El Camino College
Accelerated Math Progression Study
Spring 2012-Summer 2017

Executive Summary

This report summarizes progression for two accelerated math courses at El Camino College: Basic Accelerated Mathematics (BAM) and General Education Algebra (GEA). Key findings include:

- Students in the BAM cohort were much more likely to progress through levels of math sequence up through transfer-level compared to students in the non-BAM cohort.
- When disaggregated by ethnicity, all four of the largest groups (African American, Asian, Latino, and White) in the BAM cohort had higher progression rates than those in the non-BAM cohort.
- Disaggregation by financial aid recipients and non-recipients shows no large differences in progression rates.
- Students in the GEA cohort were also more likely to progress through intermediate algebra and transfer-level math compared to students in the non-GEA cohort.
- Disaggregation by financial aid recipients and non-recipients shows that financial aid recipients in the GEA cohorts had lower progression rates than non-recipients.

The report also includes tracking charts for the accelerated and comparison courses for the eight separate cohorts of BAM and one combined cohort of GEA.

Introduction

Basic Accelerated Mathematics (BAM) and General Education Algebra (GEA) courses are part of the accelerated math sequence. They are designed to help students complete developmental mathematics in no more than two courses and prepare them for transfer level courses. BAM is designed for students who are placed below the elementary algebra level and helps them gain arithmetic and algebra competencies needed for success in a course one level below transfer after one semester. GEA, designed for students ready for elementary algebra, offers a one-semester alternative to the traditional two-semester elementary/intermediate algebra sequence. This report explores the progression of students placed in the accelerated math sequence cohort and compares them to those who were placed in the traditional math sequence cohort between Spring 2012 and Fall 2015.

Methodology

Progression is defined as the percentage of the original cohort that successfully completes the next course(s) in the math sequence.

Students included in this study were placed into a cohort based on the first math course attempted at El Camino College (see Table 1). Students in the comparison cohort were removed from the study if they left the traditional math sequence and took the comparable accelerated

course during the tracking period. A description of the math sequences for the accelerated and comparison cohorts can be found in the appendix of this report.

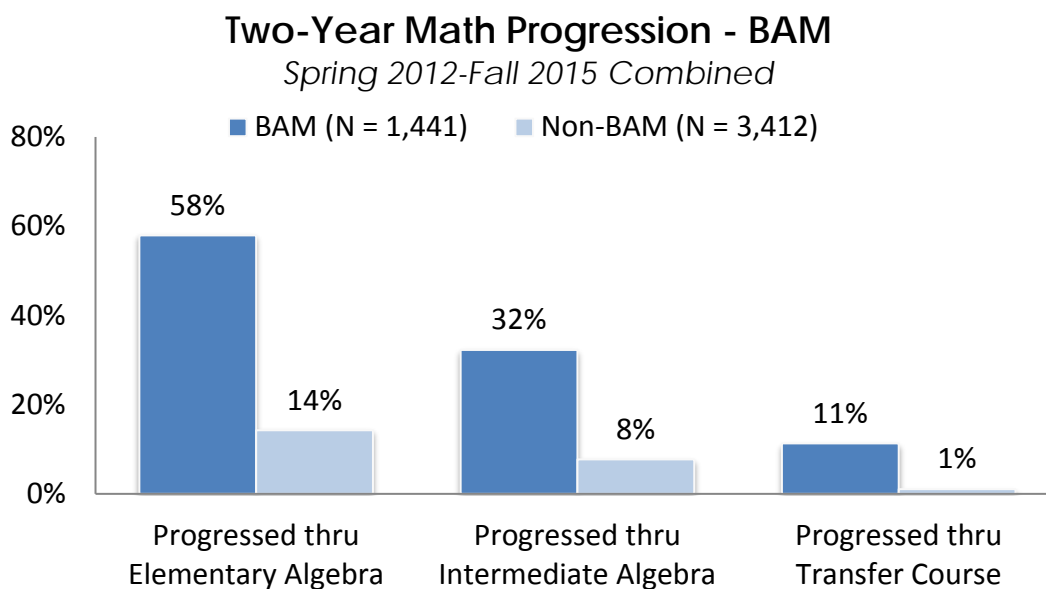*Table 1. Accelerated and Comparison Cohort*

Accelerated Cohort	Comparison Cohort
Math-37[1] (BAM)	Math-12 (Arithmetic)
Math-67[2] (GEA)	Math-40 (Elementary Algebra)

Each BAM/GEA cohort was tracked for the following cohort years:
- BAM Spring 2012 – Fall 2013 Cohorts – two, three, and four-year tracking
- BAM Spring 2014 & Fall 2014 Cohorts – two and three-year tracking
- BAM Spring 2015 & Fall 2015 Cohorts – two-year tracking
- GEA Spring 2012 – Fall 2015 Combined Cohort – two-year tracking

BAM Progression Results

Students in the BAM cohort were much more likely to progress through levels of math sequence up through transfer-level compared to students in the non-BAM cohort. The next few figures shows two-, three- and four-year progression rates. Appendix B shows detailed tracking charts[3] for accelerated and comparison courses for a combined cohort of BAM and combined cohort of GEA.

