



# Postsecondary Degree Completion Rates Among Students on the Upward Bound/Upward Bound Math-Science to Student Support Services Pathway

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## Introduction

The Upward Bound (UB), Upward Bound Math-Science (UBMS), and Student Support Services (SSS) grant programs—three of the Federal TRIO Programs that provide services to students—all share the same objective of promoting postsecondary degree attainment for low-income and first-generation college students. While UB/UBMS grant projects serve students in secondary education, SSS grant projects serve students enrolled in postsecondary education. Therefore, a student who has been served by an UB/UBMS grant project could subsequently receive services through an SSS grant project once they enroll in postsecondary education. Low-income/first-generation college students have an available pathway into and through postsecondary education that couples participation in both UB/UBMS and SSS.

This report presents data on UB/UBMS participants who also participated in the SSS program (referred to in this report as “UB/UBMS-SSS participants”). The primary purpose of this report is to highlight differences in postsecondary degree attainment rates between UB/UBMS-SSS participants and those UB/UBMS postsecondary enrollees who were not served by the SSS program (referred to in this report as “UB/UBMS-SSS nonparticipants”). To help contextualize these differences in postsecondary attainment rates, this report also presents information regarding select characteristics of UB/UBMS-SSS participants, UB/UBMS-SSS nonparticipants, and the postsecondary institutions that they attended.

Findings from this study are descriptive in nature. Service in the SSS program is a function of two selection processes: (1) students self-select whether to participate in SSS, and (2) grantees select students to serve through their recruitment efforts. Students who are served by the SSS program may differ from those who are not served in ways that matter relative to degree attainment. Since this report does not control for all differences related to selection processes, findings within this report are not sufficient to justify causal inference. They should instead be interpreted as descriptive.

Readers can reference the descriptive findings presented in this report while considering the value of efforts to further create a pathway between these two programs. Additionally, readers can reference findings presented in this report when considering research efforts to evaluate TRIO program performance, as well as efforts to conduct further research to evaluate potential causal relationships.

## Key Finding

**For both full-time and part-time enrollees, UB/UBMS participants who received services from the SSS program had higher degree completion rates than UB/UBMS participants who did not receive SSS services.**

## Data and Measures

Results presented in this report are based on U.S. Department of Education (ED) data sources and data from the National Student Clearinghouse (NSC). The two main sources of ED data for this report are (1) the Federal TRIO Programs Funded Projects Database, and (2) the annual performance reports (APRs) that UB, UBMS, and SSS grantees submit. The Funded Projects Database provides grantee-level funding

information, while the APRs provide individual-level data on each participant’s background characteristics, program services received, and achievement of program outcomes. ED’s National Student Loan Data System (NSLDS) data were used to supplement APR data in identifying students’ first-attended postsecondary institution, and the National Center for Education Statistics’ Integrated Postsecondary Education Data System (IPEDS) data were used to obtain institution-level measures related to students’ first-attended postsecondary institution. NSC data provided enrollment intensity information. More detailed information regarding these data sources is available in Appendix A of this report.

The key analysis measures examined in this report are presented in Exhibit 1. Other measures used in this report, are summarized in Appendix A.

All findings presented in this report pertain to UB/UBMS participants who graduated high school between the 2007–08 through 2010–11 academic years and enrolled in postsecondary education by the fall immediately following high school graduation (i.e., participants who are in the 2008 through 2011 UB/UBMS postsecondary education enrollment cohorts, referred to in this report as “UB/UBMS cohort participants”).

### Exhibit 1. Description of key analysis measures

Measure	Description
Postsecondary degree completion within 150 percent of normal time	Whether UB/UBMS participants who first attended a 4-year institution, completed a bachelor’s degree (at any institution) within 6 years of entering postsecondary education. For UB/UBMS cohort participants who first attended a 2-year institution, this is a measure indicating whether the highest degree completed (at any institution) within 150 percent of normal time was a (1) bachelor’s degree within 6 years of entering postsecondary education or (2) an associate degree within 3 years of entering postsecondary education.
SSS participation status	Identifies each UB/UBMS cohort participant as either (1) a “UB/UBMS-SSS participant” (i.e., received SSS services during the first year of college), or (2) a “UB/UBMS-SSS nonparticipant” (i.e., did not receive SSS services within 6 years of enrolling in college) <sup>1</sup>
Enrollment intensity	Whether the UB/UBMS cohort participant was enrolled full-time or part-time (i.e., attended three-quarter time, half-time, or less than half-time) during their first term of college.
Postsecondary institution SSS project status	Whether the UB/UBMS cohort participant’s first-attended postsecondary institution had an SSS project during the participant’s first year of college.
Institution-level graduation rate indicator	An index of the proportion of first-time, full-time students at the institution — regardless of whether those students are part of the analytic sample for this report — who completed their postsecondary degree at the institution within 150 percent of the expected time to completion.

<sup>1</sup> Due to their “partial exposure” to the SSS program, cohort participants who began participating in the SSS program during their second, third, fourth, fifth, or sixth year of postsecondary education were excluded from this analysis.



The UB/UBMS cohort participants were divided into 12 groups based on three factors: (1) the level of their first-attended postsecondary institution (4-year institution or a 2-year institution); (2) their enrollment intensity during their first term in college (full-time or part-time);<sup>2</sup> (3) and whether their first-attended postsecondary institution had an SSS project during the academic year in which they first enrolled (see Exhibit A-1).<sup>3</sup> The first two factors (level of institution first attended and enrollment intensity) are intricately linked to degree completion rates. As such, these two factors must be taken into account for comparisons of degree completion rates to be meaningful. For the third factor (whether the UB/UBMS cohort member enrolled in a postsecondary institution that offered an SSS project), any comparison of those who participated in the SSS program and those who did not are subject to potential selection bias, where qualities related to selection into the SSS program (as opposed to actual participation in the SSS program) could result in a difference between those served by an SSS project with those who were not served. Given that qualities related to this potential selection bias might differ depending on whether the student’s institution even offers the SSS program, in this report, degree completion rates are compared separately based on whether a UB/UBMS cohort member attended a postsecondary institution that offered an SSS project. That is, the analysis sample for this report includes both UB/UBMS-SSS participants and UB/UBMS-SSS nonparticipants. UB/UBMS-SSS nonparticipants are further divided into two subgroups: (1) those who first-attended a postsecondary institution that had an SSS project (referred to in this report as “UB/UBMS-SSS nonparticipants A”), and (2) those who first attended a postsecondary institution that did

not have an SSS project (“UB/UBMS-SSS nonparticipants B”).

