



# Payoffs for California College Students and Taxpayers from Investing in Student Mental Health

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There is significant unmet need for mental health services among college and university students in the United States (Blanco et al., 2008; Gallagher and Gill, 2008; Lipson et al., 2015). Roughly one-fifth to one-third of all undergraduates experience a mental health problem (Eisenberg et al., 2011; Sontag-Padilla et al., 2014; Lipson et al., 2015). Young adulthood is the most common age for students to enter an institution of higher learning, but this is also the time when many mental disorders are first diagnosed (Kessler et al., 2005; Merikangas et al., 2010). Mental health disorders are associated with a range of negative educational outcomes, from lower grades to delayed graduation to dropping out (Kessler et al., 1995; Eisenberg, Golberstein, and Hunt, 2009; Arria et al., 2013; Sontag-Padilla et al., 2014). These negative outcomes can have repercussions throughout the remainder of students' lives in terms of longer-term mental health–related consequences, as well as lifetime earnings (Wang et al., 2007; Eisenberg et al., 2011). Identifying and effectively treating mental health disorders can help students achieve better outcomes in school and beyond; yet only 20 percent to 40 percent of students who experience a mental health disorder seek treatment while in college, and this rate is even lower among students in public institutions (Blanco et al., 2008; Eisenberg, Golberstein, and Hunt, 2009; Lipson et al., 2015).

Students in community colleges may face the greatest risk of not receiving treatment for mental health disorders (Katz and Davison, 2014). Prior research by RAND indicates that students at California community colleges (CCCs) are more likely to report academic impairment due to mental health problems, but less likely to receive treatment for these problems than their counterparts at University of California (UC) and California State University (CSU) schools (Sontag-Padilla et al., 2014). Community college students generally do not live on campus and are more likely to be enrolled on a part-time basis, both of which reduce

opportunities for being identified as at-risk students. In addition, community colleges often have fewer on-campus mental health resources than other higher-education institutions (Gallagher and Taylor, 2013; Sontag-Padilla et al., 2014).

Addressing the mental health needs of higher-education students in California was one of three objectives of the state-

## Key Findings

- The percentage of students in California's public universities and community colleges who were receiving treatment for mental health issues increased 13 percent during the final year of CalMHSA's investment in prevention and early intervention programs.
- We predict that the increase in students receiving treatment will lead to an additional 329 students graduating due to receiving mental health treatment.
- Based on a benefit-cost analysis, the societal benefit of the increase in treatment and the corresponding decrease in dropouts is estimated to be as high as \$56 million for each year of CalMHSA's investment in prevention and early intervention programs, a result of expected increased lifetime earnings for additional graduates.
- Assuming the increase in treatment is entirely due to CalMHSA's investment, the estimated net societal benefit for California is \$6.49 for each dollar invested by CalMHSA in prevention and early intervention programs.
- Among community college students, who experienced greater need for mental health services and had access to fewer on-campus mental health resources than university students, the net benefit is estimated to be \$11.39 for each dollar invested.

wide programs initiated by California counties in 2011. With funding from California's 2004 Mental Health Services Act (Proposition 63), the California Mental Health Services Authority (CalMHSA), a coalition of California counties, developed and implemented a strategic plan to deliver mental health prevention and early intervention (PEI) programs across the state's three public higher-education systems: the ten-campus UC system, the 23-campus CSU system, and the 112-campus CCC system. After a year of planning, CalMHSA supported California's higher-education systems in implementing a wide range of PEI activities, including in-person and online trainings to help students, faculty, and staff better recognize and support students with mental health disorders (Osilla et al., 2015); campus-wide campaigns that complemented statewide campaigns to reduce stigma around mental health (Stein et al., 2014); training to help students better handle stress and to enhance help-seeking (Osilla et al., 2015); and the development of websites to improve access to information and materials to support prevention and early intervention of mental health problems (Sontag-Padilla, forthcoming). UC, CSU, and CCC activities started in fiscal year 2011–2012 when funded by CalMHSA, and ramped up over the course of the three years of funding. Both the UC and the CSU systems implemented these PEI activities uniformly across their campuses. The CCC system offered online suicide prevention training and technical assistance at no cost to all 112 of its campuses, but awarded grants to a select 30 to expand and enhance their existing mental health services infrastructure and student mental health PEI efforts. The overarching goal of these efforts in all three higher education systems was to improve the capacity of each campus to more quickly identify, support, and intervene with students at risk of mental health problems and to raise student and campus staff awareness of the importance of mental health well-being for successful completion of higher education.

