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Measuring the Lifetime Costs of Serious Mental Illness and the Mitigating Effects of Educational Attainment

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Abstract

Serious mental illness (SMI) is a disabling condition that develops early in life and imposes substantial economic burden. There is a growing belief that early intervention for SMI has lifelong benefits for patients. However, assessing the cost-effectiveness of early intervention efforts is hampered by a lack of evidence on the long-term benefits. We address this by estimating the lifetime burden of SMI for those diagnosed by age 25 using a dynamic microsimulation model. We estimate that the per-patient lifetime burden of SMI is \$1.85 million dollars. We also find that a policy intervention focused on improving the educational attainment of SMI patients reduces the average per-person burden of SMI by \$73,600 (4.0%), driven primarily by higher lifetime earnings, totaling over \$8.9 billion in reduced burden per cohort of SMI patients. These findings provide a benchmark for the potential value of improving educational attainment for SMI patients.

Introduction

Serious mental illness (SMI), collectively made up of psychoses, major depressive disorder and bipolar disorder, is one of the most disabling health conditions. The estimated per patient economic burden for SMI is high compared to other health conditions like cancer and diabetes.(1) Moreover, the lifetime patient burden is augmented by the comparatively young

age of onset, with the median age of diagnosis ranging from 15–30 years.(2, 3) Consequently, SMI can affect all parts of a person's life, impacting healthcare costs, educational attainment, work productivity, employment status and life expectancy. Previous reports show that SMI is associated with a median of 10 years of potential life lost, with estimates ranging as high as 30+ years lost,(4) and \$16,000 (2002 US\$) in reduced earnings annually.(5) Also, patients with SMI experience higher academic dropout rates at,(6) and educational attainment is lower than the general population.(6)

There has been a growing emphasis placed on the early identification, diagnosis and treatment of SMI.(7) Experimental treatment strategies incorporate interdisciplinary, patient-centered interventions early on to address comorbidities (e.g. substance use disorders), and personal issues that can impede improvement of SMI symptomology (e.g. housing, relationships, education, employment).(7) Clinical trials have shown the benefit of early interventions in improving health, education, employment and other outcomes.(8, 9) For example, early intervention via illness and medication management, family psychoeducation, and education/employment support (Navigate) in the “Recovery After an Initial Schizophrenia Episode - Early Treatment Program” (RAISE-ETP) improved quality of life and reduced depression symptoms, with larger effects in patients with shorter duration of untreated psychosis.(8) Early interventions increased academic enrollment, course completion and employment measures in patients with SMI,(10–12) and adolescents in general.(13) Educational attainment may also be increased by interventions that delay the onset of mental disorders and thereby increase the opportunity for a person to obtain a degree.(14)

Based on these findings, intervention strategies that result in higher educational attainment or increased employment could improve quality of life and reduce lifetime burden of SMI patients, and are being actively explored by policymakers in the U.S.(15) Despite these efforts, implementation of effective early interventions may be hindered by limited evidence of long-term return on investment, as program evaluations generally do not assess intervention benefits across a patient's lifespan.(16) This lack of evidence makes it impossible to fully assess the long-term cost-effectiveness of early interventions for SMI. We attempt to fill that gap by providing new data on the lifetime benefits of improving educational and/or employment outcomes for individuals who experience SMI early in life. Specifically, we use a microsimulation model to project the impact of successfully increasing educational attainment for individuals with SMI diagnosed before age 25 on health and economic outcomes.

Methods

We simulate the lifetime outcomes of individuals with and without SMI using the Future Americans Model (FAM), a dynamic microsimulation model that uses longitudinal data on Americans 25 years and older to project health, medical spending, social service utilization, and economic outcomes over time. The FAM, like its precursor the Future Elderly Model (FEM), constructs estimates based on the trajectories of individual health and economic outcomes rather than on average cohort-level characteristics. This allows for more accurate estimations based on subgroup analyses and spillover effects between different individual

characteristics. The FAM and FEM have been used to measure the economic burden of health conditions such as cancer, diabetes, obesity, and other conditions, and to simulate the long-term effects of scenarios such as delayed aging, reduced disability rates, medical innovation and an early childhood intervention.(17–20)

Future Americans Model

Here we briefly sketch the data and methods used in the FAM, with considerably more detail available in Supplementary Appendix C. To access the Appendix, click on the Appendix link in the box to the right of the article online. The FAM combines data from several large, nationally representative surveys: the Panel Study of Income Dynamics (PSID), the Health and Retirement Survey (HRS), the Medical Expenditure Panel Survey (MEPS) and the Medicare Current Beneficiary Survey (MCBS). The PSID and HRS are both longitudinal surveys tracking individuals over time. The FAM uses the PSID to track individuals from age 25 and uses the HRS to track individuals with identical characteristics from age 51+. The MEPS provides information on healthcare spending. These data are used to estimate transitions between health states, project health-care spending, and assess quality of life for the simulations.