## Findings

### Participants who First Enrolled at 4-Year Institutions

#### Postsecondary Degree Completion Rates

Among those who first attended a 4-year institution, this study examined postsecondary degree completion in terms of whether participants completed a bachelor’s degree within 6 years of entering postsecondary education at any institution. Within the two enrollment intensity categories, the degree completion rate was higher for UB/UBMS-SSS participants than for UB/UBMS-SSS nonparticipants (see Exhibit 2). For UB/UBMS cohort participants who enrolled full-time, UB/UBMS-SSS participants showed an average degree completion rate of 55 percent, compared to 44 percent for UB/UBMS-SSS nonparticipants whose institution had an SSS project (i.e., UB/UBMS-SSS nonparticipants A).

Differences were more modest when comparing UB/UBMS-SSS participants with UB/UBMS-SSS nonparticipants whose institution did not have an SSS project (i.e., UB/UBMS-SSS nonparticipants B) (55 percent and 51 percent, respectively).

Concerning UB/UBMS cohort participants who enrolled part-time, the degree completion rate was higher for UB/UBMS-SSS participants (37 percent) than it was for either UB/UBMS-SSS nonparticipants A or B (19 percent and 20 percent, respectively).

<sup>2</sup> Twenty-seven percent of cohort participants were missing information on their enrollment intensity during their first term in college; for these participants, a value was imputed for this measure. Further detail regarding imputation of this measure is available in Appendix A of this report.

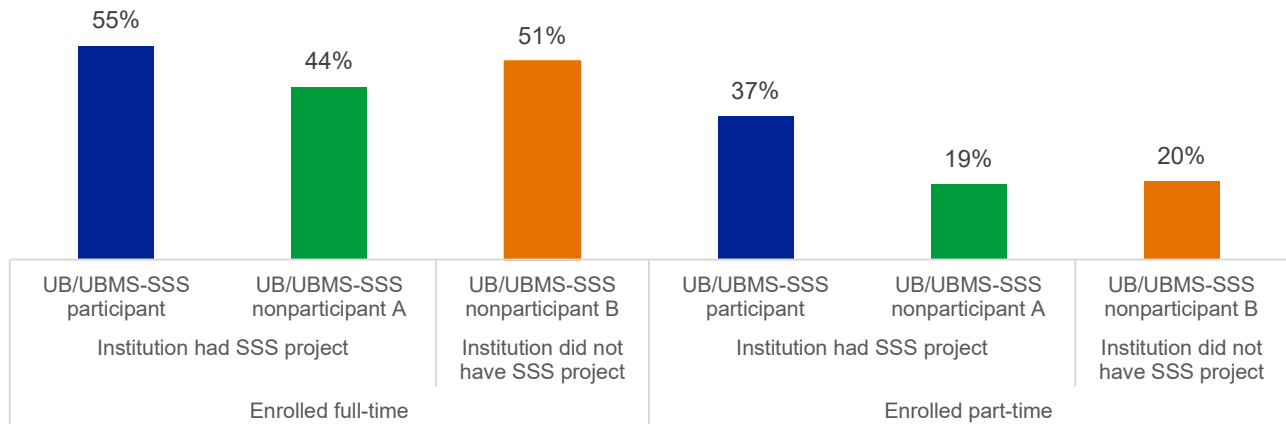
<sup>3</sup> Additional information regarding the disposition of the UB/UBMS cohort participants in terms of these various dimensions is provided in the Appendix A and Exhibit A-1.



Examining rates by enrollment intensity shows that degree completion rates were higher for UB/UBMS cohort participants who were enrolled full-time than

for those who were enrolled part-time, regardless of SSS participation status.

**Exhibit 2. Among UB/UBMS cohort participants who first enrolled at a 4-year institution, percentage who earned a bachelor's degree within 150 percent of normal time, by participants' enrollment intensity, whether first-attended postsecondary institution had an SSS project, and SSS participation status**



SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.



## Contextual Measures

While the 4-year institution UB/UBMS-SSS participants had higher degree completion rates than comparable UB/UBMS enrollees who did not participate in an SSS project, they also differed in some key contextual factors that could contribute to degree completion (see Exhibit 3). For example, the UB/UBMS-SSS participants were more likely to have participated in UB/UBMS during their senior year in high school, and were served longer by UB/UBMS, on average, than were UB/UBMS-SSS nonparticipants. These factors are associated with higher degree completion rates. On the other hand, UB/UBMS-SSS participants were more likely to meet both low-income and first-generation college student eligibility criteria than were UB/UBMS-SSS nonparticipants.<sup>4</sup>

One area in which differences between groups are particularly modest was the graduation rate for the first institution of enrollment.<sup>5</sup> Among both full-time and part-time students, the graduation rate was similar between the institutions that UB/UBMS-SSS participants attended and the institutions that UB/UBMS-SSS nonparticipants attended (i.e., within each enrollment intensity category, the groups had similar z-score values). Among full-time students, the average institution graduation rates for the three groups were approximately the same as the average graduation rate for all 4-year institutions (i.e., for all three groups, the z-scores had values close to zero). Among part-time students, the average graduation rates were marginally below the average graduation rate for all 4-year institutions (z-scores ranged from -0.21 to -0.33).

## Interpreting Z-scores

To facilitate presentation in this report, average institution graduate rates were transformed into z-scores (see Exhibits 3 and 5). Z-scores are standard scores with a mean of 0 and a standard deviation of 1. These scores indicate whether graduation rates among institutions attended by UB/UBMS participants are, on average, above or below the overall mean graduation rate for all 4-year (or 2-year) institutions. These z-scores also indicate the magnitude of differences (i.e., the number of standard deviations) between the average graduation rate among institutions attended by UB/UBMS participants and the overall mean graduation rate for all 4-year (or 2-year) institutions. If a z-score is equal to 0, it is on the overall mean. A z-score equal to +1 is 1 standard deviation above the overall mean and a z-score equal to -1 is 1 standard deviation below the overall mean. As an example, among the 4-year institutions first attended by full-time UB/UBMS-SSS participants, the average institution graduation rate has a corresponding z-score of -0.03 (a value that is very close to zero); therefore, the average graduation rate for institutions first attended by UB/UBMS-SSS participants is practically the same as the overall average rate for all 4-year institutions.

<sup>4</sup> A recent UB/UBMS Fast Facts report (U.S. Department of Education, forthcoming) found that UB/UBMS participants who were both low-income and first-generation college students had a lower rate of postsecondary degree completion within 150 percent of normal time than those who had only one of these program eligibility characteristics. This same report also found rates of postsecondary degree completion to be higher for participants who received UB/UBMS services for a longer period of time, received UB/UBMS services during their senior year of high school (compared to those who left the UB/UBMS program prior to their senior year), and those who had higher high school cumulative GPAs.

<sup>5</sup> The graduation rates are based on first-time, full-time students at 4-year postsecondary institutions who completed a bachelor's degree from the first institution attended within 150 percent of normal time (within 6 years).