The RAND Corporation was asked to design and implement an evaluation of CalMHSA's statewide PEI programs. As part of this ongoing evaluation, this report examines the potential impact of CalMHSA's student mental health initiative on the use of mental health services among college and university students and estimates benefit-cost ratios for CalMHSA's investments. Based on our finding that the percentage of students receiving mental health services increased between 2013 and 2014, we estimate the future impact of these programs on graduation rates. Finally, we estimate the ratio of benefits to costs for CalMHSA's PEI programs, taking into consideration the costs of these programs, the costs of increased treatment associated with the programs, and the benefit of increased lifetime earnings from higher rates of graduation.

## Methods

To estimate possible changes in students receiving mental health services, we relied on survey data collected as part of RAND's evaluation. For our benefit-cost analyses, we linked changes in treatment to changes in the number of students graduating. We

then estimated changes in lifetime earnings for those additional students who graduate as a result of treatment. In this section, we describe our methods for collecting data on, and analyzing changes in, college and university students' use of mental health services; our approach to predicting the impact of mental health treatment on graduation rates; and our approach to estimating the economic costs and benefits to California for each year of CalMHSA's investment in PEI programs on California's higher-education campuses. Our analyses relied on several assumptions. We highlight those assumptions and describe how we tested them below.

## Data and Analyses to Estimate Changes in the Percentage of College Students Receiving Treatment

To estimate changes in the percentage of students receiving mental health services, we used survey data collected as part of the evaluation of CalMHSA's student mental health activities in California's higher-education system (survey content described in more detail in Sontag-Padilla et al., 2014). The evaluation of CalMHSA's PEI activities was not initiated until after the programs had been funded and begun their activities. As a result, there is no pre-intervention baseline; the first wave of this survey was conducted during the spring and fall semesters of 2013 (April and December 2013). The UC chancellor's office invited all ten UC campuses to participate; eight chose to do so. The CSU chancellor's office invited all 23 CSU campuses to participate; nine chose to do so. The CCC president's office invited all 30 CCC campuses receiving CalMHSA-supported grants and an additional 30 randomly selected CCC campuses not receiving grants to participate; 14 of the former and eight of the latter chose to do so. The most common reasons for not participating were competing demands and insufficient staff and resources. Campuses were instructed to invite large numbers of students and faculty to participate, and used pre-existing lists of students and faculty to distribute the invitations and information about the survey.

The second wave of the survey was conducted primarily during the spring and fall semesters of 2014 (April 2014 and January 2015). All campuses invited to participate in the first wave of the survey were also invited to participate in the second wave. Seven UC campuses, five CSU campuses, and 14 CCC campuses (nine receiving CalMHSA-supported grants and five others) participated in the second wave. To examine the change over time in use of mental health services, we examined student responses from those campuses participating in both waves of the survey. Because of low participation among the CCC campuses that did not receive CalMHSA-supported grants, we did not include them in our analyses.

The surveys assessed students' use of services while at their current campus through two survey items. Students were asked if they had ever used on-campus mental health services while at college; students who responded "no" were asked if they had ever used off-campus mental health services while at college. Students who responded "yes" to either question were categorized as having used mental health services during college.

We used items from the survey that assessed psychological distress and academic impairment to construct a measure of mental health status. The K6 scale, a commonly used, reliable, and valid six-item Likert measure (Kessler et al., 2003; Kessler et al., 2010), assessed how frequently students experienced such symptoms as hopelessness and worthlessness during the prior 30 days. Students with a K6 score of 13 or greater were categorized as having current serious psychological distress. Items modified from the National College Health Assessment (NCHA) II 2010 spring survey assessed the extent to which six emotional issues or behavioral health problems (anxiety, stress, depression, eating disorders, alcohol use, or death of a friend or family member) affected students' academic functioning within the prior 12 months (American College Health Association, 2010). Students were categorized as having had mental health–related academic impairment if they reported having dropped a course, received an incomplete, taken a leave of absence from school, or had a substantial academic disruption as a result of at least one of the six behavioral health problems (Sontag-Padilla et al., forthcoming).

Because wave-one surveys were not distributed until after the beginning of the intervention, we were not able to estimate changes pre- to post-implementation. Instead, we estimated changes that occurred during implementation. Our surveys represent cross-sections of students taken at two times. We did not survey the same students over time, so we cannot observe within-student changes in treatment.

To address differences in sample characteristics between waves, we used multiple logistic regression to estimate the change in students receiving services over time. Receiving any mental health services was the outcome in our model. The predictors included an indicator variable for the second survey wave, and we controlled for a student's race/ethnicity, gender, sexual orientation, current serious psychological distress, mental health–related academic impairment, and graduate or undergraduate status. The marginal effect for the survey wave indicator is our estimate of the change in the percentage of students receiving services between survey waves. We estimated the marginal effect using recycled prediction. Survey responses were weighted to reflect the probability of response on each campus. We constructed response propensity weights using a logistic regression to predict response within each campus, controlling for student population characteristics and assuming all students could respond.