We use the FAM to conduct cohort simulations following a representative cohort of Americans age 25+ until death under different scenarios, comparing individuals with a self-reported diagnosis of SMI prior to age 25 to those without a diagnosis of SMI by age 25 (including those diagnosed later in life). First, the FAM calculates transition probabilities for specified health states, including chronic disease incidence, functional status, body mass index (BMI), and mortality. Transition probabilities are modeled as first-order Markov processes, with probabilities based on predicted values from probit regressions (predictors include: age, sex, education, race, health conditions, BMI and functional status). The health conditions are derived from PSID survey questions, with chronic health conditions treated as absorbing states (i.e., once individuals report being diagnosed they are considered to have that condition until death). This approach is consistent with the PSID and HRS study questionnaires, which ask whether respondents were *ever* diagnosed with a condition rather than whether they currently have it.

For this project, we incorporate questions in the PSID about mental illness. Specifically, we identify a person as having SMI if they report having been diagnosed with psychosis, bipolar disorder or depression before age 25. Because major depressive disorder is not specified, we include individuals only if they report depression with another, co-morbid mental health condition (e.g., anxiety disorder) to focus on more severe cases. This is consistent with prior research showing that self-reports of depression in conjunction with other mental health conditions are reliable proxies for major depressive disorder.(21, 22) Appendix Table A3 shows that this approach yields a conservative estimate of the burden of SMI. To access the Appendix, click on the Appendix link in the box to the right of the article online. To focus on early onset cases, we compare those who were diagnosed with SMI by age 25 to those who were not.

While chronic conditions, including SMI, are considered absorbing states, we allow for transitions in terms of functional status and BMI. Functional status is measured by

limitations to activities of daily living, and we consider individuals disabled if they report at least one limitation or live in a nursing home. Given the focus on SMI we also incorporated the score on the Kessler Psychological Distress (K6) scale, a validated population screening tool for mental health problems administered in the PSID.(23) The PSID reports the K6 score based on an assessment of the previous 30 days; we allow the K6 to vary over time to capture variability in SMI symptoms.

We next project individual healthcare spending and economic outcomes based on health transitions, functional status, BMI, K6 score and demographics. In this stage we use the MEPS to provide complementary data on medical spending. Economic outcomes include employment status, total annual earnings, and disability claims for Social Security Disability Insurance (SSDI) or Supplemental Security Income (SSI). These are estimated by regressing spending on risk factors, health and functional status (dollar values are reported in 2017 dollars, with future dollars discounted using a 3% rate). We predict quality-adjusted life-years using the EQ-5D, a quality-of-life index estimated from MEPS based on five variables indicating mobility, daily activities, self-care, anxiety, depression, and pain. Specifically, we use regression to predict EQ-5D scores as a function of the health conditions and functional status.

Simulation Scenarios

We simulate outcomes for those with and without a diagnosis of SMI by age 25, and make these comparisons under two scenarios. The first is the status quo, which provides an estimate of the current lifetime burden of SMI across a wide range of outcomes. Further, we compare outcomes for those with and without SMI according to educational attainment, to demonstrate whether education has a protective effect on the adverse lifetime outcomes for patients with SMI. While the PSID provides detailed information on years of education, which we employ in our simulation model, we report three categories of educational attainment for ease of interpretation: less than high school, high school graduate but not college, and some college or a college degree.

The second scenario, or the improved education scenario, simulates the effect of extending the RAISE-ETP trial to all patients with onset of SMI before age 25. We extrapolate from the RAISE results—which found a 5.9 percentage point increase in school participation at 12 months and an 8.3 percentage point increase after 24 months for patients at treatment sites compared to control sites—to estimate the impact of increasing years of education for individuals with SMI.(10) Consistent with these results, in the model we implement the intervention by increasing baseline years of education for patients with SMI before age 25 by 1 year; we cap the improvement in education at a college degree. Supplementary Appendix B provides a detailed description of the implementation of the intervention. To access the Appendix, click on the Appendix link in the box to the right of the article online.

