

MICHIGAN CENTER FOR STUDENT SUCCESS



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Postsecondary Transfer and Mobility in Michigan: Exploring Transfer Patterns, Programs, Places, and People

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Acknowledgements

Data Source Disclaimer

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Table of Contents

Executive Summary	4
Introduction.....	5
Methodology Notes.....	7
Section 1: Transfer Patterns and Types.....	10
Section 2: Transfer Programs.....	24
Section 3: Transfer Places.....	43
Endnotes	46
References.....	46
Appendices.....	47

Executive Summary

This report examines transfer and mobility in Michigan to understand how students successfully use community college transfer to progress toward their bachelor's degree. I use a sample of 2015 bachelor's degree graduates from all public and independent universities in Michigan who began college in 2009-2010 or later ($n=37,353$), allowing for six years of enrollment records to be analyzed (high quality postsecondary data were not available prior to 2009). Thus, it is important to consider that the results of these analyses should only be generalized to students who begin and complete college within six years. The report is organized into three sections: (1) Transfer Patterns and Types; (2) Transfer Programs; and (3) Transfer Places. The executive summary provides key findings from the report.

Transfer Patterns and Types

- Among all bachelor's degree graduates, 43% transferred at least once and 31% transferred at least once via the community college (Figure 1).
- Among bachelor's graduates that transferred via the community college ($n=11,612$), 57% began at the community college and transferred to a 4-year university, but 43% began at a 4-year university and attended the community college at some point prior to receiving their bachelor's degree (Figure 5).
- Among bachelor's graduates that transferred via the community college ($n=11,612$), 50% enrolled in the community college for one or two terms, and about 70% enrolled in the community college for four or fewer terms (Table 4).
- Bachelor's graduates have varied and complex enrollment and transfer patterns, and the analysis of enrollment patterns produced hundreds of enrollment patterns (see Appendix A).
- Among bachelor's graduates who began at a community college, there was large variation in the number of years students enroll at the community college prior to transferring to a 4-year university (Tables 6 to 8).
- Even among bachelor's graduates who followed the most traditional pathway to a bachelor's degree (those graduates who enrolled at a 4-year institution every year), between 14% and 21% enrolled in the community college for at least one term (Tables 6 to 8).
- Transfer patterns and types varied considerably by several factors, including: the bachelor's degree institution (Table 9 and 10), public or private college (Figure 7), high school type (Figure 9), sex (Figure 11), and race/ethnicity (Figure 13).

Transfer Programs

- 75% of all bachelor's graduates were concentrated in ten Classification of Instructional Programs (CIP) 2-digit codes (Table 11). At the top of the list was Business, Management, Marketing, and Related Support Services (17.9% of graduates).
- Graduates from different CIP programs transferred at different rates. For example, 37% of graduates in Health Professions and Related Programs transferred via the community college, whereas only 23% of graduates in Biological and Biomedical Sciences transferred via the community college (Table 12).
- Graduates from different CIP programs displayed different transfer types. For example, graduates from some programs were more likely to enroll in one and/or two or more years at the community college prior to transferring (e.g., Business, Management, Marketing, and Related Support Services; Public Administration and Social Services, etc.), whereas graduates from other programs were more likely to start at a 4-year institution and enroll in the community college at some point prior to completing a bachelor's degree (Engineering; Physical Sciences, etc.) (Table 12).
- A larger percent of graduates who transferred (71%) changed programs compared to students who did not transfer (51%) (Figure 15).
- A large percent of graduates that began at the community college also change program categories, although this varied considerably based on the program categories in which students begin and complete college (Table 13).

Transfer Places

- Bachelor's graduates that began at the community college transfer among 2-year and 4-year colleges all over the state of Michigan, as illustrated in Figure 29.
- Table 15, Appendix B, and Appendix C illustrate the dominant 2-year and 4-year partnerships based on the number of students that graduated from 4-year institutions and who attended 2-year institutions.