Two-Year Math Progression - BAM
Spring 2012-Fall 2015 Combined

Bar chart — BAM (N = 1,441) and Non-BAM (N = 3,412):
- Progressed thru Elementary Algebra: BAM 58%, Non-BAM 14%
- Progressed thru Intermediate Algebra: BAM 32%, Non-BAM 8%
- Progressed thru Transfer Course: BAM 11%, Non-BAM 1%

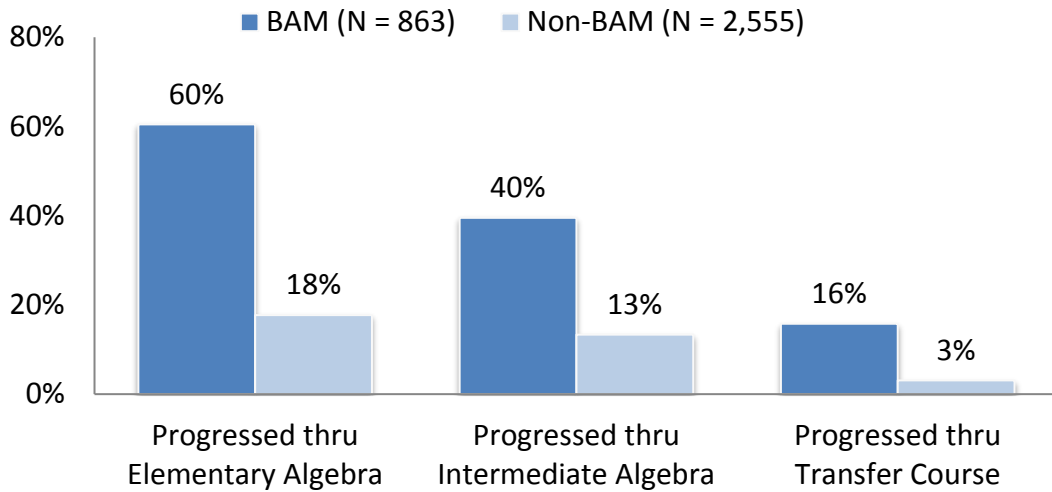[1] Effective Fall 2013, the *BAM* course number is Math-37. The previous numbering for this course was Math-50D.
[2] Effective Fall 2013, the *GEA* course number is Math-67. The previous numbering for this course was Math-50C.
[3] Tracking chart graphs were created by Marci Myers, Research Analyst, Institutional Research & Planning, based on a concept developed by Dr. Lars Kjeseth, Professor of Mathematics.
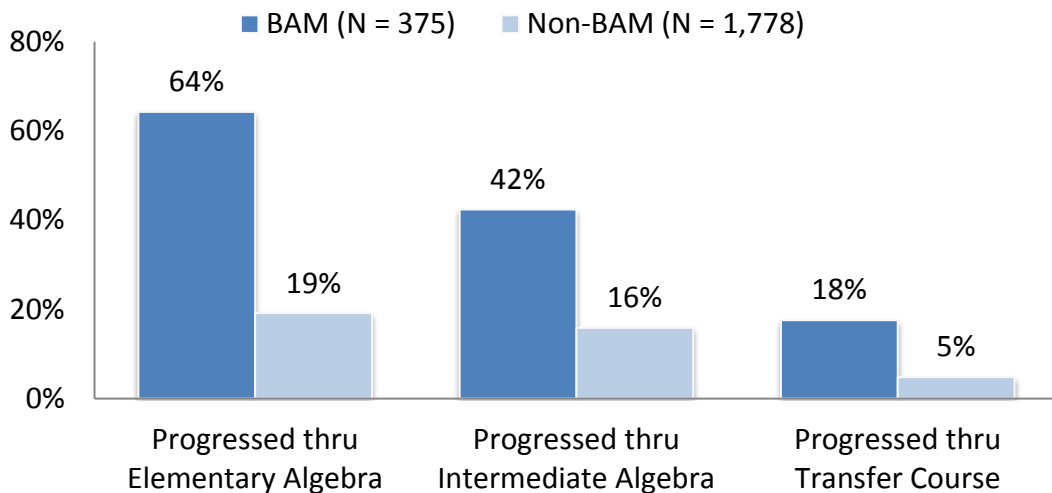
Three-Year Math Progression - BAM
Spring 2012-Fall 2014 Combined

■ BAM (N = 863)　■ Non-BAM (N = 2,555)

	Progressed thru Elementary Algebra	Progressed thru Intermediate Algebra	Progressed thru Transfer Course
BAM	60%	40%	16%
Non-BAM	18%	13%	3%

Four-Year Math Progression - BAM
Spring 2012-Fall 2013 Combined

■ BAM (N = 375)　■ Non-BAM (N = 1,778)

	Progressed thru Elementary Algebra	Progressed thru Intermediate Algebra	Progressed thru Transfer Course
BAM	64%	42%	18%
Non-BAM	19%	16%	5%

Progressions of BAM and non-BAM cohorts were disaggregated by four of the largest groups: African American, Asian, Latino, and White. Other ethnic groups could not be included in the report due to small numbers of cohort students belonging to those groups. The disaggregation showed that all four of the largest groups (African American, Asian, Latino, and White) had higher rates of progression in the BAM cohort than the non-BAM cohort. Although all groups saw increases in progression in the BAM cohort, equity gaps increased, with larger differences between the groups, particularly in the progression between elementary algebra and intermediate algebra.

Two-Year Math Progression – BAM by Ethnicity
Spring 2012-Fall 2015 Combined

BAM: ■ African American ■ Asian ■ Latino ■ White
Non-BAM: ■ African American ■ Asian ■ Latino ■ White

	Progressed thru Elementary Algebra	Progressed thru Intermediate Algebra	Progressed thru Transfer Course
African American	46% (9%)	21% (4%)	6% (<1%)
Asian	74% (26%)	58% (17%)	21% (3%)
Latino	58% (16%)	32% (9%)	10% (1%)
White	73% (19%)	47% (10%)	26% (2%)

Three-Year Math Progression – BAM by Ethnicity
Spring 2012-Fall 2014 Combined

BAM: ■ African American ■ Asian ■ Latino ■ White
Non-BAM: ■ African American ■ Asian ■ Latino ■ White

