: Where did you seek help from? -- Gamesense Information Centre	NA			NA			93.7	96.1
GP23c_91_R RECODED: Where did you seek help from? -- Other	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23D_R RECODED: How helpful was this?	99.6	99.4	98.4	99.7	99.3	97.1	93.7	96.1
GP23E_R RECODED: Have you excluded yourself from any casino or slots parlor in the past 12 months?	99.6	99.3	98.4	99.7	99.3	97.1	93.7	96.1
GP23F_RBC RECODED AND BACKCODED: In which state?	NA			100.0	100.0	100.0	NA	
GP23F_R RECODED: In which state? (CATI)	100.0	100.0	100.0	NA			NA	
GP23F_0_R RECODED: In which states have you excluded yourself? -- Massachusetts	NA			NA			100.0	100.0
GP23F_1_R RECODED: In which states have you excluded yourself? -- Connecticut	NA			NA			100.0	100.0
GP23F_2_R RECODED: In which states have you excluded yourself? -- Rhode Island	NA			NA			100.0	100.0
GP23F_3_R RECODED: In which states have you excluded yourself? -- New Jersey	NA			NA			100.0	100.0
GP23F_4_R RECODED: In which states have you excluded yourself? -- New York	NA			NA			100.0	100.0
GP23F_5_R RECODED: In which states have you excluded yourself? -- Pennsylvania	NA			NA			100.0	100.0
GP23F_6_R RECODED: In which states have you excluded yourself? -- Maine	NA			NA			100.0	100.0
GP23F_7_R RECODED: In which states have you excluded yourself? -- Nevada	NA			NA			100.0	100.0
GP23F_91_R RECODED: In which states have you excluded yourself? -- Other	NA			NA			100.0	100.0
GP24_R RECODED: Have you had problems with gambling in your lifetime prior to the past 12 months?	99.6	99.4	98.4	99.7	99.3	97.1	NA	
GP25A_R RECODED: Do you believe you are having fewer gambling problems than last year?	NA			NA			92.7	93.9
Canadian Problem Gambling Index	99.6	99.4	98.4	99.7	99.4	97.6	93.7	96.1
SF1_R RECODED: How would you rate your current family relationships?	NA			NA			99.8	99.2
SF2_R RECODED: How would you rate your current marital relationship?	NA			NA			99.6	97.8

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
SF3_R RECODED: How would you rate your current level of social support?	NA			NA			99.7	98.3
SF4_R RECODED: How important is religion in your life?	NA			NA			99.8	99.5
SF5_R RECODED: Have you committed any illegal activities in the past year?	NA			NA			99.7	99.7
SF6_R RECODED: Do you have a criminal record?	NA			NA			99.7	99.5
SF7_R RECODED: Success is based on survival of the fittest; I am not concerned about the losers.	NA			NA			99.4	97.3
SF8_R RECODED: For me, what's right is whatever I can get away with.	NA			NA			99.4	98.0
SF9_R RECODED: In today's world, I feel justified in doing anything I can get away with to succeed.	NA			NA			99.4	98.1
SF10_R RECODED: My main purpose in life is getting as many goodies as I can.	NA			NA			99.0	98.0
SF11_R RECODED: Making a lot of money is my most important goal.	NA			NA			99.0	97.3
SF12_R RECODED: I let others worry about higher values; my main concern is with the bottom line.	NA			NA			98.4	96.6
SF13_R RECODED: People who are stupid enough to get ripped off usually deserve it.	NA			NA			99.1	97.5
SF14_R RECODED: Looking out for myself is my top priority.	NA			NA			98.7	98.0
SF15_R RECODED: I tell other people what they want to hear so that they will do what I want them to do.	NA			NA			98.5	97.8
SF16_R RECODED: I would be upset if my success came at someone else's expense.	NA			NA			99.0	97.3
SF17_R RECODED: I often admire a really clever scam.	NA			NA			99.0	97.6
SF18_R RECODED: I make a point of trying not to hurt others in pursuit of my goals.	NA			NA			99.1	97.5
SF19_R RECODED: I enjoy manipulating other people's feelings.	NA			NA			99.1	98.1
SF20_R RECODED: I feel bad if my words or actions cause someone else to feel emotional pain.	NA			NA			99.3	98.1
SF21_R RECODED: Even if I were trying very hard to sell something, I wouldn't lie about it.	NA			NA			99.2	97.8
SF22_R RECODED: Cheating is not justified because it is unfair to others.	NA			NA			99.0	98.0
D4_R RECODED: At present are you…?	97.8	98.6	96.8	98.1	99.0	94.1	98.5	99.0
D5_R RECODED: How many children under 18 years old live in your household?	95.1	95.9	97.9	96.0	95.3	93.5	96.1	92.1
D6_R RECODED: What is the highest degree or level of school you have completed?	99.2	98.6	97.4	98.9	98.9	92.9	NA	
D6_R RECODED: What is the highest degree or level of school you have completed?	NA			NA			99.5	98.7
D7A_R RECODED: Are you currently…?	98.3	98.7	96.8	98.7	98.8	94.1	99.2	99.0

	Percent Complete							
	Wave 1			Wave 2			Wave 3	
	WEB	SAQ	PHONE	WEB	SAQ	PHONE	WEB	SAQ
D7B_R RECODED: Have you ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard?	99.0	98.1	97.9	98.8	98.0	94.1	99.1	98.7
D8_RBC RECODED and BACKCODED: What type of healthcare coverage do you have?	96.9	98.0	94.7	96.0	98.5	94.1	NA	
D9_RBC RECODED AND BACKCODED: Do you own the place where you currently live, pay rent or something else?	98.1	98.4	96.8	97.6	97.8	94.1	NA	
D12_R RECODED: Were you born in the United States?	99.0	98.6	97.4	98.7	98.2	94.7	99.1	98.7
D12A_R RECODED: Do you live in Massachusetts for 6 or more months out of the year?	99.0	97.6	97.4	99.3	96.7	94.1	99.2	97.3
D13_R RECODED: Are you Hispanic or Latino?	98.2	97.5	97.4	98.3	96.8	94.7	98.4	96.8
Age	93.1	97.4	97.9	95.9	99.3	98.2	98.5	98.3
Alcohol use (3 categories)	99.9	99.7	100.0	99.8	99.5	100.0	NA	
Current tobacco use	99.6	97.1	99.5	99.7	96.8	99.4	NA	
Education (6 categories)	99.2	98.6	97.4	98.9	98.9	92.9	99.5	98.7
Employment (6 categories)	98.3	98.7	96.8	98.7	98.8	94.1	99.2	99.0
Household income (6 categories)	81.8	91.8	85.8	79.8	90.1	83.5	86.2	94.9
Marital status (5 categories)	97.8	98.6	96.8	98.1	99.0	94.1	98.5	99.0
ethnicity1	96.5	98.1	96.8	97.1	97.7	92.9	97.5	98.5
Current debt	87.2	93.5	79.5	85.2	92.7	72.9	90.2	94.9

Appendix B: Questionnaire for Wave 3

Massachusetts Gambling Impact Cohort Study

Please have the adult in your household (18 years or older) who previously participated in the last round of the Massachusetts Gambling Impact Cohort Study complete this survey.