Introduction

This report examines the nature of transfer and mobility in Michigan, with a particular emphasis on the role of community colleges in the transfer pipeline. The report uses a sample of bachelor's degree graduates from Michigan in 2015 and analyzes their prior educational trajectories. A sample of bachelor's degree graduates was used for the analysis because of interest in understanding how students successfully use transfer to progress through college and to the bachelor's degree. Research shows that many community college students aspire to transfer and/or transfer to a 4-year institutions, but many of them never make it to the bachelor's degree or they take a long time until they get to the bachelor's degree (Horn & Skomsvold, 2011). However, many community college students do successfully transfer and many complete a bachelor's degree. This report retrospectively examines bachelor's graduates' enrollment and transfer histories to understand their pathways to the bachelor's degree and the role of the community college.

This report focuses primarily on transfer patterns and types, transfer programs, and transfer places; and interwoven throughout the report are the people—the students who transfer. Transfer patterns or transfer types focus on the enrollment and transfer patterns and pathways in which graduates engage, including their movement between 2-year and 4-year institutions,¹ how they transfer, and when they stop-in and stop-out. Transfer programs focuses on the degree programs and majors in which graduates enroll and complete. The section examines the programs in which graduates begin college, complete college, and how they move between programs. Finally, the report examines transfer places, or the institutions to which graduates transfer to, from, and between.

The primary findings of the report are organized into three sections:

Section 1: Transfer Patterns and Types

The first section describes dominant ways in which bachelor's graduates are mobile and identifies three specific transfer patterns used by graduates that enroll in community colleges (see Figure 1); these three transfer patterns or transfer types are used throughout the report. This section also provides readers with a nuanced analysis of different enrollment and transfer patterns that illustrate the complexities in which Michigan graduates enroll in higher education and transfer among institutions.

Section 2: Transfer Programs

The second section examines the programs in which bachelor's graduates enroll and complete their degrees, and it explores differences by transfer type and by demographic characteristics.

Section 3: Transfer Places

The third section examines the 2-year and 4-year institutions in which bachelor's graduates enroll and complete their degrees. It examines dominant partnerships among institutions and illustrates the multiple sending and receiving institutional partnerships throughout the State of Michigan.

In each section, results are presented by graduates' demographic characteristics so readers can understand how transfer patterns, programs, and places vary by the people—the students—that graduate with bachelor's degrees in Michigan. Throughout the report, the results are often presented for all bachelor's graduates so readers can compare how graduates who transferred via the community college compare to all bachelor's graduates.

Michigan Transfer Background and Context

In fall 2014, Michigan community colleges and universities adopted the Michigan Transfer Agreement (MTA) which allows students to transfer 30 credit hours of general education coursework from college to the university. This was a big step toward increasing the percentage of students who transfer, but still further work can be done to ensure that more students transfer with an associate degree and earn a bachelor's degree. To achieve this goal, in fall 2016, Michigan community colleges and universities established a statewide Transfer Steering Committee, with representatives from more than 30 colleges and universities to guide this work.

In July 2017, Governor Rick Snyder signed the FY 2018 state budget which included a one-time appropriation to support a statewide initiative to replace the Michigan Transfer Network (MTN) and build multi-institutional associate to bachelor's degree transfer pathways. The Michigan Community College Association (MCCA) and its 28 member colleges and the Michigan Association of State Universities (MASU) and its 15 member universities have been working

collaboratively to increase associate and bachelor's degree completion among transfer students from all backgrounds through collaboration among Michigan colleges and universities and engagement with faculty and higher education administrators. MCCA serves as the fiscal agent for the project and staff from the MCCA and MASU will co-lead the project and be responsible for all reporting to the State Budget Office. In addition to the Michigan Transfer Steering Committee that leads this work, multiple statewide project teams have already formed with representative membership of institutional experts and related partners.

Michigan Transfer Steering Committee

The Transfer Steering Committee's mission is to increase associate and bachelor's degree completion among transfer students from all backgrounds. The objective is to make the overall transfer experience more efficient, easy to understand, and simple to navigate while optimizing credit transfer.

Michigan colleges and universities have been working on multiple transfer-related initiatives in recent years and continue to work collaboratively on several projects to improve transfer student outcomes. These ongoing related efforts have and will continue to improve transfer for students across the state and are under the purview of this representative body of academic leaders who have been meeting since Fall 2016 to collaboratively guide and integrate related transfer work, including the new MiTransfer Pathways Project. This project, supported by a one-time state appropriation grant spanning 2017-2020, will deliver

a new, enhanced Michigan Transfer Network website and statewide associate to bachelor's degree transfer pathways in selected disciplines in phases over the next three years. Other transfer student success strategies supported by the Transfer Steering Committee are listed below.