	Progressed thru Elementary Algebra	Progressed thru Intermediate Algebra	Progressed thru Transfer Course
African American	47% (10%)	24% (7%)	9% (2%)
Asian	86% (36%)	75% (30%)	32% (9%)
Latino	60% (20%)	41% (15%)	16% (3%)
White	78% (22%)	51% (18%)	32% (5%)
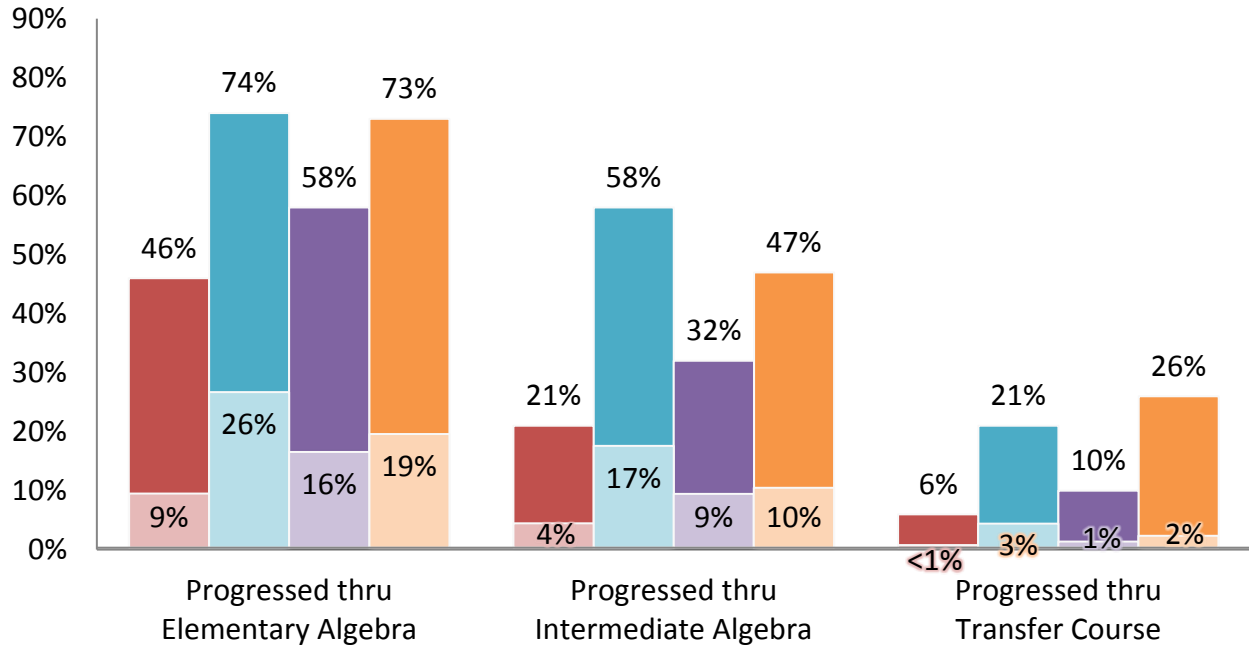
Four-Year Math Progression – BAM by Ethnicity
Spring 2012-Fall 2013 Combined