MAGIC MASSACHUSETTS GAMBLING IMPACT COHORT STUDY

UNIVERSITY OF MASSACHUSETTS SCHOOL OF PUBLIC HEALTH AND HEALTH SCIENCES

W3

Instructions for Completing the Booklet

This booklet contains several types of questions. Each question should be answered only about yourself, not anyone else in your household.

- **For some questions, you answer the question by marking a box, like this:**

  1 ☒ Yes
  2 ☐ No

- **For some questions, you answer the question by filling in one number per box, like this:**

0	9

  Number of Days

- **You will sometimes be instructed to skip one or more questions. In this example, if your choice is 'No', you skip to question 10; otherwise, you continue to the next question.**

  3 ☒ Yes
  4 ☐ No → GO TO 10

- **This survey asks many questions about gambling as a recreational activity. We would like you to participate even if you have never gambled. It is important that we collect information that is representative of the state of Massachusetts.**

Definitions

For the purposes of this survey, please refer to the definitions below for the following terms.

- **"Non-medical" drug use means using it to get high or experience pleasurable effects, see what the effects are like, or use with friends.**
- **"Serious" means something that either you or someone else would say is considerable, important, or major, either because of its frequency or significance.**
- **A high risk stock is a stock from a company that has a real risk of going out of business and/or having their stock price double or triple in value in the next year.**
- **An "underground" casino is a place with unlicensed slot machines or casino game tables.**
- **A "sportsbook" is a venue where someone can place a bet on a sporting event.**
- **A "bookmaker" or "bookies" is an organization or person that takes bets on sporting events**

The University of Massachusetts is conducting a longitudinal study about gambling in Massachusetts. This survey is private and confidential. We have a Federal Certificate of Confidentiality that is designed to protect the confidentiality of your research data from a court order or subpoena. We can provide you with more information if you would like. You don't have to answer any question you don't want to, and you can stop at any time. Almost everyone will be able to finish the survey within 20 to 40 minutes.

If you have questions about the Federal Certificate of Confidentiality, please visit: http://grants.nih.gov/grants/policy/coc/faqs.htm#187.

Health Section

We would like to start by asking you questions about your health.

1. **Over the past 12 months, would you say that in general your health has been…?**
   - [1] ☐ Excellent
   - [2] ☐ Very good
   - [3] ☐ Good
   - [4] ☐ Fair
   - [5] ☐ Poor

2. **Do you have any physical disability or chronic health problem that limits the amount or kind of activity you can do at home, work or school?**
   - [1] ☐ Yes
   - [2] ☐ No

3. **In the past 12 months, how would you rate your overall level of stress? Would you say…?**
   - [1] ☐ Very high
   - [2] ☐ High
   - [3] ☐ Moderate
   - [4] ☐ Low
   - [5] ☐ Very low

4. **Check off any events that have happened to you in the past 12 months.**
   Check all that apply.

Work/School

- [1] ☐ Started school
- [2] ☐ Experienced significant difficulties at school
- [3] ☐ Dropped out of school
- [4] ☐ Started a new job
- [5] ☐ Had a significant change in work hours, work demands, or work type
- [6] ☐ Received an important promotion
- [7] ☐ Had serious conflict(s) at work
- [8] ☐ Suffered a significant business loss or failure
- [9] ☐ Had difficulty finding employment
- [10] ☐ Was laid off or fired
- [11] ☐ Retired

Family and Friends

- [12] ☐ Moved to new location/house
- [13] ☐ Became pregnant (or spouse became pregnant)
- [14] ☐ Experienced a miscarriage or abortion
- [15] ☐ Had a new addition to the family through birth or adoption

Family and Friends (continued)

- [16] ☐ Son or daughter left home
- [17] ☐ Started a relationship with a new boyfriend/girlfriend
- [18] ☐ Got married
- [19] ☐ Had serious conflicts or difficulties with spouse or partner
- [20] ☐ Broke up with boyfriend/girlfriend
- [21] ☐ Separated or divorced
- [22] ☐ Had serious conflicts with family member(s)
- [23] ☐ Had serious conflicts with close friend(s)
- [24] ☐ Had serious conflicts with neighbor(s)
- [25] ☐ Had serious conflicts with ex-spouse
- [26] ☐ Death of spouse or partner
- [27] ☐ Death of other close family member
- [28] ☐ Death of close friend
- [29] ☐ Serious illness or injury in family member or close friend
- [30] ☐ Death of important family pet

Property and Finances

- [31] ☐ Suffered a significant financial loss
- [32] ☐ Declared bankruptcy
- [33] ☐ Went on social support or welfare
- [34] ☐ Suffered a significant loss or damage of property
- [35] ☐ Borrowed a significant amount of money (e.g., mortgage)
- [36] ☐ Had a significant financial improvement

Legal Matters/Crime

- [37] ☐ Arrested or charged with a crime
- [38] ☐ Placed in jail
- [39] ☐ Became involved in lawsuit
- [40] ☐ Received serious threats or harassment
- [41] ☐ Was assaulted
- [42] ☐ Was robbed
- [43] ☐ Was a victim of some other crime
- [44] ☐ Caused a serious accident that injured or killed someone

Health

- [45] ☐ Witnessed a serious accident that injured or killed someone
- [46] ☐ Suffered a serious injury as a result of an accident
- [47] ☐ Became seriously overweight or underweight
- [48] ☐ Developed a serious physical illness
- [49] ☐ Developed a serious mental illness
- [50] ☐ Developed a drug or alcohol addiction

If at Question 4, you selected any of the options below, please go to Question 5. If none of these items were selected, please go to Question 6:

Death of spouse or partner
Death of other close family member
Death of close friend
Serious illness or injury in family member or close friend
Received serious threats or harassment
Was assaulted
Was robbed
Was a victim of some other crime
Caused a serious accident that injured or killed someone
Witnessed a serious accident that injured or killed someone
Suffered a serious injury as a result of an accident

5. Did any of the following symptoms occur for at least a month as a result of [specify the specific event(s) checked off]
Check all that apply.