Details of RAISE-ETP

The RAISE-ETP intervention was a large, randomized control trial that focused on intervening with relatively young patients (ages 15–40) in real-world treatment settings and measured improvements in mainstream education and competitive employment. Treatment

sites in RAISE-ETP provided a range of services at existing community clinics including family education, resiliency training, supported employment and education, and individualized medication treatment plans.(24) In addition, the RAISE-ETP trial did not dictate a specific intervention, but provided a manual for guidance for patients and providers to develop individualized treatment plans and goals. Among the treatments used to improve educational outcomes were enrollment assistance, consultations to discuss accommodations, teaching study skills, and ongoing performance meetings with teachers.(25) Given the flexible, cost-conscious nature of the intervention, assessing the lifetime impact of such a scenario provides important insight into the value of intervening to reduce the burden of SMI.

We also conduct additional scenarios simulating improved workforce participation of individuals based on RAISE-ETP (described in Supplementary Appendix B; to access the Appendix, click on the Appendix link in the box to the right of the article online). This includes an improved employment scenario which increases baseline earnings for patients consistent with RAISE-ETP, as well as a combined improved employment and education scenario applying the estimated effects of both the supported employment and education interventions.

Limitations

Our study has several limitations. Some limitations are inherent to all microsimulation models, which rely on multiple datasets and estimation techniques that are subject to potential error, but which nonetheless are widely used and have been validated extensively. Also, while we model our intervention on the findings of a real-world experiment, it is still hypothetical. The findings of RAISE-ETP, which was focused on first-episode psychosis, may not generalize to the full cohort of patients with SMI by age 25. Nevertheless, we interpret our scenario as providing a plausible estimate of the effect of a comprehensive, community-based intervention targeting educational attainment for SMI patients.

Another limitation is that we rely on individual self-reports of an SMI diagnosis by age 25, which could be subject to bias. Also, the PSID data are designed such that individuals are only sampled if/when they form a household, meaning that we miss cases of SMI that are so severe early on that they prevent individuals from ever forming a household. We also do not capture incarceration, homelessness or institutionalization like long-term hospitalization associated with SMI. In Supplementary Appendix D, we benchmark our SMI prevalence numbers to the existing literature and provide a detailed accounting of the populations we might miss due to PSID survey design. To access the Appendix, click on the Appendix link in the box to the right of the article online. All of this suggests that the economic burden numbers we estimate, large as they are, are likely conservative as there are elements of societal costs that we fail to capture. Despite these limitations, we believe that our findings provide a benchmark for the costs suffered by those with SMI and the potential gains from successfully improving their educational attainment.

Results

In a single year of the data for our simulation, approximately 6.2% of individuals report having ever been diagnosed with SMI; 2.7 % were ever diagnosed before age 25. Of those individuals with SMI by age 25, 11.9% were diagnosed with psychosis, 55.1% with bipolar disorder and 66.6% with major depression. Those with an SMI diagnosis by age 25 have lower educational attainment. About 23.4% of individuals with SMI before 25 have less than a high school degree, 55.0% have only a high school degree and 21.7% have some college, compared to 11.3%, 53.7% and 35.1%, respectively, for those who never develop SMI. Those with SMI are also more likely to be female, white and have more restrictions to activities of daily living (see Appendix Table A1 for the full set of sample characteristics; to access the Appendix, click on the Appendix link in the box to the right of the article online.).

Based on our simulations, SMI substantially worsens lifetime health outcomes, raises lifetime medical costs, and reduces lifetime economic outcomes. Table 1 shows that average life expectancy from age 25 in the cohort with SMI is 45.7 years, 10.4 years (19%) lower than in the cohort without SMI by age 25. Similarly, disability free life years and quality adjusted life years are 51% and 24% lower, respectively. Total lifetime medical spending is \$96,500 (24%) higher in the cohort with SMI, even though SMI patients are much more likely to be on Medicaid or uninsured. The impact on labor earnings is especially pronounced, with the cohort with SMI earning \$537,100 (48%) less per person on average, and 13.2 (55%) fewer years of full-time work. Not surprisingly, this corresponds to more than a 500% and 809% increase in lifetime benefit payments from SSDI and SSI.