BAM: ■ African American   ■ Asian   ■ Latino   ■ White
Non-BAM: ■ African American   ■ Asian   ■ Latino   ■ White
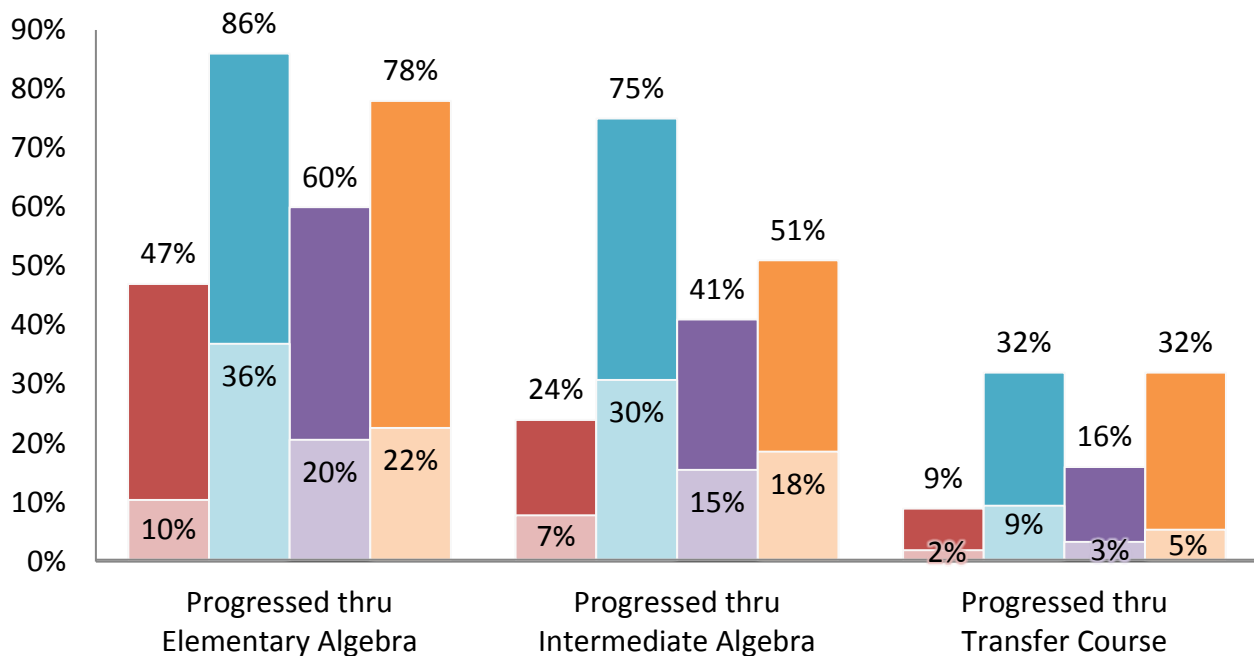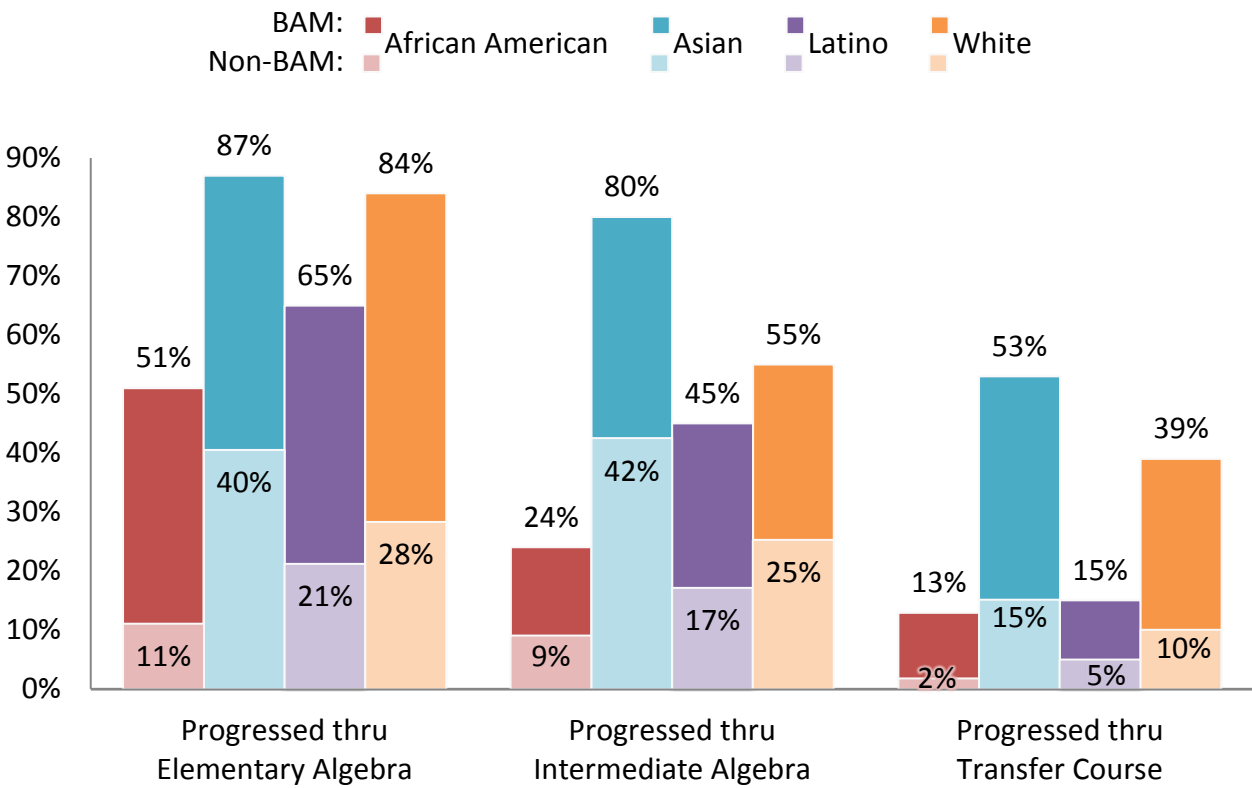
Progression rates for each cohort were also disaggregated by financial aid recipients and students who did not receive financial aid. Fifty-seven percent of students in the BAM cohorts received financial aid and 64% of students in the non-BAM cohorts received financial aid. There were no large differences in progression rates between financial aid recipients and students who did not receive financial aid for both BAM and non-BAM cohorts.

Two-Year Math Progression – BAM by Financial Aid
Spring 2012-Fall 2015 Combined

BAM: ■ Financial Aid Recipients   ■ No Financial Aid
Non-BAM:
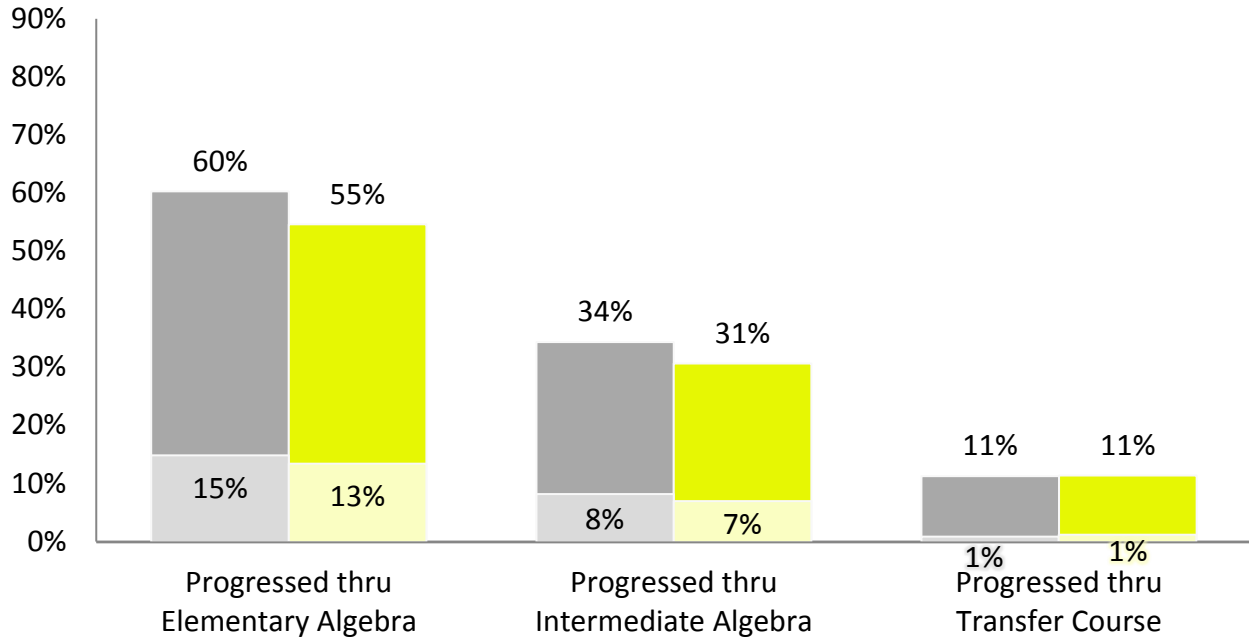
- Progressed thru Elementary Algebra: 60% / 55% (15% / 13%)
- Progressed thru Intermediate Algebra: 34% / 31% (8% / 7%)
- Progressed thru Transfer Course: 11% / 11% (1% / 1%)