1 ☐ Recurrent intrusive distressing memories of the event
2 ☐ Recurrent distressing dreams about the event
3 ☐ Flashbacks, in which you felt you were reliving the event
4 ☐ Intense psychological distress to reminders of the event
5 ☐ Intense physical reactions to reminders of the event
6 ☐ Avoidance of distressing memories, thoughts, or feelings about the event
7 ☐ Avoidance of external reminders (people, places, etc.) that might lead to memories, thoughts, or feelings about the event
8 ☐ Inability to remember an important part of the event
9 ☐ Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world (e.g., "I am bad", "No one can be trusted", "The world is dangerous")
10 ☐ Persistent, distorted beliefs about the cause or consequences of the event that has led you to blame yourself or others
11 ☐ Persistent negative emotions (fear, horror, anger, guilt, shame)
12 ☐ Markedly decreased interest or participation in activities
13 ☐ Feelings of detachment from others
14 ☐ Persistent inability to experience positive emotions
15 ☐ Irritable behavior and angry outbursts
16 ☐ Reckless or self-destructive behavior
17 ☐ Over-vigilance or over-alertness
18 ☐ Exaggerated startled response
19 ☐ Difficulty concentrating
20 ☐ Difficulty sleeping

6. In the past 12 months, how would you rate your overall level of happiness? Would you say…?

1 ☐ Very high
2 ☐ High
3 ☐ Moderate
4 ☐ Low
5 ☐ Very low

7. Have you used tobacco or e-cigarettes in the past 12 months? (includes cigarettes, cigars, pipe tobacco, shisha tobacco, chewing tobacco, dipping tobacco, snuff)

1 ☐ Yes
2 ☐ No → **GO TO 10**

8. Which of the following products have you used? *Check all that apply.*

1 ☐ Cigarettes
2 ☐ Electronic cigarettes (e-cigarettes)
3 ☐ Cigars
4 ☐ Pipe tobacco
5 ☐ Shisha tobacco
6 ☐ Chewing tobacco
7 ☐ Dipping tobacco
8 ☐ Snuff

9. Have you used tobacco or e-cigarettes in the past 30 days? (includes cigarettes, cigars, pipe tobacco, shisha tobacco, chewing tobacco, dipping tobacco, snuff)

1 ☐ Yes
2 ☐ No

10. How often have you used alcohol in the past 12 months?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all

11. In the past 12 months how often have you used any marijuana, hallucinogens (such as LSD, mushrooms, or PCP), cocaine, heroin or opium, or any other drugs not intended for medical use? *If you are not sure what is considered non-medical drug use, please refer to the definitions on the inside cover.*

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all

---

*"If you selected "Less than once a month" or "Not at all" for Question 10 **AND** Question 11, go to Question 14. Otherwise, continue to Question 12.*

---

12. In the past 12 months has your use of alcohol or other drugs been associated with any of the following? *Check all that apply.*

1 ☐ Often taken in larger amounts or over a longer period than intended
2 ☐ A persistent desire or unsuccessful efforts to cut down or control use
3 ☐ A great deal of time spent in activities necessary to obtain the substance
4 ☐ Strong cravings for the substance
5 ☐ Recurrent use resulting in a failure to fulfill major role obligations at work, school, or home
6 ☐ Continued use despite the substance causing or worsening social or interpersonal problems
7 ☐ Continued use despite the substance causing or worsening a physical or psychological problem
8 ☐ Important social, occupational, or recreational activities given up or reduced because of use
9 ☐ Recurrent use in situations in which it was physically dangerous
10 ☐ Tolerance to the substance (needing more of it to have the same effect)
11 ☐ Withdrawal symptoms when not using the substance

13. During the past 12 months, have you sought help for your use of alcohol or drugs?

1 ☐ Yes
2 ☐ No

If you would like information regarding treatment resources, please see page 19 for contact information.

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14. *Prior to the past 12 months,* have you had any significant problems with overuse of drugs or alcohol?

1 ☐ Yes
2 ☐ No

15. In the past 12 months have you had any problems with other behavior such as overeating, sex or pornography, shopping, exercise, Internet chat lines, or other things? What we mean is difficulties controlling the behavior which has led to significant negative consequences for you or other people.

1 ☐ Yes
2 ☐ No → **GO TO 17**

16. Which specific activities have you had problems with? *Check all that apply.*

1 ☐ Overeating
2 ☐ Sex or pornography
3 ☐ Exercise
4 ☐ Shopping
5 ☐ Internet chat lines
6 ☐ Video or internet gaming
91 ☐ Other

17. *Prior to the past 12 months,* have you had any significant problems with excessive involvement in overeating, sex or pornography, shopping, exercise, Internet chat lines, or other things?

1 ☐ Yes
2 ☐ No

18. In the past 12 months, was there ever a period of 2 weeks or longer where you had a depressed mood most of the day nearly every day and/or a loss of interest or pleasure in most activities?

1 ☐ Yes
2 ☐ No → **GO TO 20 ON PAGE 4**

19. **Check off any of the following that occurred during this time period.** *Check all that apply.*
    - [1] ☐ Significant weight loss or weight gain or an increase or decrease in appetite
    - [2] ☐ Problems sleeping or excessive sleeping nearly every day
    - [3] ☐ Physical agitation or being slowed down nearly every day
    - [4] ☐ Fatigue or loss of energy nearly every day
    - [5] ☐ Feelings of worthlessness or excessive or inappropriate guilt
    - [6] ☐ Decreased ability to think or concentrate or indecisiveness nearly every day
    - [7] ☐ Recurrent thoughts of death or suicide

20. **Would you describe yourself as chronically anxious? (i.e., having excessive anxiety and worry most days about a variety of things)?**
    - [1] ☐ Yes
    - [2] ☐ No → **GO TO 23**

21. **Does this anxiety cause significant distress or impairment in your social functioning, employment, or other areas?**
    - [1] ☐ Yes
    - [2] ☐ No → **GO TO 23**

22. **Do you also have any of the following symptoms?** *Check all that apply.*
    - [1] ☐ Restlessness or feeling keyed up or on edge
    - [2] ☐ Easily fatigued
    - [3] ☐ Difficulty concentrating or mind going blank
    - [4] ☐ Irritability
    - [5] ☐ Muscle tension
    - [6] ☐ Difficulty sleeping

23. **In the past 12 months have you had recurrent unexpected panic attacks during which 4 or more of the following symptoms occur:**
    - **Pounding heart**
    - **Sweating**
    - **Trembling**
    - **Shortness of breath**
    - **Feelings of choking**
    - **Chest pain**
    - **Nausea**
    - **Dizziness**
    - **Chills or hot flashes**
    - **Numbness**
    - **Feelings of unreality**
    - **Fear of losing control**
    - **Fear of dying?**

    [1] ☐ Yes
    [2] ☐ No → **GO TO 25**

24. **Have these attacks been followed by either a persistent worry about having additional attacks and/or avoidance of activities (e.g., exercise) or unfamiliar places?**
    - [1] ☐ Yes
    - [2] ☐ No