Transfer Student Success Strategies

The Transfer Steering Committee is using several strategies to improve transfer student success, including:

- Replace the Michigan Transfer Network (click [here](#) for more details on this project)
- Develop multi-institutional associate to bachelor's degree transfer pathways
- Align mathematics requirements within programs of study (read more about Michigan's Right Math at the Right Time initiative [here](#))
- Increase awards of [academic credit for military experience](#)
- Spotlight best practices to improve transfer student success
- Produce and utilize data on transfer student outcomes

Methodology Notes

Population and Sample

The analysis for the study began with a sample of students who completed a bachelor's degree in Michigan in calendar year 2015. The dataset included 52,870 students who completed a bachelor's degree. The CEPI dataset included multiple redundant degrees per student, because CEPI's records include all observations from multiple matches unless observations have exact data on all variables. So, for example, if a match does not have a valid CIP code for a bachelor's degree from the same institution, then a student would have two award records, one with a CIP code and one without. After eliminating redundant degrees using only the most complete and highest quality data, I identified 52,870 unique students with a bachelor's degree in 2015.

After identifying these students, I further restricted the sample to those students who began college in 2009-2010, because CEPI's postsecondary education records are incomplete prior to that time period. Unfortunately, this reduced the sample to 37,353 students, but this was an important consideration because accurate postsecondary enrollment and program records are critical to this study. The implication of this is that the sample was reduced to students who completed their program within four to six years of starting college. This is clearly problematic for students who begin at a community college, because research shows that only about 23% complete their bachelor's degree within six years (Horn & Skomsvold, 2011). However, these were the only available data via CEPI when the data were requested. A quick analysis of demographic differences between the full sample and the analytic sample show no differences by gender and race/ethnicity, but the smaller sample has a slightly larger proportion of out-of-state high school graduates than in-state graduates (6% larger), and a slightly larger proportion of graduates from public universities than private universities (4% higher). The demographics of this analytical sample are presented in Table 1, along with a comparison of the full bachelor's degree recipient sample.

All enrollment and transfer analyses were conducted using this sample of 37,353 students. However, analyses that involved program/major-level data involved a slightly smaller sub-sample because some students did not have accurate CIP-code data, and some students had multiple majors or programs at the same institution in the same semester. For most students in the dataset, I could accurately distinguish

between a first major and a second major, but some students did not have a code that indicated this so they were excluded from the analysis. The result is that although some students have enrollment records, they sometimes do not have CIP code records, and this varies by term. However, for most analyses, this affects less than 10% of students. Sample sizes are provided throughout the results section so the reader can assess where the sample size varies from the analytic sample.

Sample Demographics

Table 1 displays the demographic characteristics for the analytic sample of 2015 bachelor's degree graduates (n=37,353) and the full sample of 2015 bachelor's degree graduates (n=52,870). As previously noted, there are marginal differences between the analytic sample and the full sample. The analytic sample's sex is 54% female and 44% male; 3% of the sample's sex is unreported. In terms of high school, nearly three of four students graduated from a public Michigan high school (74%), 25% graduated from an out-of-state high school, and 1% graduated from a private Michigan high school. In terms of race/ethnicity, the analytic sample is .5% American Indian or Alaskan Native, 6% Asian, 7% Black/African American, 4% Hispanic/Latino, .1% Hawaiian Native or Pacific Islander, 2% Two or More Races, 10% Unknown, 3% Unreported, and 69% White. Finally, in terms of associate's degree completion, about 6% of the analytic sample completed an associate's degree, a slightly smaller percent than the full sample (9%).

Table 2 displays the distribution of the sample by the bachelor's degree granting institution; institutions are organized by public and independent institutions. In the analytic sample, 34,010 students graduated from a public institution, which represented 91% of the analytic sample. The remaining 3,303 students, or 9% of the analytic sample graduated from an independent college or university. The largest number of students graduated from Michigan State University (19%) and University of Michigan-Ann Arbor (15%). Most independent institutions represent 1% or less than 1% of the sample.