Our methods and data allowed us to observe changes over time but did not allow us to identify the cause of those changes. The main results we present below assume that all changes are due to CalMHSA's investment. We also performed sensitivity analyses to determine how robust our findings are if we assumed that CalMHSA's investment was responsible for only part of the changes observed. For example, there are other factors, such as increased enrollment in health plans after the implementation of the Affordable Care Act, that may also lead to some of the changes we observe.

## Predicting Impact of Treatment on the Likelihood of Graduation

The survey data described above did not allow us to estimate changes in academic performance or graduation. To estimate the future impact of the short-term changes we observed in the number of students receiving services, we relied on evidence from the literature. There are a number of studies that suggest positive outcomes for students who receive treatment for mental health disorders. Since the goal of the present study was to evaluate the economic benefits and costs of CalMHSA's investments in student mental health activities, we focused on graduation, an outcome that can be linked to productivity and earnings.

We are aware of only one study that estimated the impact of treatment for mental health problems on academic performance and retention among college and university students. Based on a survey of students from a large Midwestern public university, the study found that students with depression not only had lower grade point averages, but were also more likely to drop out (Eisenberg et al., 2011). By combining an observed association between depression and graduation rates with reasonable assumptions of treatment effectiveness, the authors estimated that effective treatment increased the likelihood of graduating by 1.38 percent (Eisenberg et al., 2011).

In our main results, we estimated the impact of treatment for mental health problems on graduation rates in California's higher-education institutions by multiplying the number of additional students who receive services by 1.38 percent. This is equivalent to an average increase of 1.38 percent in an individual student's likelihood of graduating.

Because we relied on a single study limited to the association between depression and graduation for this critical component of our analyses, we performed sensitivity analyses to test the impact of this assumption on our results. For example, the increase in likelihood to graduate assumes effective treatment. It is not likely that all students who receive treatment will receive effective treatment.

## Financial Costs and Benefits of PEI Programs

Here, we describe our approach to estimating the financial costs and benefits of investing in student mental health PEI programs. There are a number of inherent challenges to this type of analysis: selecting important outcomes that can be quantified and monetized, finding evidence of change in these outcomes as a result of the investment, defining the relevant time frame over which to assess the costs and benefits, and defining the relevant level of aggregation.

In our analysis of benefits, we used a student's likelihood of graduation as the intermediate outcome of increased mental health treatment. Based on graduation data for each system, we assumed that graduation occurs within five years of enrollment for CSU undergraduate students, within four years of enrollment for UC and CCC undergraduate students, and within three years for UC and CSU graduate students (Juszkiewicz, 2014; PayScale,

2015). Community college is an avenue for entrance into one of the other California higher-education systems. Among UC schools, up to 30 percent of admitted students transfer from a CCC school (President's Transfer Action Team, 2014). However, very few (2.5 percent) of the 2.2 million students enrolled in CCC campuses in 2012 transferred to UC or CSU campuses, and over one-half of those who transfer to a UC campus graduate within two years of transferring, so four years is a reasonable estimate of the expected time to graduation for CCC students (President's Transfer Action Team, 2014).

The long-term outcome we evaluated was lifetime earnings through the age of 65. Therefore, each year of investment by CalMHSA can have an impact over a period of 48 years for a student who enrolls at age 18 and works until he or she is 65. We only considered increased lifetime earnings benefits for students whom we estimated will successfully graduate as a result of treatment associated with campus PEI programs.

We also considered the costs of services and medications for all students who received either on-campus or off-campus treatment as a result of campus PEI programs; the cost of tuition for those who go on to graduate after receiving this treatment; and the opportunity cost of lost wages while in school for those who go on to graduate after receiving this treatment. We assumed comparable treatment costs for all students since we did not have information about the type or amount of individual treatments received.

Based on data from the Medical Expenditure Panel Survey, the average annual spending on mental health disorders in the United States in 2012–2013 was \$2,008 in 2015 dollars (Agency for Healthcare Research and Quality, undated). We used this as our estimate of the average cost of treatment. We noted, however, that this is likely a high estimate for the cost of treating students who seek services: the actual cost of treatment is likely to be lower for students who are treated on campus, as well as for students who are treated for less severe conditions. We performed sensitivity analyses to test the impact of different treatment costs on our estimates.

To estimate how much of these treatment costs were borne by the state government of California, we estimated how much of these treatment costs were covered by MediCal. Students covered by MediCal have one-half of their treatment costs paid for by the California state government, and we used MediCal enrollment data to estimate the share of students covered by MediCal. We assumed that the proportion of people aged 18 to 24 who were covered by MediCal was also the proportion of students who sought treatment who were covered by MediCal.