25. **In the past 12 months have you had *any other* significant mental health problem that has not been mentioned (e.g., bipolar disorder, schizophrenia, bulimia, obsessive-compulsive disorder, agoraphobia)?**
    - [1] ☐ Yes
    - [2] ☐ No

26. ***Prior to the past 12 months,* do you have any significant history of mental health problems such as depression, post-traumatic stress, panic attacks, generalized anxiety, agoraphobia, obsessive-compulsive disorder, bipolar disorder, schizophrenia, bulimia, etc.?**
    - [1] ☐ Yes
    - [2] ☐ No

27. **Is there any significant history of mental health problems, drug or alcohol addictions, or behavioral addictions in your parents, siblings, or children?**
    - [1] ☐ Yes
    - [2] ☐ No
    - [3] ☐ Unsure

28. **Were you abused as a child (physically, sexually, or emotionally)?**
    - [1] ☐ Yes
    - [2] ☐ No

If you would like information regarding mental health treatment resources, please see page 19 for contact information.

Gambling Attitudes

Now we would like to ask you some questions about gambling.

We define gambling as betting money or material goods on an event with an uncertain outcome in the hopes of winning additional money or material goods. It includes things such as lottery tickets, scratch tickets, bingo, betting against a friend on a game of skill or chance, betting on horse racing or sports, investing in high risk stocks, etc.

29. Which best describes your belief about the benefit or harm that gambling has for society? Would you say…?

1 ☐ The harm far outweighs the benefits
2 ☐ The harm somewhat outweighs the benefits
3 ☐ The benefits are about equal to the harm
4 ☐ The benefits somewhat outweigh the harm
5 ☐ The benefits far outweigh the harm

30. Do you believe that gambling is morally wrong?

1 ☐ Yes
2 ☐ No

31. Which of the following best describes your opinion about *legalized* gambling? Would you say…?

1 ☐ All types of gambling should be legal
2 ☐ Some types of gambling should be legal and some should be illegal
3 ☐ All types of gambling should be illegal

32. Which of the following best describes your opinion about gambling opportunities in Massachusetts? Would you say…?

1 ☐ Gambling is too widely available
2 ☐ Gambling is not available enough
3 ☐ The current availability of gambling is fine

Past Gambling Behaviors

The following questions ask about frequency of participation and spending on each type of gambling. Spend means how much you are ahead (+$) or behind (-$), or your net win or loss in an average month in the past 12 months.

33. In the past 12 months, how often have you purchased *lottery tickets* such as Megabucks, Powerball, or Lucky for Life? This does not include daily lottery games (e.g., Mass Cash, Numbers Game, Keno, Jackpot Poker) or instant tickets, pull tabs, or raffle tickets. Would you say…?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 35**

34. Roughly how much money do you spend on lottery tickets in a typical month?

☐ $ ☐☐☐,☐☐☐

35. In the past 12 months, how often have you purchased *instant tickets* or *pull tabs*? Would you say…?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 37**

36. Roughly how much money do you spend on instant tickets or pull tabs in a typical month?

☐ $ ☐☐☐,☐☐☐

37. In the past 12 months, how often have you purchased *raffle tickets*? Would you say…?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 39 ON PAGE 6**

38. **Roughly how much money do you spend on raffle tickets in a typical month?**

– $ ☐☐☐,☐☐☐,☐☐☐

39. **In the past 12 months, how often have you played *daily lottery games* such as *Mass Cash, Keno, Jackpot Poker, Numbers Game*? Would you say…?**

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 41**

40. **Roughly how much money do you spend on daily lottery games in a typical month?**

– $ ☐☐☐,☐☐☐,☐☐☐

41. **In the past 12 months, how often have you bet money or gambled on *sports* (this includes social betting, online betting, and fantasy sports)? Would you say…?**

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 51 ON PAGE 7**

42. **Roughly how much money do you spend on sports betting in a typical month?**

– $ ☐☐☐,☐☐☐,☐☐☐

43. **What type of sports betting did you engage in?** *For a definition of sportsbook, please refer to inside cover. Check all that apply.*

1 ☐ Office sports pools or social betting against friends or family
2 ☐ Placing bets with a legal land-based sportsbook outside of Massachusetts
3 ☐ Placing bets with an illegal/underground land-based sportsbook or bookmaker in Massachusetts
4 ☐ Placing bets on sporting events with an online sportsbook
5 ☐ Online fantasy sports

If you selected "Online fantasy sports," then go to Question 44. If you did NOT select "Online fantasy sports," then go to Question 51 on page 7.

44. **Do you play traditional fantasy sports (where results are determined at the end of the season) or daily fantasy sports (where results are determined on a daily or weekly basis)?**

1 ☐ Traditional fantasy sports → **GO TO 51 ON PAGE 7**
2 ☐ Daily fantasy sports
3 ☐ Both traditional and daily fantasy sports

45. **Which internet sites do you most often use to play daily fantasy sports?**
Check all that apply.

1 ☐ DraftKings
2 ☐ FanDuel
3 ☐ DraftDay
91 ☐ Other *(specify)*

46. **In the past 30 days, on the days that you played, how many hours on average did you spend on daily fantasy sports?**

☐☐

47. **In the past 30 days, what has your usual balance been in your daily fantasy sports account(s)?**

$ ☐,☐☐☐,☐☐☐

48. **In the past 30 days, how much have you deposited into your daily fantasy sports account(s)?**

$ ☐,☐☐☐,☐☐☐

49. **In the past 30 days, how much money have you cashed out from your daily fantasy sports account(s)?**

$ ☐,☐☐☐,☐☐☐

50. **Considering all the time you spend on all your gambling activities, what percentage of time involves playing daily fantasy sports?**

☐☐☐%

51. In the past 12 months, how often have you played *bingo* either in person or online? Would you say…?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 54**

52. Roughly how much money do you spend on bingo in a typical month?

– $ ☐, ☐☐☐, ☐☐☐

53. How and where do you play bingo? *Check all that apply.*

1 ☐ In person at a bingo hall in Massachusetts
2 ☐ In person at a bingo hall outside Massachusetts
3 ☐ At an online bingo site

54. In the past 12 months, how often have you spent money on *electronic gambling machines* (i.e., slot machines, video lottery terminals, electronic casino table games) either in person or online?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 56**

55. Roughly how much money do you spend on electronic gambling machines in a typical month?

– $ ☐, ☐☐☐, ☐☐☐

56. In the past 12 months how often have you bet money on any *casino table game* such as poker, blackjack, baccarat, roulette, craps, mah-jong, sic-bo, pai gow, either in person or online? *This does not include automated electronic versions of these games, which should be reported in the question about electronic gambling machines.*

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all

If you did not bet money on electronic gambling machines or casino table games in the past 12 months, please go to Question 68 on page 8. Otherwise continue to Question 58.