Table 1. Demographic Characteristics of Analytic Sample and Full Sample of 2015 Michigan Bachelor's Degree Graduates.

Demographic Characteristic	Analytic Sample of 2015 Michigan Bachelor's Graduates (n=37,353)		Full Sample of 2015 Michigan Bachelor's Graduates (n=52,870)	
	N	Percent	N	Percent
Sex				
Female	20,015	53.6%	28,228	53.4%
Male	16,299	43.6%	22,642	42.8%
Unreported	1,039	2.8%	2,000	3.8%
High School				
Private MI HS	332	0.9%	386	0.7%
Public MI HS	27,601	73.9%	35,979	68.1%
Out-of-State HS	9,420	25.2%	16,505	31.2%
Race/Ethnicity				
American Indian or Alaskan Native	180	0.5%	295	0.6%
Asian	2,049	5.5%	3,056	5.8%
Black/African American	2,489	6.7%	3,817	7.2%
Hispanic/Latino	1,296	3.5%	1,821	3.4%
Hawaiian Native or Pacific Islander	37	0.1%	47	0.1%
Two or More Races	835	2.2%	1,127	2.1%
Unknown	3,601	9.6%	5,832	11.0%
Unreported	1,039	2.8%	2,000	3.8%
White	25,827	69.1%	34,875	66.0%
Associate's Degree				
Completed Associate's Degree	2,215	5.9%	4,630	8.8%
Did Not Complete Associate's Degree	35,138	94.1%	48,251	91.2%

Table 2. Public and Independent Institutions for Analytic Sample and Full Sample of 2015 Michigan Bachelor's Degree Graduates.

Institution	Analytic Sample of 2015 Michigan Bachelor's Graduates (n=37,313) ²		Full Sample of 2015 Michigan Bachelor's Graduates (n=52,870)	
	N	Percent	N	Percent
Public Institutions				
Central Michigan University	3,233	8.7%	4,073	7.7%
Eastern Michigan University	1,861	5.0%	3,272	6.2%
Ferris State University	1,571	4.2%	2,677	5.1%
Grand Valley State University	3,336	8.9%	4,356	8.3%
Lake Superior State University	340	0.9%	476	0.9%
Michigan State University	6,969	18.7%	8,114	15.4%
Michigan Technological University	897	2.4%	1,073	2.0%

continued on next page

Table 2. Public and Independent Institutions for Analytic Sample and Full Sample of 2015 Michigan Bachelor's Degree Graduates. *cont.*

Institution	Analytic Sample of 2015 Michigan Bachelor's Graduates (n=37,313) ²		Full Sample of 2015 Michigan Bachelor's Graduates (n=52,870)	
	N	Percent	N	Percent
Northern Michigan University	944	2.5%	1,248	2.4%
Oakland University	1,942	5.2%	3,051	5.8%
Saginaw Valley State University	1,010	2.7%	1,413	2.7%
University of Michigan-Ann Arbor	5,753	15.4%	7,009	13.3%
University of Michigan-Dearborn	815	2.2%	1,224	2.3%
University of Michigan-Flint	712	1.9%	1,208	2.3%
Wayne State University	1,877	5.0%	3,042	5.8%
Western Michigan University	2,750	7.4%	3,780	7.2%
Independent Institutions				
Adrian College	17	0.0%	192	0.4%
Albion College	27	0.1%	206	0.4%
Alma College	209	0.6%	233	0.4%
Andrews University	23	0.1%	48	0.1%
Aquinas College	60	0.2%	262	0.5%
Baker College	433	1.2%	746	1.4%
Calvin College	232	0.6%	269	0.5%
Cleary University	12	0.0%	38	0.1%
College for Creative Studies	163	0.4%	222	0.4%
Cornerstone University	44	0.1%	234	0.4%
Davenport University	209	0.6%	796	1.5%
Finlandia University	16	0.0%	49	0.1%
Hope College	48	0.1%	427	0.8%
Kalamazoo College	176	0.5%	192	0.4%
Kettering University	163	0.4%	182	0.3%
Lawrence Technological University	32	0.1%	161	0.3%
Madonna University	89	0.2%	145	0.3%
Marygrove University	80	0.2%	133	0.3%
Northwestern Michigan College	18	0.0%	35	0.1%
Northwood University	331	0.9%	513	1.0%
Olivet College	111	0.3%	124	0.2%
Rochester College	69	0.2%	178	0.3%
Spring Arbor University	238	0.6%	451	0.9%
The Robert B Miller College	11	0.0%	37	0.1%
University of Detroit Mercy	374	1.0%	555	1.1%
Walsh College	118	0.3%	316	0.6%