Students who remained in school because of treatment will pay tuition until they graduate. We used the average in-state tuition for each type of institution (UC, CSU, and CCC) to estimate the tuition costs for each additional student who graduates after receiving treatment. For our models, we assumed that students who drop out would start earning wages. Those who do not drop out forgo these wages during the years they remain

enrolled in school. To estimate the opportunity cost of these wages lost during additional years of undergraduate school, we used the median annual wages for employees aged 18 to 24 with some college but no degree (Bureau of Labor Statistics, 2015). To estimate the opportunity cost of these wages lost during additional years of graduate school, we used the median annual wages for employees aged 18 to 24 with a college degree (Bureau of Labor Statistics, 2015).

We considered improvement in lifetime earnings as the economic value of completing post-secondary education. Lifetime earnings for college and university graduates are higher on average than for dropouts. Using data on average starting salaries for graduates from each of California's higher education systems, we estimated the increase in starting salaries for the additional graduates relative to what they would have earned had they dropped out. Using methods described in more detail elsewhere (Ashwood et al., 2015), we then computed the net present value of lifetime earnings through the age of 65. Our approach assigned individuals a starting salary based on gender and age at graduation. We then summed wages over time, accounting for life expectancy and unemployment rates until age 65. We computed the present value of lifetime wages assuming a 3-percent discount rate. We consider the difference in the present value of lifetime earnings (and tuition costs) in two scenarios—one in which graduation rates improve, and the other in which they do not—to estimate the economic benefit of graduation. The state government of California stands to benefit directly from these higher lifetime earnings through an increase in income tax revenue. We estimated the share of increased income that the state government would earn through income tax revenue. Tax revenue was computed for each year of wages based on the 2015 California income tax brackets. The present value of total income tax was computed using the same method used for lifetime wages (Ashwood et al., 2015).

### Investment Costs of CalMHSA's Higher Education Prevention and Early Intervention Programs

For the purposes of this study, CalMHSA's investment costs included the payments made for student mental health programs in higher education from fiscal years 2011–2012 to 2013–2014. The total amount of these payments was \$25.1 million in nominal dollars, or \$26.0 million in 2015 dollars. The survey data only allow us to examine changes in service utilization over a single year, so we did not evaluate the full impact of the three-year investment. Instead, we estimated the impact of a single year of investment. Spending was evenly distributed across all three years. This yielded \$8.7 million per year in 2015 dollars. By system, the investment per year was \$2.7 million for UC, \$2.5 million for CSU, and \$3.5 million for CCC. We believe an estimate of the annual impact was helpful for understanding the potential benefits and costs of future investment.

## Findings

A total of 29,134 students from participating schools in all three systems completed the survey at wave 1; 14,071 completed the survey at wave 2. Table 1 contains the comparison of wave 1 and

wave 2 respondents. After weighting, the respondents were similar in both waves on most characteristics. There were relatively fewer community college students among respondents in wave 2.

**Table 1. Respondent Characteristics from Wave 1 and Wave 2**

	Wave 1			Wave 2		
	N	Unweighted Percentage	Weighted Percentage	N	Unweighted Percentage	Weighted Percentage
Total	29,134	–	–	14,071	–	–
Gender						
Female	18,475	63.9	55.3	9,016	64.8	54.9
Male	10,294	35.6	44.6	4,803	34.5	45.1
Other (e.g., Transgender)	152	0.5	0.0	103	0.7	0.0
Race/Ethnicity						
White	11,928	41.7	35.0	5,184	37.6	35.9
Latino	7,182	25.1	30.5	3,544	25.7	29.3
Asian	6,747	23.6	26.2	3,803	27.6	28.4
Black	818	2.9	4.7	306	2.2	3.6
Other	1,909	6.7	3.6	944	6.9	2.8
LGBTQ						
No	26,342	90.4	90.4	12,490	88.8	90.4
Yes	2,792	9.6	9.7	1,581	11.2	9.6
Student Status						
Undergraduate	23,292	81.2	81.7	10,794	78.0	82.0
Graduate	5,407	18.8	18.3	3,054	22.1	18.1
Higher Education System						
CCC	10,288	35.3	46.0	4,490	31.9	36.5
CSU	3,299	11.3	11.4	1,041	7.4	16.0
UC	15,547	53.4	42.7	8,540	60.7	47.5
Psychological Distress						
No	23,175	80.6	79.2	10,591	76.4	79.2
Yes	5,567	19.4	20.8	3,273	23.6	20.8
Academic Impairment						
No	25,761	89.1	87.8	12,367	88.7	88.7
Yes	3,169	11.0	12.2	1,575	11.3	11.3
Psychological Distress or Academic Impairment						
No	21,584	74.6	72.5	9,872	70.8	73.1
Yes	7,362	25.4	27.5	4,073	29.2	26.9

NOTE: Proportions in weighted columns are weighted for non-response. Proportions do not always sum to 100 due to rounding.