57. Roughly how much money do you spend on casino table games in a typical month?

– $ ☐, ☐☐☐, ☐☐☐

58. Where did you play these electronic gambling machines and/or casino table games? *Check all that apply.*

1 ☐ At the Plainridge Park Casino in Plainville, Massachusetts
2 ☐ At a land-based casino, slot parlor, slots at racetrack, or card room outside of Massachusetts
3 ☐ At an online casino or card/poker room
4 ☐ At an underground/illegal casino, slot parlor, or card room in Massachusetts
5 ☐ At a private residence

59. Roughly what percentage of your spending on electronic gambling machines and/or casino table games is done at each location? *The percentages should add up to 100%.*

1 ☐☐☐ % Plainridge Park Casino in Plainville, Massachusetts
2 ☐☐☐ % Land-based casino, slot parlor, slots at racetrack, or card room outside of Massachusetts
3 ☐☐☐ % Online casino or card/poker room
4 ☐☐☐ % Underground/illegal casinos, slot parlor, or card room in Massachusetts
5 ☐☐☐ % At a private residence

*At a land-based casino, slot parlor, slots at racetrack, or card room outside of Massachusetts" at Question 58, go to Question 60. If you did **NOT** select this option, go to Question 64.*

60. In the past 12 months, how many times have you played electronic gambling machines or casino table games at a casino, slots parlor, slots at racetrack, or card room outside of Massachusetts?

☐☐☐ number of times

61. Roughly how much money do you spend on *gambling* per visit in out of state casinos, slots parlors, slots at racetracks, and card rooms?

– $☐,☐☐☐,☐☐☐

62. Roughly how much money do you spend on *nongambling activities* (such as food, travel, lodging, entertainment) per visit in out of state casinos, slots parlors, slots at racetracks, and card rooms?

$☐☐,☐☐☐

63. Which specific casino or slots parlor do you most often go to?

1 ☐ Atlantic City Casino (NJ)
2 ☐ Nevada Casino
3 ☐ Empire City (Yonkers, NY)
4 ☐ Foxwood (Ledyard, CT)
5 ☐ Hollywood Slots (Bangor, ME)
6 ☐ Mohegan Sun (Uncasville, CT)
7 ☐ Monticello (Monticello, NY)
8 ☐ Newport Grand (Newport, RI)
9 ☐ Oxford Casino (Oxford, ME)
10 ☐ Resorts World (Queens, NY)
11 ☐ Saratoga Casino & Raceway (Saratoga, NY)
12 ☐ Turning Stone (Verona, NY)
13 ☐ Twin River (Lincoln, RI)
14 ☐ Vernon Downs (Vernon, NY)
91 ☐ Other

64. Do you have a casino player rewards card (e.g., Marquee Rewards)?

1 ☐ Yes
2 ☐ No → **GO TO 68**

65. Is this a rewards card for a Massachusetts casino?

1 ☐ Yes
2 ☐ No → **GO TO 68**

66. Have you used the Play Management system on your card (allowing you to put limits on your time and expenditure)?

1 ☐ Yes
2 ☐ No → **GO TO 68**

67. Have you found these features useful in managing your gambling?

1 ☐ Yes
2 ☐ No

68. In the past 12 months, how often have you bet on *horse racing* or *dog racing* either in person, by phone, or online? Would you say…?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 71**

69. Roughly how much money do you spend on horse or dog racing in a typical month?

– $☐,☐☐☐,☐☐☐

70. Where do you most often bet on horse or dog racing?

1 ☐ Suffolk Downs
2 ☐ Plainridge Racecourse
3 ☐ Raynham Park
4 ☐ Other Massachusetts racecourse (e.g., Brockton)
5 ☐ Online racebook
91 ☐ Other

71. In the past 12 months how often have you gambled or bet money on *other types of gambling* that have not yet been mentioned, such as betting on card games other than poker, blackjack, and baccarat; board games (e.g., chess, backgammon); television events; political events; video games; cock fighting; dog fights; financial indices betting on a gambling website (including spread betting); or anything else?

1 ☐ 4 or more times a week
2 ☐ 2-3 times a week
3 ☐ Once a week
4 ☐ 2-3 times a month
5 ☐ Once a month
6 ☐ Less than once a month
7 ☐ Not at all → **GO TO 75 ON PAGE 9**

72. **What are these other types of gambling you bet money on?** *Check all that apply.*
- 1 ☐ Non-casino card games
- 2 ☐ Board games
- 3 ☐ Television events
- 4 ☐ Political events
- 5 ☐ Video games
- 6 ☐ Cock fights
- 7 ☐ Dog fights
- 8 ☐ Financial indices betting
- 91 ☐ Other

73. **Did you make these bets in person or remotely via a computer, phone, television, or other device?** *Check all that apply.*
- 1 ☐ In person
- 2 ☐ Remotely via a computer, phone, television, or other device

74. **Roughly how much money do you spend on these other types of gambling in a typical month?**

☐ – $ ☐, ☐☐☐, ☐☐☐

75. **Do you personally manage most of your own *stock market* investments (i.e., make your own decisions and purchases of stocks, bonds, etc. independent of a financial advisor or fund manager)?**
- 1 ☐ Yes
- 2 ☐ No → **GO TO 78**
- 3 ☐ I have no stock market investments → **GO TO 78**

76. **In the past 12 months, which of the following financial products/activities have you purchased, sold, or engaged in?** *Check all that apply.*
- 1 ☐ Mutual funds
- 2 ☐ Bonds
- 3 ☐ Individual stocks
- 4 ☐ Penny stocks
- 5 ☐ Options
- 6 ☐ Futures
- 7 ☐ Other derivatives (e.g., Swaps)
- 8 ☐ Shorting stocks
- 9 ☐ Day trading

77. **What do you estimate your net loss or gain in a typical month is from your stock market activity?**

☐ – $ ☐, ☐☐☐, ☐☐☐

78. **To what extent do you agree with the statement: "wealth is a good measure of success in life"?**
- 1 ☐ Strongly agree
- 2 ☐ Agree
- 3 ☐ Neutral
- 4 ☐ Disagree
- 5 ☐ Strongly disagree

79. **How often do you use automatic teller machines at casinos, slot parlors, racetracks, or bingo halls?**
- 1 ☐ Never
- 2 ☐ Occasionally
- 3 ☐ Most times that I go

80. **In the past 12 months what was the largest amount of money you have won gambling in a single day?**
- 1 ☐ $0
- 2 ☐ +$1 to +$199
- 3 ☐ +$200 to +$499
- 4 ☐ +$500 to +$999
- 5 ☐ +$1000 to +$1999
- 6 ☐ +$2000 or more

81. **In the past 12 months what was the largest amount of money you have lost gambling in a single day?**
- 1 ☐ $0
- 2 ☐ -$1 to -$199
- 3 ☐ -$200 to -$499
- 4 ☐ -$500 to -$999
- 5 ☐ -$1000 to -$1999
- 6 ☐ -$2000 or more

Gambling Motivation

The following questions ask about your current gambling activities and the availability of gambling in your area.