**Exhibit 3. Among UB/UBMS cohort participants who first enrolled at a 4-year institution, the percentage who earned a bachelor's degree within 150 percent of normal time and select contextual measures, by enrollment intensity, whether institution had an SSS project, and SSS participation status**

	Percentage who earned a bachelor's degree within 150 percent normal time	Contextual measures				
		Percentage who were both low income and first generation <sup>1</sup>	Percentage participating in UB/UBMS during senior year of high school	Average length of UB/UBMS participation (in months)	Average high school cumulative GPA	Average institution graduation rate (z-score) <sup>2</sup>
Enrolled full-time during first term of college						
Institution had SSS project						
UB/UBMS-SSS participant	54.9	82.8	92.5	34	3.26	-0.03
UB/UBMS-SSS nonparticipant A	44.4	77.4	82.1	31	3.22	-0.01
Institution did not have SSS project						
UB/UBMS-SSS nonparticipant B	50.9	77.5	81.3	31	3.23	0.12
Enrolled part-time during first term of college						
Institution had SSS project						
UB/UBMS-SSS participant	36.8	85.1	91.3	33	3.11	-0.21
UB/UBMS-SSS nonparticipant A	19.3	79.0	78.5	31	2.99	-0.33
Institution did not have SSS project						
UB/UBMS-SSS nonparticipant B	20.2	79.6	76.0	30	2.96	-0.26

<sup>1</sup> *First generation* refers to first-generation college student. Reference category is being low-income only or first-generation college student only.

<sup>2</sup> Column shows the z-scores that correspond to the graduation rates for cohort participants' first-attended institution. Z-scores are standard scores with a mean of 0 (the original cohort-specific means ranged from 47.4 to 48.9) and a standard deviation of 1 (the original cohort-specific standard deviations ranged from 21.5 to 22.0). These scores indicate whether graduation rates among institutions attended by UB/UBMS participants are, on average, above or below the overall mean graduation rate for all 4-year institutions; in addition, these z-scores indicate the magnitude of differences (i.e., the number of standard deviations) between the average graduation rate among institutions attended by UB/UBMS participants and the overall mean graduation rate for all 4-year institutions. The graduation rates are based on first-time, full-time students at 4-year postsecondary institutions who completed a bachelor's degree from the first institution attended within 150 percent of normal time (within 6 years).

NOTES: GPA = grade point average; SSS = Student Support Services; UB = Upward Bound; and UBMS = Upward Bound Math-Science. Results include the 35,035 UB/UBMS participants who were in the 2008 through 2011 postsecondary education enrollment cohorts and first enrolled at a 4-year institution. *Institution* refers to the participants' first-attended postsecondary institution.

SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.

## Participants who First Enrolled at 2-Year Institutions

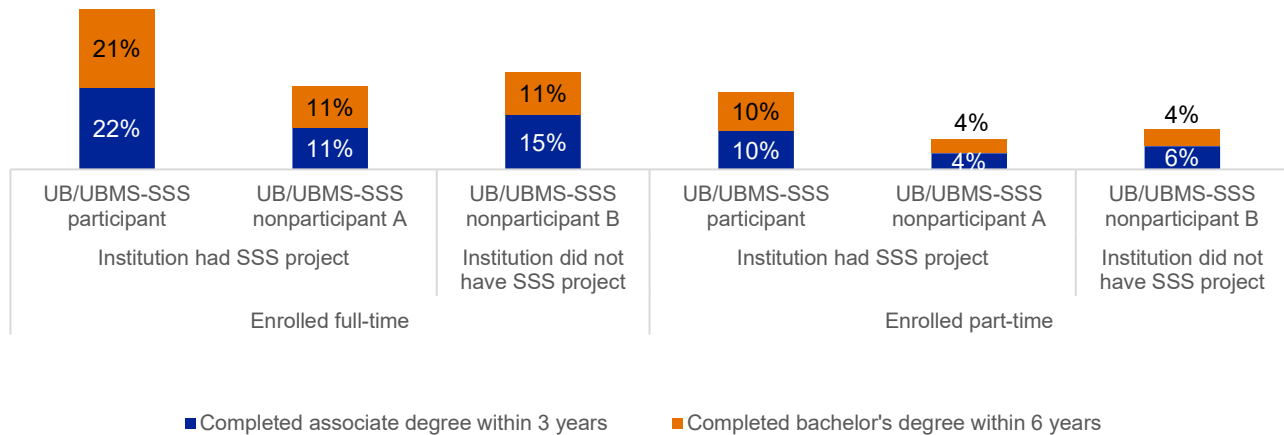
### Postsecondary Degree Completion Rates

Among those who first attended a 2-year institution, this study examined the highest postsecondary degree completed within 150 percent of normal time (i.e., completed a bachelor's degree within 6 years or an associate degree within 3 years of entering postsecondary education). UB/UBMS-SSS participants had higher degree completion rates than did UB/UBMS-SSS nonparticipants, and these differences were evident for both associate and bachelor's degree completion (see Exhibit 4).

Overall, among those who enrolled full-time, 43 percent of UB/UBMS-SSS participants earned a postsecondary degree within 150 percent of normal time, as compared with 22 percent of nonparticipants A and 26 percent of nonparticipants B. Similar patterns are seen among those who enrolled part-time: whereas 20 percent of UB/UBMS-SSS participants earned a postsecondary degree within 150 percent of normal time, only 8 percent of nonparticipants A and 10 percent of nonparticipants B did so.



**Exhibit 4. Among UB/UBMS cohort participants who first enrolled at a 2-year institution, the highest postsecondary degree completed within 150 percent of normal time, by participants' enrollment intensity, whether first-attended postsecondary institution had an SSS project, and SSS participation status**



SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.

**Contextual Measures**

UB/UBMS-SSS participants' senior year UB/UBMS participation rates were higher than those of UB/UBMS-SSS nonparticipants, and average length of participation in the UB/UBMS program was longer for those who went on to participate in an SSS project (see Exhibit 5). High school cumulative GPAs were, on average, higher among UB/UBMS-SSS participants relative to UB/UBMS-SSS nonparticipants.

Unlike findings for those who enrolled in 4-year institutions, UB/UBMS-SSS participants and UB/UBMS-SSS nonparticipants who first attended 2-year institutions were similar in the percentage who met

both the low-income and first-generation college student eligibility criteria.

For students in both enrollment intensity categories, the average institution graduation rates were lower than the average graduation rate for all 2-year institutions (i.e., for all groups, the z-scores had negative values).<sup>6</sup> Among both full-time and part-time students, the institutions attended by UB/UBMS-SSS participants had, on average, modestly higher graduation rates than the institutions attended by UB/UBMS-SSS nonparticipants A (i.e., the z-score value for UB/UBMS-SSS participants was greater than the z-score value for UB/UBMS-SSS nonparticipants A).