## The Number of Students Receiving Mental Health Services Increased Significantly

We found an increase of 13.2 percent in the proportion of students who reported using mental health services in one year: in academic year 2013, 19.6 percent of students reported receiving such services; in academic year 2014, 22.1 percent of students reported receiving such services (see Figure 1). Among students experiencing current serious psychological distress or mental health–related academic impairment, the increase in the percentage of those who reported using mental health services in one year was even greater, rising 15.8 percent from 2013 (when 26.6 percent of students reported using mental health services) to 2014 (when 30.8 percent of students reported using mental health services). There was a much more modest increase in service utilization among students who did not report current serious psychological distress and impairment. Recognizing that students who receive mental health services may no longer experience current serious psychological distress, we used the increase from 19.6 percent to 22.1 percent of students receiving treatment for our benefit-cost analysis. Based on this percentage increase, we estimated that 23,806 additional students used mental health services in 2014 on campuses that received CalMHSA funding.\*

Given the unique environment and student body of the community colleges, we performed additional analyses restricted

\* This includes all UC and CSU campuses and only the CCC campuses directly receiving CalMHSA funds. See discussion of funding in the Methods section.

to CCC students. Among students on the CCC campuses that received CalMHSA funding, we found a 15-percent increase in the proportion of students who reported using mental health services in one year, a substantially greater increase than we saw in the UC and CSU systems. On CCC campuses, there was an increase from 18.1 percent of students who reported receiving mental health services in academic year 2013 to 20.8 percent of students in academic year 2014 (Figure 1). We noted that even with this increase, CCC students received services at a lower rate than students at other systems. Among CCC students experiencing current serious psychological distress or academic impairment, the percentage that reported using mental health services in one year increased by 26.2 percent.

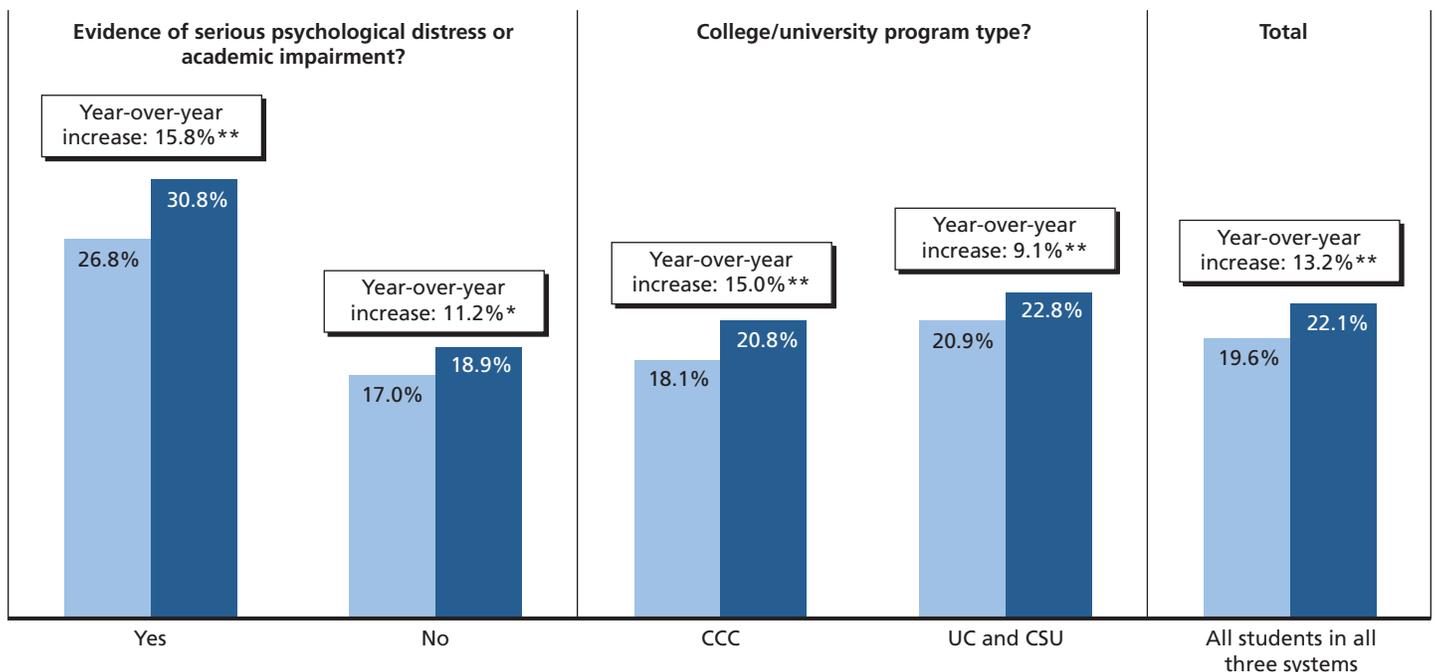
## More Students Receiving Services Likely Means More Students Graduating

Applying our estimate of the impact of treatment on graduation rates, we estimated that an additional 329 students from all three systems will graduate for each year of CalMHSA’s investment in campus PEI programs (Table 2). Among CCC students, we estimated that an additional 101 students will graduate from among the 7,354 additional CCC students receiving services.