82. **What would you say is the main reason that you gamble? Would you say…?**
- 1 ☐ For excitement/entertainment
- 2 ☐ To win money
- 3 ☐ To escape or distract yourself
- 4 ☐ To socialize with family or friends
- 5 ☐ To support worthy causes
- 6 ☐ Because it makes you feel good about yourself
- 91 ☐ Other

Gambling Recreation

83. How important is gambling to you as a recreational activity? Would you say...?

1 ☐ Very important
2 ☐ Somewhat important
3 ☐ Not very important
4 ☐ Not at all important

84. Has gambling replaced other recreational activities for you in the past year?

1 ☐ Yes
2 ☐ No → GO TO 86

85. Which recreational activities has gambling replaced?

Gambling Context

86. Do you typically gamble alone or with friends?

1 ☐ More often alone
2 ☐ More often with friends

87. How available are gambling opportunities at your workplace or school?

1 ☐ Not available
2 ☐ Somewhat available
3 ☐ Extensively available

88. How close is the nearest casino to you?

1 ☐ More than a 30 minute drive from either home, work, or school
2 ☐ A 16 to 30 minute drive from either home, work, or school
3 ☐ A 5 to 15 minute drive from either home, work, or school
4 ☐ Less than a 5 minute drive from either home, work, or school

Lifetime Gambling

89. At what age do you recall gambling for money for the first time?

90. Have any of your parents, brothers or sisters, or children ever been regular gamblers?

1 ☐ Yes
2 ☐ No → GO TO 92
3 ☐ Unsure

91. Have any of your parents, brothers or sisters, or children ever been problem gamblers (i.e., had difficulty controlling their gambling to the extent that it caused significant problems)?

1 ☐ Yes
2 ☐ No
3 ☐ Unsure

Gambling Fallacies

The next set of questions will ask your opinion about various gambling situations.

92. Which of the following set of lottery numbers has the greatest probability of being selected as the winning combination?

1 ☐ 1, 2, 3, 4, 5, 6
2 ☐ 8, 18, 3, 55, 32, 28
3 ☐ Each of the above have an equal probability of being selected

93. Which gives you the best chance of winning the jackpot on a slot machine?

1 ☐ Playing a slot machine that has not had a jackpot in over a month.
2 ☐ Playing a slot machine that had a jackpot an hour ago.
3 ☐ Your chances of winning the jackpot are the same on both machines.

94. How lucky are you? If 10 people's names were put into a hat and one name drawn for a prize, how likely is it that <u>your name</u> would be chosen?

1 ☐ About the same likelihood as everyone else
2 ☐ Less likely than other people
3 ☐ More likely than other people

95. If you were to buy a lottery ticket, which would be the best place to buy it from?

1 ☐ A place that has sold many previous winning tickets
2 ☐ A place that has sold few previous winning tickets
3 ☐ One place is as good as another

96. A positive attitude or doing good deeds increases your likelihood of winning money when gambling.

1 ☐ Disagree
2 ☐ Agree

97. A gambler goes to the casino and wins 75% of the time. How many times has he or she likely gone to the casino?

1 ☐ 4 times
2 ☐ 100 times
3 ☐ It is just as likely that he has gone either 4 or 100 times

98. You go to a casino with $100 hoping to double your money. Which strategy gives you the best chance of doing this?

1 ☐ Betting all your money on a single bet
2 ☐ Betting small amounts of money on several different bets
3 ☐ Either strategy gives you an equal chance of doubling your money

99. Which game can you consistently win money at if you use the right strategy?

1 ☐ Slot machines
2 ☐ Roulette
3 ☐ Bingo
4 ☐ None of the above

100. Your chances of winning a lottery are better if you are able to choose your own numbers.

1 ☐ Disagree
2 ☐ Agree

101. You have flipped a coin and correctly guessed 'heads' 5 times in a row. What are the odds that heads will come up on the next flip. Would you say…?

1 ☐ 50%
2 ☐ More than 50%
3 ☐ Or less than 50%

Prevention Awareness

Now we would like to ask you a few questions about media campaigns and gambling behaviors.

102. In the past 12 months have you seen or heard any media campaigns to prevent problem gambling in Massachusetts?

1 ☐ Yes
2 ☐ No

103. In the past 12 months have you been aware of any programs to prevent problem gambling (other than media campaigns) offered at your school, your place of work, in your community or elsewhere?

1 ☐ Yes
2 ☐ No

*If you selected "No" to both Question 102 **AND** Question 103, then go to Question 106.*

104. Did you participate in any of the problem gambling prevention programs that you heard of in the past 12 months?

1 ☐ Yes
2 ☐ No

105. Did any of these media campaigns or programs cause you to alter your own gambling behavior?

1 ☐ Yes
2 ☐ No

Gambling Problems - Others

106. What portion of your close friends and family members are regular gamblers? Would you say…?

1 ☐ None of them
2 ☐ Some of them
3 ☐ Most of them
4 ☐ All of them

107. During the last 12 months, has there been any person in your life that you consider gambles too much?

1 ☐ Yes
2 ☐ No → **GO TO 109 ON PAGE 12**

108. What is this person's relationship to you?

1 ☐ Spouse/partner
2 ☐ Parent/step parent
3 ☐ Child/step child
4 ☐ Other person (in your household)
5 ☐ Other family member (not living in your household)
6 ☐ Ex-partner
7 ☐ Work colleague
8 ☐ Friend
9 ☐ Neighbor
91 ☐ Someone else

Gambling Problems - Self

Please answer all of the following questions, even if you think they do not apply to you.

109. In the past 12 months, have you bet more than you could really afford to lose? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

110. In the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

111. In the past 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

112. In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

113. In the past 12 months, have you borrowed money or sold anything to get money to gamble? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

114. In the past 12 months, has your gambling caused any financial problems for you or your household? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

115. In the past 12 months, has your gambling caused you any health problems, including stress or anxiety? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

116. In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

117. In the past 12 months, have you felt that you might have a problem with gambling? Would you say…?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Most of the time
4 ☐ Almost always

118. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months?

1 ☐ Yes
2 ☐ No

119. Has your involvement in gambling caused significant problems in your relationship with your spouse/partner or important friends or family in the past 12 months?