<sup>6</sup> The graduation rates are based on first-time, full-time students at 2-year postsecondary institutions who completed a degree from the first institution attended within 150 percent of normal time (within 3 years).



**Exhibit 5. Among UB/UBMS cohort participants who first enrolled at a 2-year institution, the percentage who earned a postsecondary degree within 150 percent of normal time and select contextual measures, by enrollment intensity, whether institution had an SSS project, and SSS participation status**

	Percentage who earned a postsecondary degree within 150 percent normal time <sup>1</sup>	Contextual measures				
		Percentage who were both low income and first generation <sup>2</sup>	Percentage participating in UB/UBMS during senior year of high school	Average length of UB/UBMS participation (in months)	Average high school cumulative GPA	Average institution graduation rate (z-score) <sup>3</sup>
Enrolled full-time during first term of college						
Institution had SSS project						
UB/UBMS-SSS participant	43.0	82.8	87.9	34	3.04	-0.83
UB/UBMS-SSS nonparticipant A	22.2	80.1	71.7	29	2.82	-0.98
Institution did not have SSS project						
UB/UBMS-SSS nonparticipant B	26.0	81.4	74.3	30	2.81	-0.80
Enrolled part-time during first term of college						
Institution had SSS project						
UB/UBMS-SSS participant	20.8	82.2	85.2	33	2.81	-0.91
UB/UBMS-SSS nonparticipant A	8.1	82.0	69.4	28	2.60	-1.04
Institution did not have SSS project						
UB/UBMS-SSS nonparticipant B	10.7	81.7	69.4	29	2.62	-0.85

<sup>1</sup> Earned a postsecondary degree at any institution within 150 percent of normal time means earning either a bachelor's degree within 6 years or an associate degree within 3 years of beginning postsecondary education.

<sup>2</sup> First generation refers to first-generation college student. Reference category is being low-income only or first-generation college student only.

<sup>3</sup> Column shows the z-scores that correspond to the graduation rates for cohort participants' first-attended institution. Z-scores are standard scores with a mean of 0 (the original cohort-specific means ranged from 43.6 to 46.2) and a standard deviation of 1 (the original cohort-specific standard deviations ranged from 26.3 to 27.2). These scores indicate whether graduation rates among institutions attended by UB/UBMS participants are, on average, above or below the overall mean graduation rate for all 2-year institutions; in addition, these z-scores indicate the magnitude of differences (i.e., the number of standard deviations) between the average graduation rate among institutions attended by UB/UBMS participants and the overall mean graduation rate for all 2-year institutions. The graduation rates are based on first-time, full-time students at 2-year postsecondary institutions who completed a degree from the first institution attended within 150 percent of normal time (within 3 years).

NOTES: GPA = grade point average; SSS = Student Support Services, UB = Upward Bound; and UBMS = Upward Bound Math-Science. Results include the 17,457 UB/UBMS participants who were in the 2008 through 2011 postsecondary education enrollment cohorts and first enrolled at a 2-year institution. *Institution* refers to the participants' first-attended postsecondary institution.

SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.

## Conclusion

The key finding from this report is the higher rate of postsecondary degree completion among UB/UBMS-SSS participants relative to UB/UBMS-SSS nonparticipants. This pattern held true in each of the four domains addressed within this report:

1. UB/UBMS cohort participants who first-enrolled full-time at a 4-year institution
2. UB/UBMS cohort participants who first-enrolled part-time at a 4-year institution
3. UB/UBMS cohort participants who first-enrolled full-time at a 2-year institution

4. UB/UBMS cohort participants who first-enrolled part-time at a 2-year institution

The difference in degree completion rates is most pronounced among those who enrolled part-time, and/or enrolled at a 2-year institution (domains 2, 3, and 4); the difference is less pronounced – though still favoring UB/UBMS-SSS participants – among those who first-enrolled full-time at a 4-year institution (domain number 1).

Although beyond the scope of this study, the differences in postsecondary degree completion rates presented in this report could be accounted for – at least in part – by differences in factors established prior to beginning postsecondary education. For example,





relative to UB/UBMS-SSS nonparticipants, UB/UBMS participants had higher rates of UB/UBMS program participation during the senior year of high school, and longer exposure to UB/UBMS services (in terms of average length of UB/UBMS participation). Each of these factors are positively associated with postsecondary degree completion among UB/UBMS participants (see also footnote 2).

Conversely, for UB/UBMS cohort participants who first-enrolled full- or part-time at a 4-year institution (domains 1 and 2), UB/UBMS-SSS participants were more likely to be both low-income and a first-generation college student than UB/UBMS-SSS nonparticipants. Among UB/UBMS cohort participants, being both low-income and a first-generation college student was negatively associated with postsecondary degree completion (see also footnote 2).

A limitation of this analysis is that the data sources used in this report did not include information about other factors that could influence postsecondary degree completion (e.g., participants' level of motivation, educational expectations/aspirations, rigor of high school curriculum, course scheduling, and personal finances). For example, it may be the case that students who participated in SSS programs had stronger degree attainment motivation than those that did not, but this study does not have any data to consider this proposition. The extent to which UB/UBMS-SSS participants and UB/UBMS-SSS nonparticipants may differ on these factors is unknown and, as a result, the degree to which these factors could account for the differences in postsecondary degree completions found in this report is also unknown.

A secondary finding of interest in this study is the extent to which members of the UB/UBMS cohort attend postsecondary institutions that offer an SSS project. Of the entire cohort, nearly two-thirds of UB/UBMS participants enrolled in a postsecondary institution that provided an SSS project. However, of

the students from the cohort who attended an institution which provided an SSS project only 22 percent participated in the project (See discussion in Appendix A and Exhibit A-1). Overall, only 13 percent of the UB/UBMS postsecondary cohort participated in an SSS project in their first year of enrollment (including both those who first attended an institution that offered an SSS program and those who did not). An additional 3 percent first participated in an SSS project later after completing their first year of postsecondary enrollment.