## There Is a Positive Return to California for CalMHSA Higher Education Prevention and Early Intervention Activities

Table 3 contains the benefit-cost calculations associated with an increase of 2.4 percentage points in students receiving services for

**Figure 1. Percentage of Students Receiving Mental Health Services, by Year**



\* Increase is statistically significant at the 0.1 level or below.  
 \*\* Increase is statistically significant at the 0.05 level or below.

**Table 2. Likely Increase in the Number of Students Graduating in 2014, by System**

System	Number of Additional Students Receiving Mental Health Services in 2014	Number of Additional Graduates
CCC	7,354	101
UC and CSU	16,452	228
Total	23,806	329

mental health disorders. The cost of treatment for these additional 23,806 students was \$47.8 million, of which the state government paid \$2.9 million through MediCal. Assuming that 329 additional students will graduate as a result of their treatment, the net societal benefit to California for CalMHSA’s investment is \$56.1 million, of which the state government alone will receive a net benefit of \$8.5 million. This translates to a benefit-to-cost ratio of 6.49 overall, 0.98 for the state government. So, for each dollar invested by CalMHSA in mental health initiatives for college and university students, \$6.49 returns to society and \$0.98 to the state government.

Table 4 summarizes the possible impact of CalMHSA’s investment for the 301,000 students enrolled in the community colleges included in our sample. We estimated that 7,354 additional CCC students sought treatment for mental health disorders in 2014, and that an additional 101 students graduated as a result of treatment. The benefit-to-cost ratio for spending on CCC students was higher than the ratio for spending on students

at all three systems combined (11.39:1 versus 6.49:1). This was driven mainly by the fact that students who graduate from community colleges appear to double their lifetime wages relative to students who do not. For example, we estimated that the present value of lifetime earnings of a male who graduates from a CCC school is \$1.4 million, compared with \$700,000 for a high school graduate or CCC dropout. By comparison, a male graduating from a UC school has an estimated present value lifetime earnings of \$2 million, compared with \$1.5 million for a male who has some college—an increase of only 33 percent. In addition, the costs of staying in school are much lower for CCC students than for students in the other systems, both in terms of tuition and forgone wages while in school.

**Sensitivity Analyses**

We made a number of assumptions in our analyses. The three main assumptions were (1) that the increase in students receiving treatment is entirely due to CalMHSA’s investment, (2) that 1.38 percent of students who receive treatment will graduate because of treatment, and (3) that the average cost of treatment is \$2,008 per year. We tested each of these assumptions by choosing alternative values for each and then estimating new benefit-cost ratios. We summarize the values of each of our three assumptions that would yield a benefit-cost ratio of 1 in Table 5. This would be the value at which the state of California society would break even, or receive \$1 of net benefits for each \$1 invested. To estimate the values in Table 5, we assumed that the other assumptions are held constant at their original values. For example, in estimating the break-even value for additional

**Table 3. Benefit-Cost Calculation for All Three Systems**

Cost/Benefit	Estimated Value
1. CalMHSA’s annual investment in student mental health programs for higher education 2011–2013	\$8,650,311
2. Additional students seeking treatment for mental health disorders 2014	23,806
3. Total cost of treatment for additional students	\$47,802,805
4. State government’s share through MediCal	\$2,868,168
5. Additional students who graduate because of treatment	329
6. Net cost of additional years of school	\$36,812,840
7. State government’s share through lost income tax	\$749,740
8. Present value of increased lifetime earnings for additional graduates	\$140,715,038
9. State government’s share through income tax	\$12,070,692
10. Present value of net benefits of treatment (row 8 – row 3 – row 6)	\$56,099,393
11. State government’s share (row 9 – row 4 – row 7)	\$8,452,784
12. Broader societal perspective: Benefit:Cost ratio (dollars returned for each dollar invested = row 10 / row 1)	6.49:1
13. ... Of which, California government budget perspective: Benefit:Cost ratio (dollars returned for each dollar invested = row 11/ row 1)	0.98:1