1 ☐ Yes
2 ☐ No

120. In the past 12 months, has your involvement in gambling caused you to repeatedly neglect your children or family?

1 ☐ Yes
2 ☐ No

121. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time off work or school?

1 ☐ Yes
2 ☐ No

122. In the past 12 months, has your involvement in gambling caused you or someone close to you to write bad checks, take money that didn't belong to you or commit other illegal acts to support your gambling?

1 ☐ Yes
2 ☐ No

123. In the past 12 months, have you often gambled longer, with more money or more frequently than you intended to?

1 ☐ Yes
2 ☐ No

124. In the past 12 months, have you made attempts to either cut down, control or stop gambling?

1 ☐ Yes
2 ☐ No → **GO TO 126**

125. Were you successful in these attempts to cut down, control or stop gambling?

1 ☐ Yes
2 ☐ No

126. In the past 12 months, is there anyone else who would say that you had difficulty controlling your gambling, regardless of whether you agreed with them or not?

1 ☐ Yes
2 ☐ No

127. In the past 12 months, would you say you have been preoccupied with gambling?

1 ☐ Yes
2 ☐ No

128. In the past 12 months, when you did try cutting down or stopping did you find you were very restless or irritable or that you had strong cravings for it?

1 ☐ Yes
2 ☐ No

129. In the past 12 months, did you find you needed to gamble with larger and larger amounts of money to achieve the same level of excitement?

1 ☐ Yes
2 ☐ No

130. Are there particular types of gambling that have contributed to your problems more than others?

1 ☐ Yes
2 ☐ No → **GO TO 132**

131. Which types of gambling have contributed to your problems? *Check all that apply.*

1 ☐ Lottery
2 ☐ Instant ticket
3 ☐ Daily lotteries
4 ☐ Bingo
5 ☐ Slot machines or video lottery terminals
6 ☐ Casino table games (i.e., Blackjack, Baccarat, Roulette, Craps, etc.)
7 ☐ Poker
8 ☐ Horse racing or dog racing
9 ☐ Sports betting
10 ☐ Speculative high risk stocks, options, futures, or day trading
11 ☐ Online gambling
91 ☐ Other

132. Have you *wanted* help for gambling problems in the past 12 months?

1 ☐ Yes
2 ☐ No → **GO TO 136**

133. Have you *sought* help for gambling problems in the past 12 months?

1 ☐ Yes
2 ☐ No → **GO TO 136**

134. Where did you seek help from?
Check all that apply.

1 ☐ Friends or family
2 ☐ Gamesense Information Centre
3 ☐ Gamblers Anonymous
4 ☐ Gam Anon (This is a support group for friends/family of problem gamblers)
5 ☐ Family doctor
6 ☐ Private Psychologist/Psychiatrist/Counselor
7 ☐ Problem gambling treatment center/clinic
8 ☐ Pastor/Minister/Priest/etc.
9 ☐ Telephone help/hotline
10 ☐ Online help
91 ☐ Other

135. How helpful was this? Would you say…?

1 ☐ Very helpful
2 ☐ Somewhat helpful
3 ☐ Not very helpful
4 ☐ Not at all helpful

136. Have you excluded yourself from any casino or slots parlor in the past 12 months?

1 ☐ Yes
2 ☐ No → **GO TO 138 ON PAGE 14**

137. In which states have you excluded yourself?
Check all that apply.

1 ☐ Massachusetts
2 ☐ Connecticut
3 ☐ Rhode Island
4 ☐ New Jersey
5 ☐ New York
6 ☐ Pennsylvania
7 ☐ Maine
8 ☐ Nevada
91 ☐ Other

138. What would you say have been the main cause or causes of your gambling problems (provide as much detail as needed)?

139. Do you believe you are having fewer gambling problems than last year?

1 ☐ Yes
2 ☐ No → GO TO 141

140. What would you say is responsible for this improvement (provide as much detail as needed)?

If you would like information regarding treatment resources, please see page 19 for contact information.

Social Functioning

We would now like to switch focus and ask a few questions about family and social relationships.

141. How would you rate your current family relationships?

1 ☐ Excellent
2 ☐ Very good
3 ☐ Average
4 ☐ Below average
5 ☐ Poor

142. How would you rate your current marital relationship?

1 ☐ Excellent
2 ☐ Very good
3 ☐ Average
4 ☐ Below average
5 ☐ Poor
6 ☐ Not applicable

143. How would you rate your current level of social support?

1 ☐ Excellent
2 ☐ Very good
3 ☐ Average
4 ☐ Below average
5 ☐ Poor

144. How important is religion in your life?

1 ☐ Very important
2 ☐ Somewhat important
3 ☐ Not too important
4 ☐ Not at all important

145. Have you committed any illegal activities in the past year?

1 ☐ Yes
2 ☐ No

146. Do you have a criminal record?

1 ☐ Yes
2 ☐ No

Please rate the extent to which you agree or disagree with each of the following statements.

	Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly
147. Success is based on survival of the fittest; I am not concerned about the losers	1 ☐	2 ☐	3 ☐	4 ☐
148. For me, what's right is whatever I can get away with	1 ☐	2 ☐	3 ☐	4 ☐
149. In today's world, I feel justified in doing anything I can get away with to succeed	1 ☐	2 ☐	3 ☐	4 ☐
150. My main purpose in life is getting as many goodies as I can	1 ☐	2 ☐	3 ☐	4 ☐
151. Making a lot of money is my most important goal	1 ☐	2 ☐	3 ☐	4 ☐
152. I let others worry about higher values; my main concern is with the bottom line	1 ☐	2 ☐	3 ☐	4 ☐
153. People who are stupid enough to get ripped off usually deserve it	1 ☐	2 ☐	3 ☐	4 ☐
154. Looking out for myself is my top priority	1 ☐	2 ☐	3 ☐	4 ☐
155. I tell other people what they want to hear so that they will do what I want them to do	1 ☐	2 ☐	3 ☐	4 ☐
156. I would be upset if my success came at someone else's expense	1 ☐	2 ☐	3 ☐	4 ☐
157. I often admire a really clever scam	1 ☐	2 ☐	3 ☐	4 ☐
158. I make a point of trying not to hurt others in pursuit of my goals	1 ☐	2 ☐	3 ☐	4 ☐
159. I enjoy manipulating other people's feelings	1 ☐	2 ☐	3 ☐	4 ☐
160. I feel bad if my words or actions cause someone else to feel emotional pain	1 ☐	2 ☐	3 ☐	4 ☐
161. Even if I were trying very hard to sell something, I wouldn't lie about it	1 ☐	2 ☐	3 ☐	4 ☐
162. Cheating is not justified because it is unfair to others	1 ☐	2 ☐	3 ☐	4 ☐

Demographics

The last few questions are about your background so we can keep track of the characteristics of people who respond to the survey.