Section 1: Transfer Patterns and Types

This first section of the report provides a working definition of transfer for the purpose of the report and then describes how Michigan bachelor's graduates engage in transfer during their postsecondary careers.

Defining Transfer

Transfer is a complex phenomenon with multiple definitions, patterns, and types (Taylor & Jain, 2017). Although many conceptualize transfer in a traditional way—community college to 4-year—the reality is that students engage in diverse and multiple transfer pathways, as this report illustrates. When defining and operationalizing transfer, researchers typically use different methods and definitions based on the study's purpose, data sources, and analyses. For the purpose of this report, I focused predominantly on vertical and lateral transfer and consider where students

began their postsecondary career. Figure 1 provides a graphical representation of the transfer types that will be used throughout this report, and Table 3 provides definitions of these types. These transfer types are further explored in the remainder of this section.

There are two critical observations from this section: (1) bachelor's graduates follow varied and complex pathways through college, many of which include transfer; (2) the community college plays a critical role in the education of bachelor's graduates, even for those students who begin college at a 4-year institution. Although many bachelor's graduates follow a traditional pathway, almost half enroll in more than one institution and nearly a third enroll in the community college. As I explain later in the report, this is likely an underestimate, but these are the best data available to produce this analysis.

Figure 1. Transfer Flow among Michigan Bachelor's Graduates.

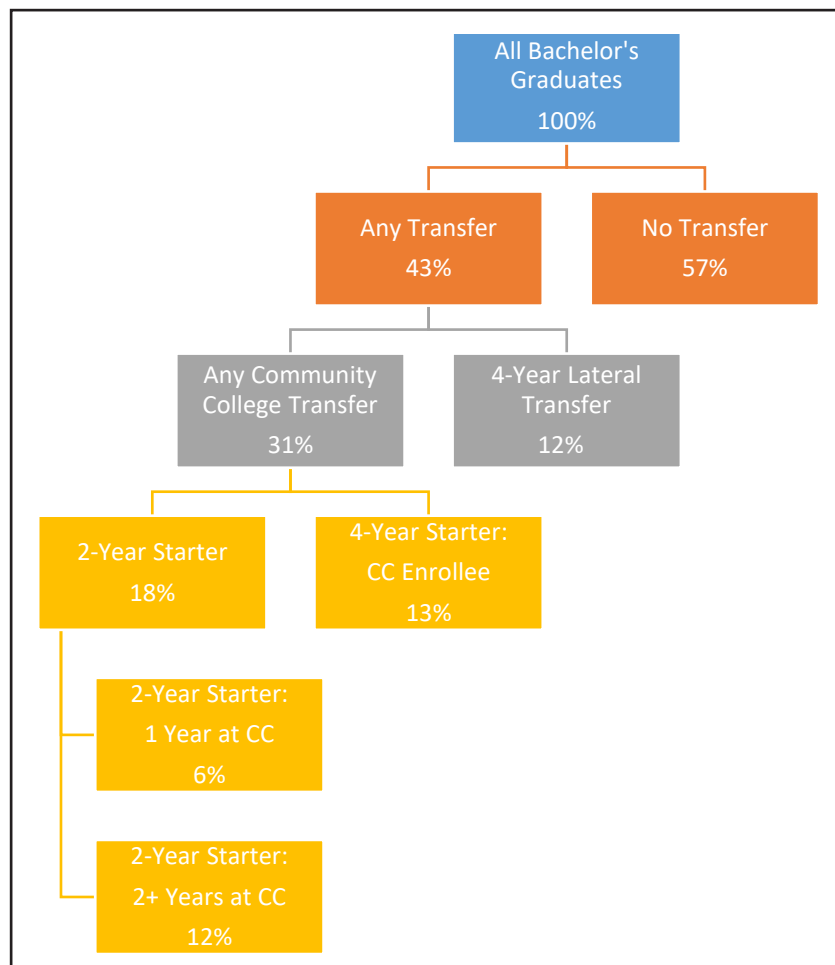


Table 3. Transfer Types and Definitions Used in Report.