**Table 4. Benefit-Cost Calculations for CCC and UC/CSU**

	Participating CCCs	UC/CSU
1. CalMHSA's annual investment in student mental health programs for 2011–2013	\$3,513,881	\$5,136,430
2. Additional students seeking treatment for mental health disorders 2014	7,354	16,452
3. Total cost of treatment for additional students	\$14,766,265	\$33,036,540
4. State government's share through MediCal	\$885,976	\$1,982,192
5. Additional students who graduate because of treatment	101	228
6. Net cost of additional years of school	\$5,150,364	\$31,662,476
7. State government's share through lost income tax	\$145,592	\$604,148
8. Present value of increased lifetime earnings for additional graduates	\$59,943,302	\$80,771,736
9. State government's share through income tax	\$4,707,994	\$7,362,698
10. Present value of net benefits of treatment (row 8 – row 3 – row 6)	\$40,026,673	\$16,072,720
11. State government's share (row 9 – row 4 – row 7)	\$3,676,426	\$4,776,358
12. Broader societal perspective: Benefit:Cost ratio (dollars returned for each dollar invested = row 10 / row 1)	11.39:1	3.13:1
13. ... Of which, California government budget perspective: Benefit:Cost ratio (dollars returned for each dollar invested = row 11/ row 1)	1.05:1	0.93:1

graduates (row 2), we held constant our estimates of the increase in students receiving treatment (23,806) and the average cost of treatment (\$2,008 per year).

We estimated that the increase in students receiving treatment due to CalMHSA's investment could be 85 percent lower than the observed increase, and California would still break even (Table 5). If we assume that only one-half of the increase in treatment utilization is due to CalMHSA's investments (not shown in the table)—and, therefore, that CalMHSA investments caused only 11,903 of the additional students to receive treatment and only 164 of the additional graduating students—then the benefit-to-cost ratio is 3.24:1 overall and 0.49:1 to the state government. The effectiveness of treatment could be close to one-half the value we used in our original estimates and California would still break even. Alternatively, the average cost of treatment could be twice as high and California would still break even. As mentioned previously, the cost of treatment is likely to be lower for students. If the cost is one-half of our original value (\$1,004 per year), the benefit-cost ratio rises to 9.25:1 for California as a whole and 1.14:1 for the state government (not shown).

### Discussion

Our findings indicate that California will benefit from CalMHSA's investment in PEI programs on its higher-education campuses in multiple ways: more students will use mental health services, more students will graduate after receiving treatment, and these additional graduates will see increased lifetime earnings. CalMHSA's investments were not designed to increase the number of mental health providers and improve access. Rather, they result from wide-ranging efforts to change the campus conversation and culture about mental health to reduce stigma and educate and empower students, faculty, and staff to support students struggling with mental health issues.

Our results suggest that CalMHSA's investments may be even more cost-effective among community college students. Because of the greater potential impact on lifetime earnings for community college students who earn an associate's degree, the financial benefits of even a small change in the number of community college graduates can yield a positive return. As a result, the benefit-to-cost ratios are almost twice as high among students in community colleges that received funding from CalMHSA

**Table 5. Sensitivity Analyses**

Model Input	Original Value Used in Main Analysis	Break-Even Value	Relationship to Original Value
Additional students seeking treatment	23,806	3,660	15%
Additional graduates	329	179	54%
Average treatment cost	\$2,008	\$4,000	199%

to implement PEI programs. We estimated a societal benefit of \$11.39 for each CalMHSA dollar invested in CCC schools.

We note that the analyses summarized above focus on the 30 CCC campuses that received CalMHSA-supported grants for PEI programs. Given the higher level of need for mental health services among community college students (Sontag-Padilla et al., 2014), we considered the impact of CalMHSA's initiative if funding was extended to all 112 CCC campuses. If we assume that each additional campus received the same level of funding as each of the original 30, then the total spent would be \$13.1 million per year across the CCC system. If the changes we observed for the original 30 campuses held for all 112 CCC campuses, the total number of additional CCC students receiving mental health treatment would increase from 7,354 (on 30 campuses) to as many as 23,048 (on 112 campuses), and the number of additional graduates would increase from 101 (on 30 campuses) to 318 (on 112 campuses). This would yield a benefit-to-cost ratio of 9.56:1 for the state as a whole, and 0.88:1 for the state government. The ratios in this scenario are lower because the 30 schools originally selected have a proportionally higher enrollment (32 percent of the CCC students). We note, however, that the CCC campuses that received campus-based grants were selected because of their ability to use these funds to further develop and enhance PEI efforts already occurring on campus; we do not know the extent to which funding on the remaining CCC campuses would similarly augment existing prevention and intervention efforts.

### **Context, Assumptions, and Limitations**

There are a number of limitations to our analysis. As noted previously, there are alternative factors that could explain the increase in students receiving treatment. The passage of the Affordable Care Act (ACA) in 2010 has led to an increase in the number of young adults with health insurance, especially because they are allowed to remain covered by their parents' insurance through the age of 26 (Cantor et al., 2012; Sommers et al., 2013). Studies have shown that increasing insurance coverage leads to a corresponding increase in the receipt of health care, especially mental health care (Sommers et al., 2013). With the data available to us, we were unable to determine precisely what portion of the observed changes were due to CalMHSA's investment, but we have provided alternative estimates in our sensitivity analyses (summarized in Table 5) to explore the impact of this investment. We note, however, that even prior to the ACA, it was common for many colleges to require that students have health insurance or to provide it to them and, given the timing of our sample waves, it is unlikely that expanding coverage due to the ACA accounts for all the change we observed. While the open enrollment period for the ACA began in 2013, most of the enrollment impact on young adults occurred shortly after the implementation of PEI programs in 2010 and 2011—as students were allowed to remain on their parents' health insurance plans through age 26—and prior to 2013 (Cantor et al., 2012; Sommers et al., 2013), when our first wave of data was collected.