Three-Year Math Progression – BAM by Financial Aid
Spring 2012-Fall 2014 Combined

BAM: ■ Financial Aid Recipients   ■ No Financial Aid
Non-BAM:

- Progressed thru Elementary Algebra: 61% / 60% (18% / 18%)
- Progressed thru Intermediate Algebra: 41% / 35% (13% / 13%)
- Progressed thru Transfer Course: 16% / 14% (3% / 3%)

Four-Year Math Progression – BAM by Financial Aid
Spring 2012-Fall 2013 Combined

BAM:
Non-BAM:
■ Financial Aid Recipients
■ No Financial Aid

Chart — Four-Year Math Progression by Financial Aid:

Category	Financial Aid Recipients (BAM / Non-BAM)	No Financial Aid (BAM / Non-BAM)
Progressed thru Elementary Algebra	63% total / 18%	68% total / 22%
Progressed thru Intermediate Algebra	42% total / 15%	42% total / 19%
Progressed thru Transfer Course	17% total / 5%	19% total / 3%
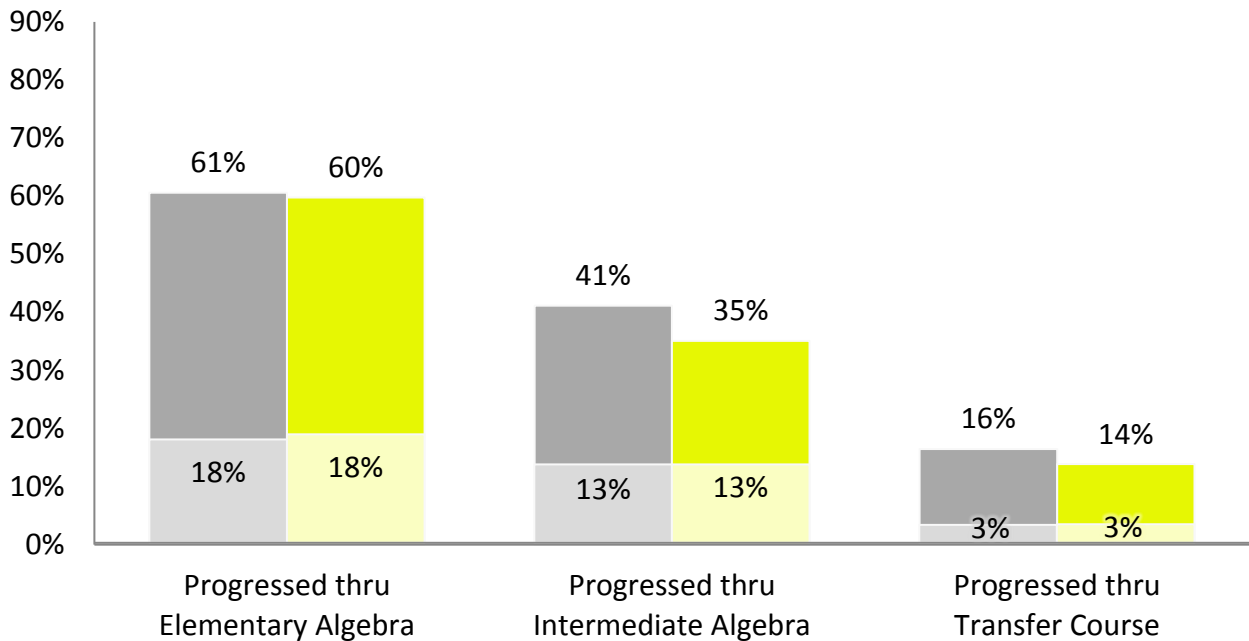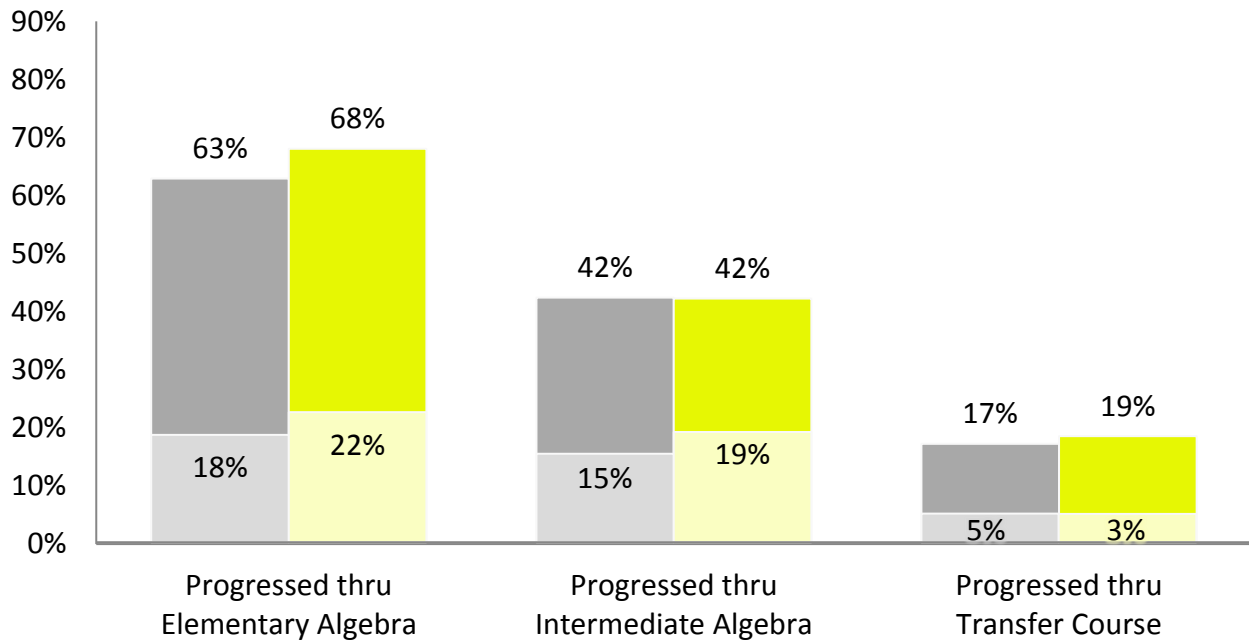
GEA Progression