The association between SMI and average outcomes is not uniform across all individuals with a diagnosis, and varies according to educational attainment as shown in Table 2. In most cases, outcomes are improved with higher educational attainment for those with or without SMI. Life expectancy, quality of life, earnings and employment are higher, and SSDI and SSI payments are lower, for those with some college compared to those without a high school diploma in both cohorts. The one exception is medical spending, which increases in education for both cohorts, likely as a result of improved life expectancy. Similarly, the effect of SMI varies by sex. As shown in Appendix Table A2, women diagnosed with SMI before age 25 face a higher relative and absolute burden than do men. To access the Appendix, click on the Appendix link in the box to the right of the article online.

While outcomes for those in the SMI cohort are better with more education, individuals with SMI by age 25 still lag behind similarly-educated individuals without an early SMI diagnosis. Life expectancy, disability and quality of life for someone with SMI by age 25 who has some college or a college degree are most comparable to someone in the no-SMI cohort without a high school diploma. A person in the SMI cohort without a high school diploma has by far the worst outcomes on average: just 38.6 years of life expectancy after age 25, \$471,500 in lifetime medical costs, just \$192,900 in lifetime earnings and 4.7 years of full-time work. The partial mediating effect of educational attainment on the burden of SMI raises the question of how much of the burden can be mitigated by improving educational attainment for those with SMI.

Table 3 reports the change in expected outcomes for individuals with early-onset SMI under the improved education scenario. The first panel reports the average, cohort-level effects spread across the early-onset SMI population. The second panel report changes to average outcomes for the SMI population under the improved education scenario. Life expectancy, disability-free life years and quality-adjusted life years increase by 0.7%, 1.9% and 0.8% overall. Under the improved education scenario, there is a small increase in medical spending (0.2%), but lifetime earnings increase by 7.0% and SSDI and SSI payments decrease by 1.7% and 13.5%, respectively. These effects reflect average increases across all early-onset SMI patients. Under the Improved Education Scenario, only 12.8 percent had improved degree attainment (e.g. going from some college to a college degree). As a result, the magnitude of these improvements in outcomes is much higher among those patients “treated” by the Improved Education Scenario than among the full SMI by age 25 cohort.

Table 4 reports the total, per-person lifetime economic burden of early-onset SMI based on the status quo and under the Improved Education Scenario. We estimate that early-onset SMI imposes \$1,852,800 in total economic burden per individual. The largest component of burden comes from the value of QALYs lost, which accounts for \$1,160,000 per person (about 63% of the total burden) followed by lost earnings (29%). The direct cost of medical spending is relatively low, accounting for 5% of burden. Across the entire SMI by age 25 cohort, the average per person burden falls by \$73,600 (4.0%) under the Improved Education Scenario.

Discussion

There is growing emphasis on early identification and treatment of patients with mental illness in the US, with the hopes that intervention could put people on better lifetime trajectories and improve their future prospects. However, efforts to implement these programs on a wider scale have been hampered by a lack of clear evidence on their value or long-term cost-effectiveness. In this study, we simulate differences in life expectancy, quality of life, medical spending and economic outcomes for a representative cohort of individuals from age 25 through death according to whether or not they had a diagnosis of SMI by age 25. We find that early-onset SMI is associated with substantially worse lifetime outcomes, including 10 fewer quality-adjusted life years, 24% higher medical spending and 48% lower earnings. All told these worse outcomes lead to more than \$1.85 million per patient in lifetime economic burden.

To put these findings in perspective, data from the US Census Bureau suggests that the cohort of 25 year-olds in the US in 2017 included approximately 4.5 million people, about 2.7% of which would be expected to have ever had an SMI diagnosis based on our data. This suggests that the entire cohort of new patients can be expected to experience about \$225 billion in economic burden over the course of their lives. Note that the bulk of this estimate comes from valuing reductions in QALYs. While this provides a straightforward method for calculating a total burden, it should be noted that as a result, society may not be able to fully recoup the burden of SMI in the same way that it could directly recoup reduced spending on SSI and SSDI.