As noted, we focused exclusively on the impact of increased treatment utilization on graduation rates. There are other important outcomes of treatment, however, such as increased well-being or improved academic performance. We did not include these outcomes because we focused only on those that could be linked through available data to a financial outcome; in so doing, we underestimated the full benefits of treatment among college students. Our findings on changes in service utilization came from students on campuses that participated in both waves of the survey. We do not know the extent to which our findings represent non-participating campuses or other higher-education institutions. The first wave of the survey was launched after many campuses had already initiated PEI activities, and we do not know how these pre-existing activities may have influenced the use of services reported in the first wave of the survey.

Our approach to surveying a convenience sample was similar to that of other large higher-education surveys (American College Health Association, 2010; Boynton Health Service and University of Minnesota, 2012; Higher Education Research Institute 2014), but as each campus was responsible for sending out the invitation to participate to students and faculty/staff, we had no information about the numbers or characteristics of non-respondents. We sought to mitigate the effects of selection bias by weighting our sample to represent each campus's general student body, allowing us to adjust for bias associated with available demographic characteristics. The rates of mental health problems in the weighted sample are also comparable to rates in random sample studies of college students, providing some reassurance that respondents were unlikely to have higher rates of mental health problems than the general student body. Still, we had no way to assess response bias—it is possible that respondents were more likely than non-respondents to seek services and perceive their campus climate as supportive of mental health issues.

We relied on a single study for our estimate of the impact of mental health treatment on graduation rates. That study estimated the relationship between depression, as measured by the Patient Health Questionnaire (PHQ) scale, and graduation rates—not between treatment and graduation rates. To estimate the impact of treatment, researchers looked to a third study for evidence of how treatment changes the PHQ score. It is possible that our estimate of the impact of treatment on graduation rates was either too low or too high. As we described above, however, even if the number of students who actually graduate was much lower than the figure we used for our calculations, the state would still break even. Therefore, even if treatment effectiveness were lower, we would still project a positive impact for the state. If treatment effectiveness is higher, we would project a higher benefit-to-cost ratio.

We have used average wage estimates for our lifetime earnings calculations. If students receiving mental health services continue to have mental health disorders after graduation, their earnings may be lower. This would yield lower net benefits. We did not include the multiplier effects of paid wages in our estimates.

Whenever economic activity is added to or subtracted from an economy (such as the added, higher wages of a college graduate), the repercussions reach well beyond the wages earned as the graduate spends her income and it becomes, in turn, someone else's wages and profit. Our goal here was to be comprehensible and informative, rather than exhaustive. We have intentionally focused on wage benefits in order to highlight the relationship between one policy intervention and a large, quantifiable benefit.

## Conclusion

The findings from this study contribute substantially to our understanding of the potential impact and benefits of mental health PEI activities on higher-education campuses. We found that efforts to improve the capacity of individual campuses to more quickly identify, support, and intervene with students at risk of mental health problems, and to reduce the stigma around student mental health problems, can significantly increase the number of students receiving much-needed mental health services. We found a disproportionate improvement in treatment utilization among students with a history of academic impairment and current serious psychological distress. Investment in PEI efforts has a significant societal benefit: we found that spending on mental health services is later recouped through increased wages. At a time of increased public attention to the mental health needs of college students, we believe that quantifying the relationship between CalMHSA's investment in student mental health services on higher-education campuses and California's gain in wage employment and tax revenues will help policymakers put these investments into perspective.

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## Acknowledgments

The RAND Health Quality Assurance process employs peer reviewers. This document benefited from the rigorous technical reviews of Donna Farley and Jeanne Ringel, which served to improve the quality of this report. In addition, members of the Statewide Evaluation Experts (SEE) Team, a diverse group of California stakeholders, provided valuable input on the project.

## RAND Health

This research was conducted in RAND Health, a division of the RAND Corporation. A profile of RAND Health, abstracts of its publications, and ordering information can be found at <http://www.rand.org/health>.

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The California Mental Health Services Authority (CalMHSA) is an organization of county governments working to improve mental health outcomes for individuals, families, and communities. Prevention and early intervention programs implemented by CalMHSA are funded by counties through the voter-approved Mental Health Services Act (Prop. 63). Prop. 63 provides the funding and framework needed to expand mental health services to previously underserved populations and all of California's diverse communities.

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