## For Further Reference

The following resources contain additional information about the UB and UBMS programs:

UB webpage (provides information on UB program funding and other resources):

<https://www2.ed.gov/programs/trioupbound/index.html>

UBMS webpage (provides information UBMS program funding and other resources):

<https://www2.ed.gov/programs/triomathsci/index.html>

TRIO UB/UBMS published reports:

<https://www2.ed.gov/programs/trioupbound/resources.html>

<https://www2.ed.gov/programs/triomathsci/resources.html>

- Fast Facts Report for the Upward Bound and Upward Bound Math-Science Programs (2021)
- Upward Bound and Upward Bound Math-Science Programs Postsecondary Outcomes Report (2016)
- Upward Bound and Upward Bound Math-Science Program Outcomes for Participants Expected to Graduate High School in 2004–05, With Supporting Data From 2005–06



- A Profile of the Upward Bound Program: 2000–2001
- A Profile of the Upward Bound Math-Science Program: 2000–2001

The following resources contain additional information about the SSS program:

SSS webpage (provides information on SSS program funding and other resources):  
<https://www2.ed.gov/programs/triostudsupp/index.html>

TRIO SSS published reports:

<https://www2.ed.gov/about/offices/list/ope/trio/index.html>

<https://www2.ed.gov/programs/triostudsupp/resources.html>

- Comparing Student Outcomes Between Student Support Services Participants and Nonparticipants in the 2004/09 Beginning Postsecondary Students Longitudinal Study (2019)
- Fast Facts Report for the Student Support Services Program (2016)
- Persistence and Completion in Postsecondary Education of Participants in the TRIO Student Support Services Program (2015)
- National Evaluation of Student Support Services: Examination of Student Outcomes After Six Years (2010)
- A Profile of the Student Support Services Program: 1998–1999 Through 2001–2002

Finally, for more information about the TRIO umbrella program, please see the following resources:

TRIO webpage (provides links to the webpages for individual TRIO programs; TRIO news and information; and links to TRIO reports, maps, and other resources):

<https://www2.ed.gov/about/offices/list/ope/trio/index.html>

TRIO Story Maps:

- Project Sites Throughout the U.S. and Outlying Territories:  
<https://ope.ed.gov/programs/maped/storymaps/trio/>
- Grantee data for all TRIO programs:  
<https://ope.ed.gov/programs/trio/trioexplorer/>
- Target school search radius map (allows users to search for secondary public schools within a specified distance); UB/UBMS grantees are also plotted on the map:  
<https://ope.ed.gov/programs/trio/DiscoverTRIOTargetSchools/>
- TRIO Target Schools Throughout the U.S (forthcoming):  
[https://ope.ed.gov/programs/trio/ub\\_ubmsmap](https://ope.ed.gov/programs/trio/ub_ubmsmap)



# Appendix A. Technical Appendix

## Analytic Sample

The analytic sample for this report is comprised of 52,492 Upward Bound/Upward Bound Math-Science (UB/UBMS) participants who were in the 2008 through 2011 UB/UBMS postsecondary education enrollment cohorts and were served by projects that were funded during both the 2007–12 and 2012–17 funding cycles.<sup>7</sup> UB/UBMS postsecondary education enrollment cohorts are comprised of UB/UBMS participants who graduated high school during a given academic year and enrolled in postsecondary education by the fall term immediately following high school graduation (e.g., for the 2008 UB/UBMS postsecondary education enrollment cohort, participants graduated high school in the 2007–08 academic year and enrolled in postsecondary education by fall 2008). The study used multiple cohort years to have a sample that was large enough to support analysis and improve the generalizability of results. The 2008–11 postsecondary education enrollment cohorts were the most recent ones for which 6 years of post-high school longitudinal data were available at the time the analysis was conducted. The 6 years of post-high school data allowed for identification of UB/UBMS cohort members who did or did not earn a postsecondary degree within 150 percent of normal time.

The study sample includes UB/UBMS cohort participants who began receiving SSS program services during their first year of college (UB/UBMS-SSS participants) and those who were not served by the SSS program (UB/UBMS-SSS nonparticipants). UB/UBMS-SSS participants and UB/UBMS-SSS

nonparticipants were disaggregated by: (1) the level of their first-attended postsecondary institution (4-year institution or a 2-year institution); (2) their enrollment intensity during their first term in college (full-time or part-time); (3) and whether their first-attended postsecondary institution had an SSS project during the academic year in which they first enrolled (see Exhibit A-1).

Roughly twice as many UB/UBMS cohort participants began their postsecondary education at a 4-year institution than began at a 2-year institution (see Exhibit A-1). UB/UBMS cohort participants who first attended a 4-year institution were more likely to be enrolled full-time during their first term of college than those who first attended a 2-year institution. Among those in the analytic sample, 62 percent attended a postsecondary institution that had an SSS project during the academic year in which they first enrolled, and 14 percent participated in the SSS project during their first year of postsecondary education.