163. Are you male or female?

1 ☐ Male
2 ☐ Female

164. In what year were you born?

☐☐☐☐ Year

165. At present are you…?

1 ☐ Married
2 ☐ Living with your partner
3 ☐ Separated, but still legally married
4 ☐ Divorced
5 ☐ Widowed
6 ☐ Never been married

166. How many children under 18 years old live in your household?

☐☐ Number of children

167. What is the highest degree or level of school you have completed?

1 ☐ Never attended school or only attended kindergarten
2 ☐ Grades 1 through 8
3 ☐ Grades 9 through 11
4 ☐ Regular High School Diploma or GED
5 ☐ Some college credit, but less than 1 year of college credit
6 ☐ 1 or more years of college credit, but no degree
7 ☐ Associate Degree
8 ☐ Bachelor's Degree
9 ☐ Master's Degree
10 ☐ Professional Degree beyond a Bachelor's Degree
11 ☐ Doctorate Degree

168. Are you currently…?

1 ☐ Employed for wages
2 ☐ Self- employed
3 ☐ Out of work for more than 1 year
4 ☐ Out of work for less than 1 year
5 ☐ A Homemaker
6 ☐ A Student
7 ☐ Retired
8 ☐ Unable to work

169. Have you ever served on active duty in the U.S. Armed Forces, military Reserves, or National Guard? Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War.

1 ☐ Yes, now on active duty
2 ☐ Yes, on active duty in the past, but not during the last 12 months
3 ☐ No, training for Reserves or National Guard only
4 ☐ No, never served in the military

170. Do you own the place where you currently live, pay rent or something else?

1 ☐ Own
2 ☐ Rent
3 ☐ Something else

171. Is your approximate annual household income from all sources…?

1 ☐ Less than $15,000
2 ☐ $15,000 - $29,999
3 ☐ $30,000 - $49,999
4 ☐ $50,000 - $69,999
5 ☐ $70,000 - $99,999
6 ☐ $100,000 - $124,999
7 ☐ $125,000 - $149,999
8 ☐ $150,000 or more

172. What do you estimate your current debt to be? Please include mortgages, credit cards, loans, car payments, etc.

1 ☐ $0 (no debt)
2 ☐ Less than $10,000
3 ☐ $10,000 - $19,999
4 ☐ $20,000 - $39,999
5 ☐ $40,000 - $59,999
6 ☐ $60,000 - $79,999
7 ☐ $80,000 - $99,999
8 ☐ $100,000 - $119,999
9 ☐ $120,000 - $139,999
10 ☐ $140,000 - $159,999
11 ☐ $160,000 - $179,999
12 ☐ $180,000 - $199,999
13 ☐ $200,000 - $299,999
14 ☐ $300,000 - $399,999
15 ☐ $400,000 - $499,999
16 ☐ $500,000 or more

173. Were you born in the United States?

1 ☐ Yes
2 ☐ No

174. Many people only live in Massachusetts for part of the year. Do you live in Massachusetts for 6 or more months out of the year? *If you recently moved to Massachusetts and plan on staying for 6 months or longer, mark yes. If you are planning on moving out of Massachusetts but have lived there for at least 6 months in 2015, mark yes.*

1 ☐ Yes
2 ☐ No

175. Are you Hispanic or Latino?

1 ☐ Yes
2 ☐ No

176. Which one or more of the following would you say is your race? *Check all that apply.*

1 ☐ White or Caucasian
2 ☐ Black or African American
3 ☐ Asian
4 ☐ Native Hawaiian or Other Pacific Islander
5 ☐ Native American or Alaskan Native
91 ☐ Some other race

177. How many members of your household, including yourself, are 18 years of age or older?

☐☐ Number of adults (18 or older)

178. Do you have an internet connection either at home or at work?

1 ☐ Yes
2 ☐ No

179. Overall, how often do you use the Internet?

1 ☐ Daily
2 ☐ A few times a week
3 ☐ A few times a month
4 ☐ A few times a year
5 ☐ Not at all

Because we are interested in how opinions change over time, you may be re-contacted in the future to participate in related studies. If you are contacted to participate in future surveys, you have the right to refuse. To document who completed the survey from your household, please provide any edits to your name, email and phone number.

180. First Name:

181. Last Name:

182. What is the best phone number to reach you if we have more questions about your household? *This number will only be used to contact you about this study. We are prohibited from sharing, distributing, or selling your information to anyone outside this project.*

(☐☐☐)☐☐☐–☐☐☐

183. Please enter your email address.

You have reached the end of the survey. You will be re-contacted again each year about this same time to retake the survey. If any of your contact information changes in the next year please contact NORC via email or by phone at MAHealth@norc.org or 866-900-9601. It is also possible you may be re-contacted to participate in related studies. If you are contacted to participate in any future surveys, you have the right to refuse. I'd like to thank you on behalf of the University of Massachusetts for the time and effort you've spent answering these questions. If you have any questions about this survey, you may contact Dr. Rachel Volberg at 413-545-6700.

Thank you again.

If you would like information regarding treatment resources, please contact:

Massachusetts Substance Abuse Information and Education Helpline
800-327-5050
TTY: 617-536-5872

Drug & Alcohol Treatment Hotline
800-662-HELP

National Alliance on Mental Illness
1-800-950-6264

Samaritans
877-870-4673

National Suicide Prevention Lifeline
1-800-273-8255
1-800-799-4889

To help us contact you, please provide any edits to the names and contact information you previously provided for 3 people who are likely to know where you can be reached. *Please do not include someone who lives in your household.*

Contact #1
Name

Address

Phone

Email

Contact #2
Name

Address

Phone

Email

Contact #3
Name

Address

Phone

Email

Please return your completed questionnaire using the enclosed pre-paid envelope to:

University of Massachusetts Amherst
C/O NORC at the University of Chicago
55 East Monroe Street, 16th Floor
Chicago, IL 60603

If you have misplaced the pre-paid envelope, please call 1-866-900-9601 for a new one.

NORC at the University of Chicago is conducting this study on behalf of the University of Massachusetts Amherst. If you have questions or would prefer to complete the survey by phone, please call NORC toll-free at 1-866-900-9601.

If you have questions about your rights as a study participant, you may call the NORC Institutional Review Board toll-free, at 1-866-309-0542.

If you would prefer to complete this survey online, please go to: https://MACohort.norc.org/go/MAGIC.

Your unique survey Personal Identification Number (PIN) is: XXXXX.

OFFICE USE ONLY							
Receipt		CADE		Verification		Adjudication	
Initials	Date	Initials	Date	Initials	Date	Initials	Date