While improving educational attainment of individuals with SMI has clear economic benefits, such an intervention is costly. The RAISE-ETP trial was estimated to cost approximately \$34,224 for 24 months of treatment compared to \$26,876 for 24 months of status quo community care.(26) These costs include not only the provision of supported education and employment, but also medications, health care utilization, and staff training. Our findings indicate that there is a reduction in lifetime per-person burden of SMI of \$73,600 associated with the educational outcomes of the RAISE-ETP trial; aggregated to the cohort of current 25-year-olds with likely SMI those savings total \$8.9 billion. Providing a similar, two-year intervention to the full cohort would cost approximately \$4.2 billion, more than a two-to-one return on investment. Assuming even a fraction of these patients are already accessing mental health services, that could be an overestimate of the cohort-level cost. Conversely, an important feature of the RAISE-ETP trial was that it relied on existing community sources of care to limit costs. Scaling up to the population level would probably require additional resources.

We also show that a significant fraction of economic burden, particularly the lost economic productivity, is associated with worse educational attainment for those with SMI. While improving education does not appear to be sufficient to eliminate the economic burden of SMI, we find that it at least alleviates the burden. Simulating the potential benefits of an improved education scenario consistent with the measured effects of existing interventions, we find improved outcomes for SMI patients, including an average increase in QALYs of 0.8% and a 7.0% increase in lifetime earnings. At the cohort level, this was associated with a decrease in the average per-person economic burden of \$73,600 (4.0%).

Policy Implications

These findings highlight both the opportunities and challenges in introducing new intervention strategies to improve outcomes for those with SMI. The opportunities are clear; based on the numbers above, each new cohort of SMI patients experiences nearly a quarter of a trillion dollars in economic burden, and our hypothetical improvement in educational attainment would reduce that by over \$8.9 billion. However, these gains would be diffuse across different agents and spread across many years, suggesting that the economic case may not be realized without public investment or subsidy.

Conclusion

The burden of early-onset SMI is large, but improved educational outcomes can greatly reduce that burden. Relatively low-cost interventions focused on helping these individuals enroll in school, obtain appropriate accommodations from teachers and administrators, and provide ongoing meetings between students with SMI and their teachers can have large impacts on school participation. However, many assessments of these programs focus on outcomes that are not easily translated to existing nationally-representative surveys to estimate their broad or long-term effects. Future interventions and evaluations should consider using clearly defined and objective outcome measures like education that can be linked to publicly available data sources to help facilitate measuring their economic value.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1.

Lifetime Health and Economic Outcomes According to the Presence of SMI by Age 25

	No SMI by Age 25	SMI by Age 25	Difference (%)
Lifetime outcomes from age 25			
Life Expectancy, Years	56.1	45.7	−10.4 (−19%)
Disability Free Life Years	42.3	20.6	−21.7 (−51%)
Quality Adjusted Life Years	47.6	36.0	−11.6 (−24%)
Total Medical Spending, 2017 US Dollars (1,000s)	399.3	495.9	96.5 (+24%)
Lifetime Earnings, 2017 US Dollars (1,000s)	1122.3	585.2	−537.1 (−48%)
Years Worked	32.6	17.8	−14.8 (−45%)
Full-time Years Worked	23.8	10.6	−13.2 (−55%)
Lifetime SSDI Income, 2017 US Dollars (1,000s)	7.8	46.6	38.8 (+500%)
Lifetime SSI Income, 2017 US Dollars (1,000s)	2.5	22.9	20.3 (+809%)

SOURCE: Authors' analysis of data from the Panel Study of Income Dynamics, Health and Retirement Survey, Medical Expenditure Panel Survey, and Medicare Current Beneficiary Survey

NOTES: Table reports expected outcomes from age 25 until death based on simulations from the Future Americans Model. The first column reports results from those that do not have SMI by age 25, while the second reports results for those with a diagnosis of psychosis, bipolar or major depression by age 25.

Table 2.

Simulated Lifetime Health and Economic Outcomes for Those with and without SMI According to Educational Attainment