Due to the methodology of including only first time mathematics students in the cohorts, the GEA cohort is quite small. Of all 1,231 students who have enrolled in a GEA course between Spring 2012 and Fall 2015, only 10% have no previous math enrollments at ECC. The small cohort sizes prevent a reliable disaggregation by ethnic group. Students in the GEA cohort were more likely to progress through intermediate algebra and transfer-level math compared to students in the non-GEA cohort.

Two-Year Math Progression - GEA
Spring 2012-Fall 2015 Combined

■ GEA (N = 119) ■ Non-GEA (N=1,708)
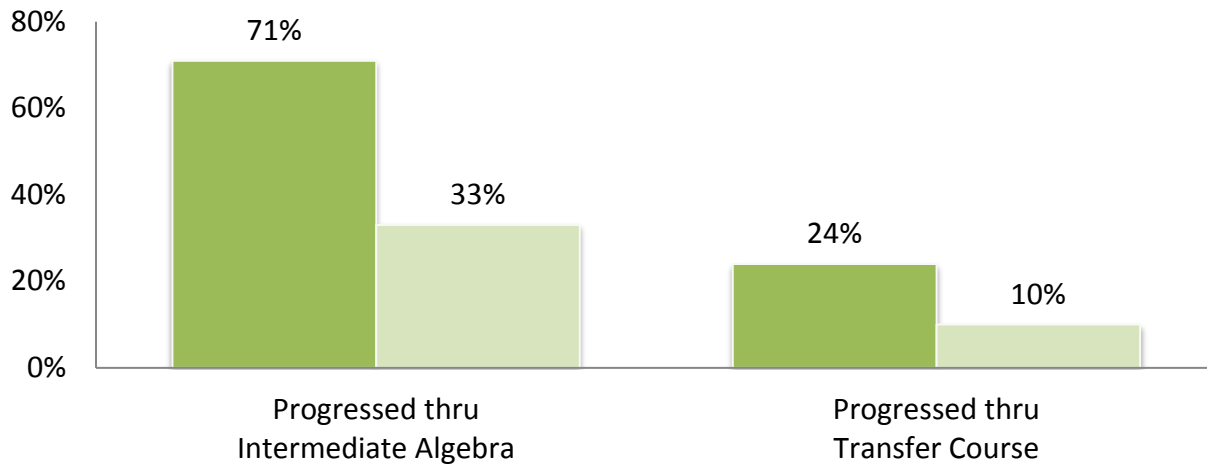
Progression of the cohorts was disaggregated by financial aid recipients and students who did not receive financial aid (please see next page). Slightly less than half (47%) of students in the GEA cohorts received financial aid and 52% of students in the non-GEA cohorts received financial aid. The progression rates of non-GEA financial aid recipients and non-recipients were similar. However, financial aid recipients in the GEA cohorts had slightly lower progression rates than non-recipients.