Transfer Pattern or Type	Definition	Percent from Figure 1
No Transfers	Student attended only one college/university.	57%
Any Transfer	Student attended two or more institutions during college. This is the broadest definition of transfer. (Note: “Any Transfer” is the sum of “4-year Lateral Transfer” and “Any Community College Transfer”)	43%
4-Year Lateral Transfer (Exclusively Lateral)	Student transferred from a 4-year to a 4-year institution during college, but did not attend a community college (exclusively 4-Year lateral transfer).	12%
Any Community College Transfer	Student attended at least one term of community college during college.	31%
2-Year Starter: Note: “2-Year Starter” is the sum of “2-Year Starter: 1 Year at CC” and “2-Year Starter: 2+ Years at CC”		18%
2-Year Starter: 1 Year at CC	Students’ highest enrollment during their first year of college was at the community college and second year of enrollment was at a 4-Year.	6%
2-Year Starter: 2+ Years at CC	Students’ highest enrollment during their first two years of college was at the community college and third year of enrollment was at a 4-Year.	12%
4-Year Starter: CC Enrollee	Students’ highest enrollment during the first year was a 4-year, but they transferred to a community college in any term prior to bachelor’s degree completion.	13%

“On average, 31% of bachelor’s degree graduates enrolled in a community college.”

Any Transfer

Overall, Michigan bachelor's graduates are extremely mobile. Indeed, only 57% of bachelor's degree recipients attended the same institution during their postsecondary career (Figure 2). This means that 43% transferred institutions and/or credits at some point during their postsecondary career.

Michigan bachelor's degree graduates transferred between 2-year and 4-year institution, and they transferred laterally between 4-year institutions. Figure 3 illustrates that the community college is a dominant pathway for bachelor's degree graduates. On average, 31% of bachelor's degree graduates enrolled in a community college.³ Another 12% of bachelor's degree graduates transferred laterally between 4-year institutions. The remainder of this report will predominantly focus on community college transfer.

Figure 2. Number of Institutions Attended by Bachelor's Degree Recipients (n=37,353).

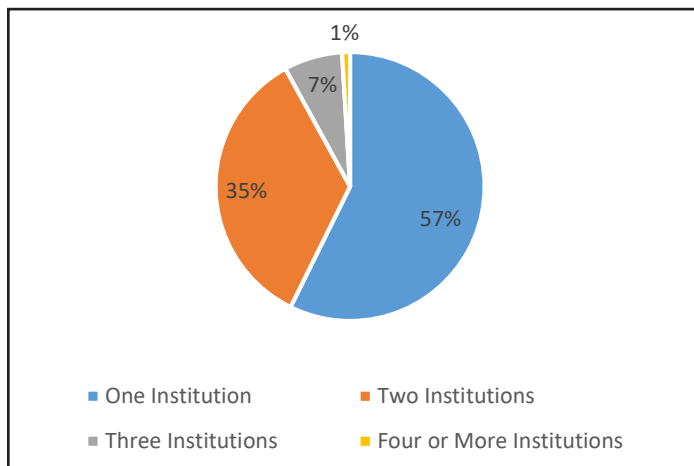
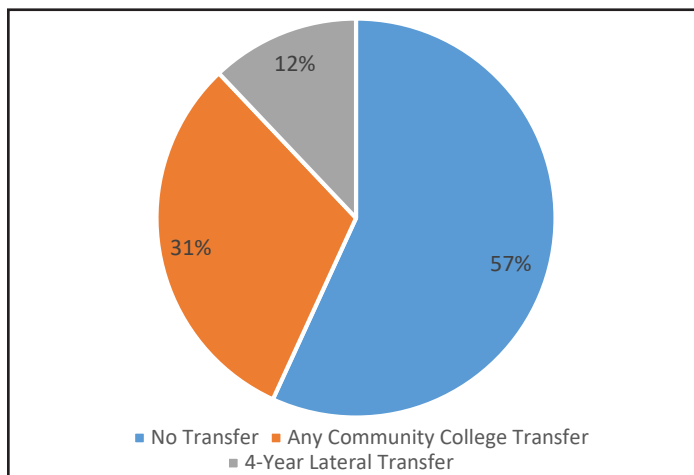