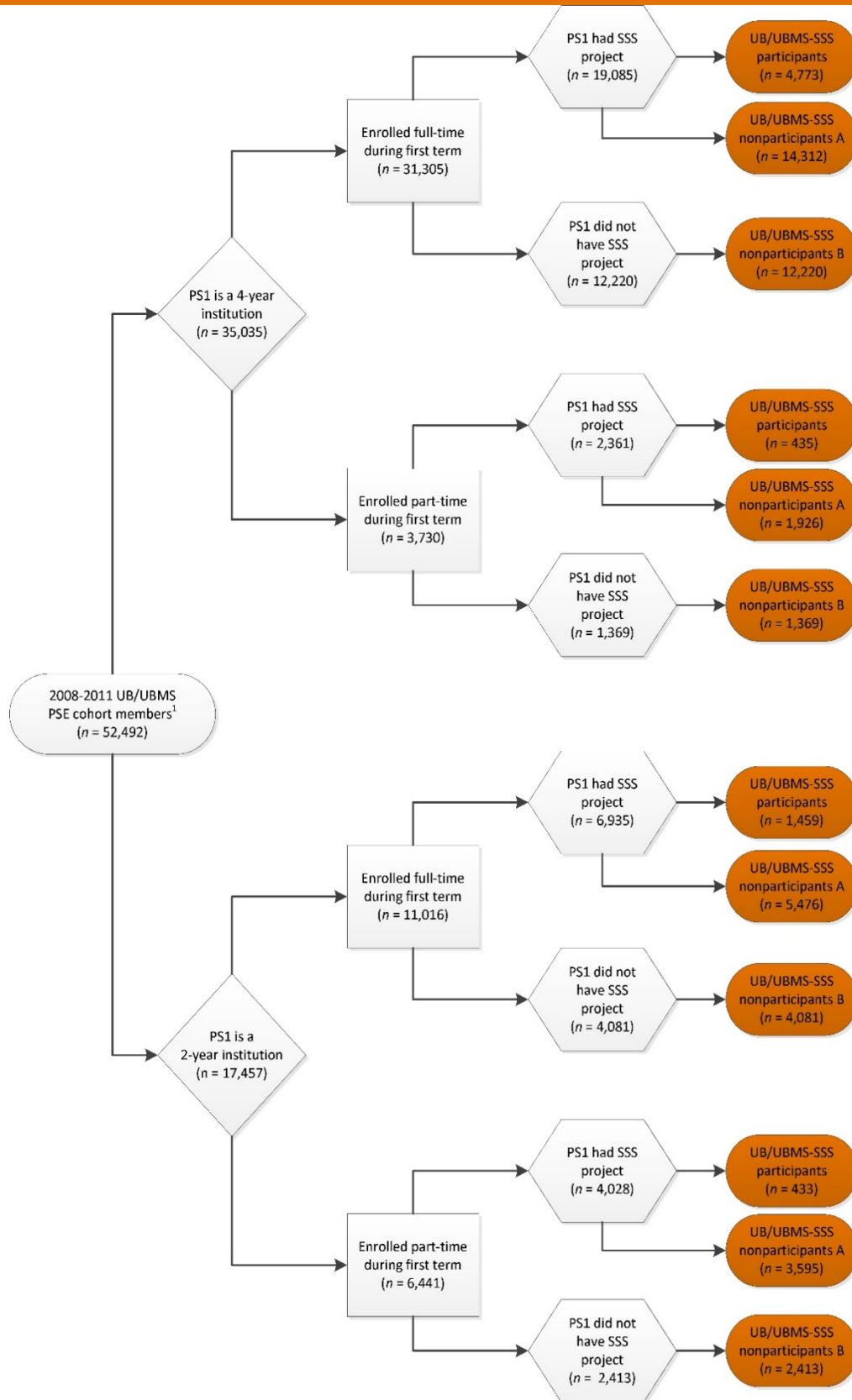
## Data Sources

The data sources for this report were primarily from the U.S. Department of Education (ED): the Federal TRIO Programs UB/UBMS and Student Support Services (SSS) annual performance reports (APRs) and the TRIO Funded Projects Database; the National Student Loan Data System (NSLDS); and the Integrated Postsecondary Education Data System (IPEDS). Additionally, the report used data from the National Student Clearinghouse (NSC). These various data sources were merged using common identifiers contained in the data.

<sup>7</sup> There were 3,889 cohort participants who were excluded from the analytic sample because (1) their postsecondary degree completion status was unknown; (2) their first-attended postsecondary institution was unknown; and/or (3) their SSS participation status was unknown, or did not fall within one of the two categories considered in this report (i.e. started SSS in their first year of postsecondary education, or, had no SSS participation within 6 years of beginning postsecondary education).



## Exhibit A-1. Disposition of the analysis sample



<sup>1</sup> There were 3,889 UB/UBMS cohort participants who were excluded from the sample because (1) their postsecondary degree completion status was unknown; (2) their first-attended postsecondary institution was unknown; and/or (3) their SSS participation status was unknown or did not fall within one of the two categories considered in this report.

NOTES: PSE = postsecondary education; PS1 = students' first-attended postsecondary institution; SSS = Student Support Services; UB = Upward Bound; and UBMS = Upward Bound Math-Science. Two types of UB/UBMS-SSS nonparticipants are depicted in this exhibit: (1) those whose institution had an SSS project ("UB/UBMS-SSS nonparticipants A"), and (2) those whose institution did not have an SSS project ("UB/UBMS-SSS nonparticipants B").



**TRIO program data.** The primary data source for this study is the UB/UBMS APR data that grantees submit annually. UB/UBMS APRs include individual-level information for participants who were served during the reporting year and for prior-year participants who were served in previous reporting year(s). APRs contain information on UB/UBMS program participation, participant demographics and family background, high school experiences and academic performance, and postsecondary enrollment and degree completion. Participant-level APR data for SSS participants are also collected each year. Participant records from the UB/UBMS APR data were merged with participant records from the SSS APR data to identify UB/UBMS cohort participants who received SSS program services while in college and which year(s) the SSS services were received.

The TRIO Funded Projects Database includes a comprehensive record of grantees funded in each of the TRIO Programs in each funding year. The database includes UB/UBMS and SSS grantees' Office of Postsecondary Education Identifiers (OPEIDs) that were used to determine whether the postsecondary institution that participants first attended had an SSS project. The database also includes information on sector of the UB/UBMS and SSS grantee institution.

**NSLDS.** ED's NSLDS maintains student-level data on Pell Grants and other federal student loans received, as well as the name and OPEIDs of the postsecondary institution(s) attended. UB/UBMS longitudinal data file records are annually merged with NSLDS data and the resulting match file's data are merged onto the UB/UBMS longitudinal data file. The study used NSLDS data covering the period of fall 2007 through fall 2011 to supplement APR data in identifying the specific postsecondary institutions attended by UB/UBMS participants.<sup>8</sup>

**IPEDS.** ED's IPEDS includes information on every college, university, and technical and vocational institution that participates in the federal student financial aid programs. IPEDS was the data source for the level of participants' first-attended postsecondary institution (4-year vs. 2-year), and for the institution graduation rates. Depending on UB/UBMS participants' postsecondary education enrollment cohort year, IPEDS data from 2008, 2009, 2010, or 2011 were merged with records from UB/UBMS APR data using the OPEIDs that are in both IPEDS and the UB/UBMS longitudinal data file.

**NSC.** The NSC regularly collects student-level college enrollment and degree data from more than 3,700 colleges and universities of all types (e.g., 2-year, 4-year, public, private, trade schools). APR records for UB/UBMS cohort participants were merged with NSC records to obtain information on participants' enrollment intensity (enrolled full-time or part-time) during their first term of college.

## Measures

The study's key analysis measures are defined in Exhibit 1. In this section, more detailed information is provided for the enrollment intensity measure and the additional measures included in the study's analyses are defined.

**Enrollment intensity.** This report uses a simplified construct for enrollment intensity that is based on whether the UB/UBMS cohort participant was enrolled full-time or part-time during their first term (or first semester) of attendance at a postsecondary institution. Importantly, enrollment intensity varies much more broadly than a simple differentiation between those who are enrolled full-time in their first term versus those who are not. Moreover, differences in enrollment intensity beyond the first term is an extremely important factor in predicting degree

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<sup>8</sup> NSLDS data pertains to federal student loans; as such, NSLDS can only be used to help identify those institutions attended by federal aid recipients.



attainment rates.<sup>9</sup> Our report does not account for mixed enrollment pathways (i.e., a student who showed a combination of full-time and part-time enrollment through the study period) because enrollment intensity after the first term is potentially an endogenous factor that may be an outcome of SSS participation. For example, SSS participation may change the likelihood of later part-time enrollment.

This report is based on a study design that cannot evaluate or otherwise control for this potential endogeneity. Addressing this endogeneity would add a layer of complexity that is beyond the scope of this report. An improved study design and analysis could address how the complex variation in postsecondary enrollment intensity pathways helps us better understand how TRIO program participation is related to postsecondary degree attainment.