Two-Year Math Progression – GEA by Financial Aid
Spring 2012-Fall 2015 Combined

GEA:
Non-GEA: ■ Financial Aid Recipients   ■ No Financial Aid
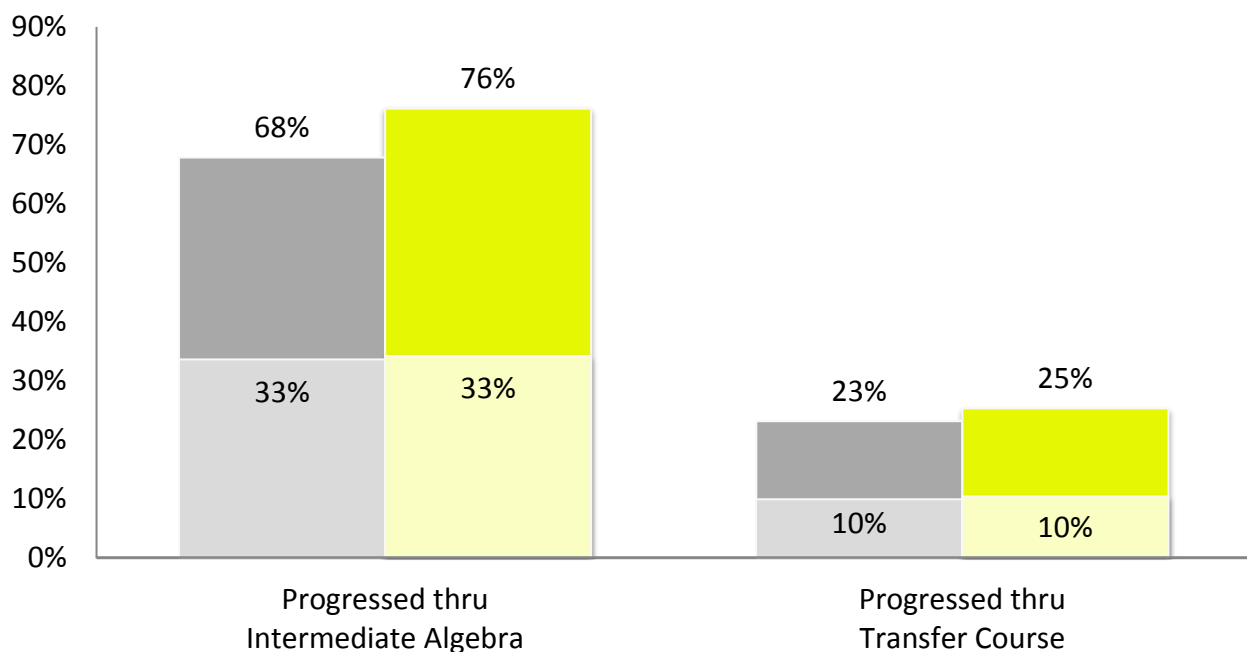
Conclusion

Students in both accelerated cohorts, BAM and GEA, were more likely to progress through levels of math sequence up through transfer-level compared to students in the comparison cohort. Disaggregation of BAM and non-BAM cohorts by major ethnic group also shows higher progression across all groups for BAM students. However, the existence of equity gaps suggests the need to consider how math courses can successfully prepare all students for success as they progress through the sequence. Future studies can also explore the specific transfer level courses in which BAM cohorts, GEA cohorts, and their comparison cohorts are particularly successful. Such study can help better understand how accelerated courses are preparing their students as they progress through the sequence. This could in turn inform efforts in identifying ways in which students could be effectively supported. Overall, analyses indicate that accelerated math courses support students in their progression through the math sequence.

Appendix A: Math Sequence

BAM and Comparison Cohort Math Sequence

Arithmetic	→	Pre-Algebra	→	Elementary Algebra	→	Intermediate Algebra	→	Transfer Level
• Math-12		• Math-23		• Math-40		• Math-67 • Math-73 • Math-80		• Math-130 • Math-150 • Math-170

BAM	→	Intermediate Algebra	→	Transfer Level
• Math-37		• Math-67 • Math-73 • Math-80		• Math-130 • Math-150 • Math-170

GEA and Comparison Cohort Math Sequence

Elementary Algebra	→	Intermediate Algebra	→	Transfer Level
• Math-40		• Math-67 • Math-73 • Math-80		• Math-130 • Math-150 • Math-170

GEA	→	Transfer Level
• Math-67		• Math-130 • Math-150 • Math-170
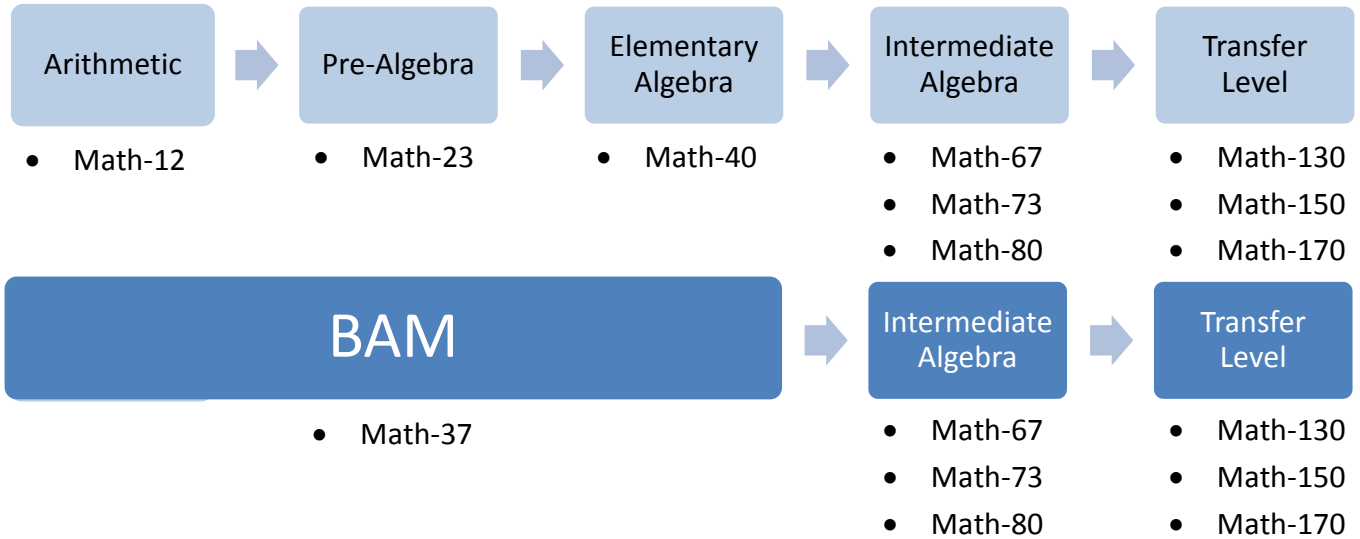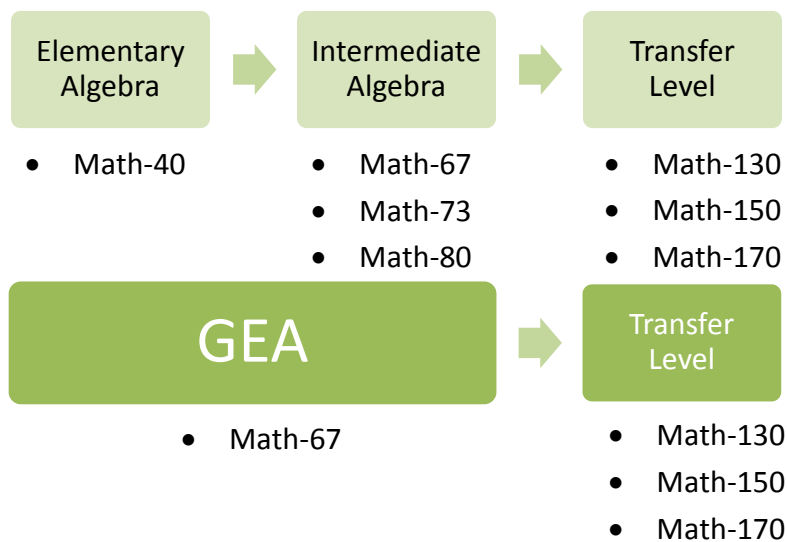
Appendix B: Tracking Charts