	Less than High School	High School Education	More than High School
Lifetime outcomes from age 25			
<i>A. No SMI</i>			
Life Expectancy, Years	49.6	54.8	60.1
Disability Free Life Years	33.4	40.2	47.9
Quality Adjusted Life Years	40.9	46.1	51.8
Total Medical Spending, 2017 US Dollars (1,000s)	344.9	383.8	441.7
Lifetime Earnings, 2017 US Dollars (1,000s)	500.3	907.0	1,639.7
Years Worked	24.0	31.7	36.4
Full-time Years Worked	16.1	23.1	27.0
Lifetime SSDI Income, 2017 US Dollars (1,000s)	16.1	9.0	3.4
Lifetime SSI Income, 2017 US Dollars (1,000s)	9.8	2.5	0.6
<i>B. Has SMI</i>			
Life Expectancy, Years	38.6	44.7	49.4
Disability Free Life Years	12.4	19.1	24.6
Quality Adjusted Life Years	28.6	34.9	39.7
Total Medical Spending, 2017 US Dollars (1,000s)	471.5	478.8	535.4
Lifetime Earnings, 2017 US Dollars (1,000s)	192.9	491.3	954.0
Years Worked	9.1	17.6	23.0
Full-time Years Worked	4.7	10.5	13.9
Lifetime SSDI Income, 2017 US Dollars (1,000s)	71.8	50.7	28.8
Lifetime SSI Income, 2017 US Dollars (1,000s)	49.1	22.6	5.0

SOURCE: Authors' analysis of data from the Panel Study of Income Dynamics, Health and Retirement Survey, Medical Expenditure Panel Survey, and Medicare Current Beneficiary Survey

NOTES: Table reports expected outcomes from age 25 until death based on simulations from the Future Americans Model. Panel A reports results from simulations of those that do not experience SMI before age 25, while Panel B reports results for those with a diagnosis of psychosis, bipolar or major depression by age 25. In both panels, results are reported separately for the subpopulations who leave high school without a diploma, those with a high school diploma but no college or those with some college or a college degree.

Table 3.**Lifetime Outcomes under Improved Education Scenario**

Population with SMI before Age 25		
Average Effect on the Full Cohort of SMI Patients		
	Status Quo	Change After Improved Education Scenario (%)
Life Expectancy, Years	45.7	0.3 (0.7%)
Disability Free Life Years	20.6	0.4 (1.9%)
Quality Adjusted Life Years	36.0	0.3 (0.8%)
Total Medical Spending, 2017 US Dollars (1,000s)	495.9	1.1 (0.2%)
Lifetime Earnings, 2017 US Dollars (1,000s)	585.2	40.9 (7.0%)
Years Worked	17.8	0.7 (3.9%)
Full-time Years Worked	10.6	0.5 (4.7%)
Lifetime SSDI Income, 2017 US Dollars (1,000s)	46.6	−0.8 (−1.7%)
Lifetime SSI Income, 2017 US Dollars (1,000s)	22.9	−3.1 (−13.5%)

SOURCE: Authors' analysis of data from the Panel Study of Income Dynamics, Health and Retirement Survey, Medical Expenditure Panel Survey, and Medicare Current Beneficiary Survey

NOTES: Table reports expected outcomes from age 25 until death based on simulations from the Future Americans Model. The first panel reports the baseline outcomes for the full cohort of SMI patients prior to a scenario that improves the educational attainment of SMI patients consistent with the results of the RAISE-ETP trial (resulting in about 11% of SMI patients with improved education). The second panel reports the change in outcomes after the implementation of that improved education scenario.

Table 4.**Lifetime, Per-Person Burden of SMI by Source**

Average Cost of SMI for Population with SMI before Age 25		
	Status Quo	Improved Education Scenario
Total Incremental Lifetime Cost of SMI from Age 25, 2017 US Dollars (1,000s)		
Incremental Medical Spending	96.5	97.7
Incremental SSDI costs	38.8	38.0
Incremental SSI costs	20.3	17.3
Lost Earnings	537.1	496.2
Value of Quality-Adjusted Life Years Lost ^a	1,160.0	1,130.0
Total Lifetime Cost	1,852.8	1,779.2
Per-person Reduction in SMI Burden (%)		73.6 (4.0%)

^aBased on a value of \$100,000 per QALY lost.

SOURCE: Authors' analysis of data from the Panel Study of Income Dynamics, Health and Retirement Survey, Medical Expenditure Panel Survey, and Medicare Current Beneficiary Survey

NOTES: Table reports the expected total cost of SMI from age 25 through death in thousands of year 2017 US Dollars, based on simulations from the Future Americans Model. Costs represent the estimated difference in expected outcome for a person with the same observable characteristics with or without a diagnosis of SMI by age 25. The first column reports the expected outcomes for the full population of SMI patients under the status quo, the second column reports the expected outcomes after the improved education scenario for the full SMI cohort.