**Being both a low-income and a first-generation college student.** This is a dichotomous measure of whether the student was eligible to participate in the UB/UBMS program because the student met both eligibility criteria of being both low-income and potential first-generation college students or met only one of these criteria (i.e., low-income only or potential first-generation college student only). As defined in Upward Bound regulations (Title 34, Section 645.6), low-income individual means an individual whose family taxable income did not exceed 150 percent of the poverty level amount in the calendar year preceding the year in which the individual initially participated in the project. The poverty level amount is determined using criteria established by the Bureau of the Census of the U.S. Department of Commerce and varies based on family size. First-generation college student means an individual neither of whose natural or adoptive parents received a baccalaureate degree; or a student who, prior to the age of 18, regularly resided with and received support from only one natural or adoptive

parent and whose supporting parent did not receive a baccalaureate degree.

**Participating in UB/UBMS during senior year of high school.** This is a dichotomous measure of whether the UB/UBMS participant received UB/UBMS services during the senior year of high school or left the UB/UBMS program prior to the senior year.

**Length of UB/UBMS participation (in months).** This measure is operationalized as the difference between each participant's date of last UB/UBMS project service and date of first UB/UBMS project service.

**High school cumulative grade point average (GPA).** This GPA measure is based on a 4-point scale and reflects the participants' cumulative GPA at the end of the academic year the participant last received UB/UBMS services.

### **Imputation of Students' First-Term Enrollment Intensity**

Information on UB/UBMS cohort participants' enrollment intensity during their first term of college was obtained by matching UB/UBMS cohort participant records to NSC records. Of the 52,492 UB/UBMS cohort participants, 14,336 (27 percent) were missing information on enrollment intensity because they either did not match to an NSC record (8 percent) or they had an NSC record but the record did not have intensity information for the first term the student was enrolled (19 percent). UB/UBMS cohort participants who first-enrolled at a 4-year institution were less likely to be missing information on enrollment intensity than those who first enrolled at a 2-year institution (21 percent and 40 percent, respectively) (see Exhibit A-2).

<sup>9</sup> See Shapiro, D., Dundar, A., Huie, F., Wakhungu, P.K., Yuan, X., Nathan, A. & Bhimdiwali, A. (2017, December). "Completing College: A National View of Student Completion Rates – Fall 2011 Cohort" (Signature Report No. 14). Herndon, VA: *National Student Clearinghouse Research Center*.



**Exhibit A-2. Distribution of the analysis sample before and after imputation of the enrollment intensity measure, by the level of participants' first-attended postsecondary institution, participants' enrollment intensity, whether first-attended postsecondary institution had an SSS project, and SSS participation status**

	First enrolled at a 4-year institution				First enrolled at a 2-year institution			
	Pre-imputation		Post-imputation		Pre-imputation		Post-imputation	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Enrolled full-time during first term of college								
Institution had SSS project								
UB/UBMS-SSS participant	3,919	11.2	4,773	13.6	1,078	6.2	1,459	8.4
UB/UBMS-SSS nonparticipant A	11,090	31.7	14,312	40.9	3,336	19.1	5,476	31.4
Institution did not have SSS project								
UB/UBMS-SSS nonparticipant B	9,750	27.8	12,220	34.9	2,362	13.5	4,081	23.4
Enrolled part-time during first term of college								
Institution had SSS project								
UB/UBMS-SSS participant	323	0.9	435	1.2	245	1.4	433	2.5
UB/UBMS-SSS nonparticipant A	1,547	4.4	1,926	5.5	2,170	12.4	3,595	20.6
Institution did not have SSS project								
UB/UBMS-SSS nonparticipant B	1,066	3.0	1,369	3.9	1,267	7.3	2,413	13.8
Unknown enrollment intensity during first term of college								
Institution had SSS project								
UB/UBMS-SSS participant	966	2.8	—	—	569	3.3	—	—
UB/UBMS-SSS nonparticipant A	3,601	10.3	—	—	3,565	20.4	—	—
Institution did not have SSS project								
UB/UBMS-SSS nonparticipant B	2,773	7.9	—	—	2,865	16.4	—	—

— Not applicable.

NOTES: SSS = Student Support Services; UB = Upward Bound; and UBMS = Upward Bound Math-Science. Results include the 52,492 UB/UBMS participants who were in the 2008 through 2011 postsecondary education enrollment cohorts. Of these participants, 7,340 who first attended a 4-year institution and 6,999 who first attended a 2-year institution had a missing value for the enrollment intensity measure that was imputed. Institution refers to participant's first-attended postsecondary institution.

SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.

To facilitate presentation of results in this report, missing values for the first-term enrollment intensity measure were imputed.<sup>10</sup> Exhibit A-2 shows the

distribution of the analytic sample both before and after imputation of the first-term enrollment intensity measure. Imputation of enrollment intensity (i.e., “full-

<sup>10</sup> Missing values were imputed using PROC MI, a SAS procedure that uses multiple imputation (as opposed to single imputation) to replace each missing value with a set of plausible values that represent the uncertainty about the right value to impute. Further detail regarding PROC MI can be found in the SAS documentation for the procedure:

[https://support.sas.com/documentation/cdl/en/statug/63962/HTML/default/viewer.htm#statug\\_mi\\_sect001.htm](https://support.sas.com/documentation/cdl/en/statug/63962/HTML/default/viewer.htm#statug_mi_sect001.htm).



time” or “part-time”) was conditional on the following six factors:

- whether the UB/UBMS cohort participant completed a postsecondary degree within 150 percent of normal time;
- whether the participant was both low-income and a first-generation college student or had only one of these characteristics;
- the participant’s UB/UBMS program participation status during the senior year of high school (i.e., participated or did not participate in senior year);
- the number of months the participant received UB/UBMS services;

- the participant’s high school cumulative GPA; and
- the institution-level graduation rate for the participant’s first-attended postsecondary institution.

Differences in postsecondary degree completion rates (UB/UBMS-SSS participants vs. UB/UBM-SSS nonparticipants) were examined both before and after imputation of the first-term enrollment intensity measure. As seen in Exhibit A-3, postsecondary degree completion rates among UB/UBMS-SSS participants are higher than those among corresponding subgroups of UB/UBMS-SSS nonparticipants – even among those with unknown enrollment intensity – both before and after imputation.