Two-Year Progression in Math: Spring 2012-Fall 2015 Combined BAM Cohort and Comparison Cohort

Comparison Cohort

Arithmetic	Pre-Algebra	Elementary Algebra	Interm. Algebra	Transfer Level

Interm. Algebra: *8%* of cohort progressed

Transfer Level: *1%* of cohort progressed

- 486 Passed
- 264 Passed
- 37 Passed
- 3,412 Enrolled
- 451 Enrolled
- 81 Enrolled
- 93% persist
- 59% success
- 31%
- 46%
- 35 Never Enrolled in Next Course
- 187 Failed to Pass
- 183 Never Enrolled in Next Course
- 44 Failed to Pass

BAM Cohort

Basic Accelerated Mathematics (BAM)

Interm. Algebra: *32%* of cohort progressed

Transfer Level: *11%* of cohort progressed

- 835 Passed
- 465 Passed
- 163 Passed
- 1,441 Enrolled
- 667 Enrolled
- 274 Enrolled
- 80% persist
- 70% success
- 59%
- 59%
- 168 Never Enrolled in Next Course
- 202 Failed to Pass
- 191 Never Enrolled in Next Course
- 111 Failed to Pass

Passed is defined as the number and percentage of enrolled students who complete a course with a C or better, or the equivalent. *Persisted* indicates the percentage of passing students who enroll in the next level of math. A student is counted if he or she *ever enrolled in* or *ever passed* any course at the level indicated during the tracking period.

Three-Year Progression in Math: Spring 2012-Fall 2015 Combined BAM Cohort and Comparison Cohort

Comparison Cohort

Arithmetic	Pre-Algebra	Elementary Algebra	Interm. Algebra	Transfer Level

Interm. Algebra: *13%* of cohort progressed

Transfer Level: *3%* of cohort progressed

453 Passed

340 Passed

78 Passed

100%* persist

44%

65% success

52%

2,555 Enrolled

525 Enrolled

149 Enrolled

185 Failed to Pass

71 Failed to Pass

0 Never Enrolled in Next Course

191 Never Enrolled in Next Course

BAM Cohort

Basic Accelerated Mathematics (BAM)

Interm. Algebra: *40%* of cohort progressed

Transfer Level: *16%* of cohort progressed

522 Passed

341 Passed

136 Passed

87% persist

66%

75% success

60%

863 Enrolled

452 Enrolled

226 Enrolled

111 Failed to Pass

90 Failed to Pass

70 Never Enrolled in Next Course

115 Never Enrolled in Next Course

Persistence rate can be over 100% when a student doesn't pass course but enrolls in the next course in the sequence.

Four-Year Progression in Math: Spring 2012-Fall 2015 Combined BAM Cohort and Comparison Cohort

Comparison Cohort

| Arithmetic | Pre-Algebra | Elementary Algebra | Interm. Algebra | Transfer Level |

Interm. Algebra

16% of cohort

Transfer Level

5% of cohort progressed

340 Passed

282 Passed

86 Passed

100%* persist

69% success

51%

60%

1,778 Enrolled

411 Enrolled

143 Enrolled

0 Never Enrolled in Next Course

129 Failed to Pass

139 Never Enrolled in Next Course

57 Failed to Pass

BAM Cohort

Basic Accelerated Mathematics (BAM)

Interm. Algebra

42% of cohort

Transfer Level

18% of cohort

241 Passed

159 Passed

66 Passed

88% persist

75% success

70%

59%

375 Enrolled

212 Enrolled

111 Enrolled

29 Never Enrolled in Next Course

53 Failed to Pass

48 Never Enrolled in Next Course

45 Failed to Pass

Persistence rate can be over 100% when a student doesn't pass course but enrolls in the next course in the sequence.

Two-Year Progression in Math: Spring 2012-Fall 2015 Combined GEA Cohort and Comparison Cohort

Comparison Cohort

Elementary Algebra	Interm. Algebra	Transfer Level

10% of cohort progressed

565 Passed

168 Passed

47% persist

63% success

1,708 Enrolled

268 Enrolled

100 Failed to Pass

297 Never Enrolled in Next Course

GEA Cohort

General Education Algebra (GEA)	Transfer Level

24% of cohort progressed

85 Passed

29 Passed

56% persist

60% success

119 Enrolled

48 Enrolled

19 Failed to Pass

37 Never Enrolled in Next Course