**Exhibit A-3. Among UB/UBMS cohort participants, percentage who earned a degree within 150 percent of normal time both before and after imputation of the enrollment intensity measure, by the level of participants’ first-attended postsecondary institution, participants’ enrollment intensity, whether first-attended postsecondary institution had an SSS project, and SSS participation status**

	First attended a 4-year institution		First attended a 2-year institution	
	Pre-imputation	Post-imputation	Pre-imputation	Post-imputation
Enrolled full-time during first term of college				
Institution had SSS project				
UB/UBMS-SSS participant	55.3	54.9	42.1	43.0
UB/UBMS-SSS nonparticipant A	46.0	44.4	23.5	22.2
Institution did not have SSS project				
UB/UBMS-SSS nonparticipant B	53.7	50.9	27.1	26.0
Enrolled part-time during first term of college				
Institution had SSS project				
UB/UBMS-SSS participant	34.4	36.8	21.6	20.8
UB/UBMS-SSS nonparticipant A	18.4	19.3	8.4	8.1
Institution did not have SSS project				
UB/UBMS-SSS nonparticipant B	20.2	20.2	10.7	10.7
Unknown enrollment intensity during first term of college				
Institution had SSS project				
UB/UBMS-SSS participant	52.2	—	36.9	—
UB/UBMS-SSS nonparticipant A	37.4	—	15.1	—
Institution did not have SSS project				
UB/UBMS-SSS nonparticipant B	37.9	—	19.0	—

— Not applicable.

NOTES: SSS = Student Support Services; UB = Upward Bound; and UBMS = Upward Bound Math-Science. Results include the 52,492 UB/UBMS participants who were in the 2008 through 2011 postsecondary education enrollment cohorts. Among those who first enrolled at a 4-year institution, degree completion rates indicate the proportion who earned a bachelor’s degree within 6 years of beginning their postsecondary education; among those who first enrolled at a 2-year institution, degree completion rates indicate the proportion who earned either a bachelor’s degree within 6 years or an associate degree within 3 years. Institution refers to participants’ first-attended postsecondary institution.

SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.



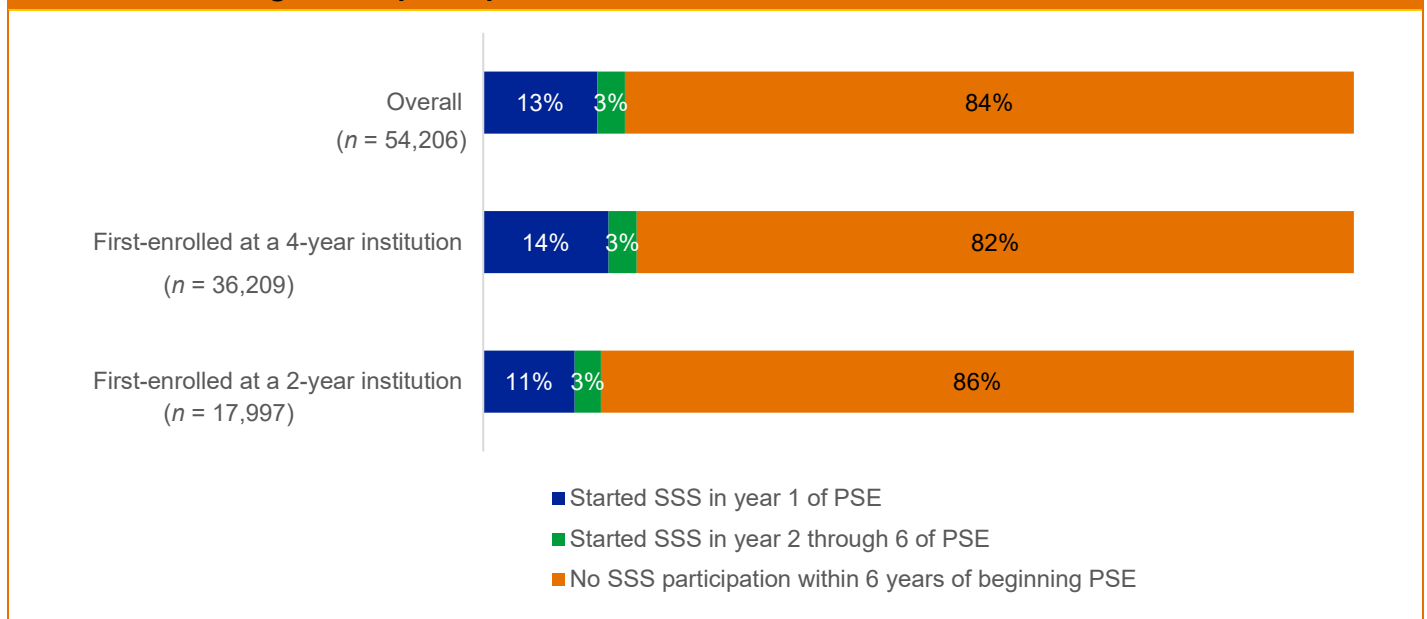


## Rates of SSS Participation Among UB/UBMS Cohort Participants

Overall, approximately 13 percent of the UB/UBMS cohort participants began participation in the SSS program during their first year of postsecondary education (Exhibit A-4). This rate varied by the level of participants' postsecondary institution: among those who enrolled at a 4-year institution, the rate was 14 percent, and among those who enrolled at a 2-year

institution, the rate was 11 percent. An additional 3 percent of UB/UBMS cohort participants began participating in the SSS program during their second, third, fourth, fifth, or sixth year of postsecondary education (i.e., had late SSS participation). Due to their "partial exposure" to the SSS program, the 1,714 UB/UBMS cohort participants who had late SSS participation were excluded from the analysis presented in the main body of this report.

**Exhibit A-4. Among UB/UBMS cohort participants, percentage who participated in the SSS program, by the level of participants' first-attended postsecondary institution and timing of SSS participation**



NOTES: PSE = postsecondary education; SSS = Student Support Services; UB = Upward Bound; and UBMS = Upward Bound Math-Science. Results include the 54,206 UB/UBMS cohort participants who were in the 2008 through 2011 PSE enrollment cohorts (results include the 1,714 cohort participants who had late SSS participation). The analysis sample for this report (n = 52,492) excluded cohort participants who had late SSS participation, as well as 2,175 cohort participants whose (1) postsecondary degree completion status was unknown; (2) first-attended postsecondary institution was unknown; and/or (3) SSS participation status was unknown.  
 SOURCES: U.S. Department of Education, Federal TRIO Programs, UB/UBMS longitudinal data file 2000–17, SSS longitudinal data file 1998–2017, and TRIO Funded Project Database; U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education System 2004–11; National Student Clearinghouse 2007–20; and National Student Loan Data System data, Fall 2007 through Fall 2017.



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**U.S. Department of Education**

Miguel Cardona

*Secretary*

**Office of Postsecondary Education**

Michelle Asha Cooper

*Acting Assistant Secretary for Postsecondary Education*

**Office of Postsecondary Education**

**Higher Education Programs**

Michelle Asha Cooper

*Deputy Assistant Secretary*

**Office of Postsecondary Education**

**Higher Education Programs Student**

**Service**

Linda Byrd-Johnson

*Senior Director*

August 2021

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