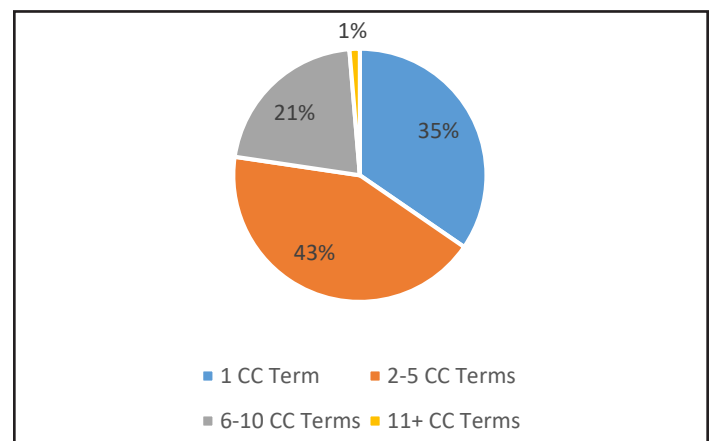
Figure 3. Transfer among Bachelor's Degree Recipients (n=37,353).



Any Community College Transfer

Of the 31% that attended a community college (n=11,612), the majority of bachelor's graduates (65%) attended for two or more terms (Figure 4). This means that bachelor's graduates transferring via the community college are not just *visitors* (to borrow and adapt Adelman's [2005] language); visitors have only a brief enrollments in the community college (although Adelman had specific definitions of this term). Rather, the majority enroll for two or more terms, and 22% enrolled for six or more terms, meaning they were more likely *tenants* or *homeowners*, again adapting Adelman's (2005) terms.

Figure 4. Number of Community College Terms Enrolled among Bachelor's Graduates with Any Community College Enrollment (n=11,612).



Community College Starters and 4-Year Starters

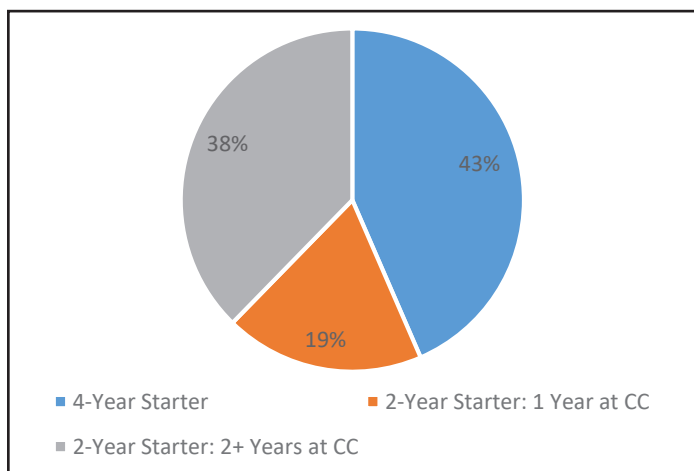
Bachelor's graduates who attended any community college (n=11,612) could have started college at either a community college or a 4-year institution. As noted below, students exhibited hundreds of different enrollment patterns. For the purpose of this report, I organized these patterns into three different categories based on their starting point and enrollment duration at the community college (2-year college):

- **4-Year Starter: Community College Enrollee.** Began college at 4-year institution but attended the 2-year institution prior to completing their bachelor's degree.
- **2-Year Starter: 1 Year at CC.** Began at a 2-year institution and enrolled for 1 year at community college before transferring to a 4-year institution.
- **2-Year Starter: 2+ Years at CC.** Began at a 2-year institution and enrolled for two or more years at community college before transferring to a 4-year institution.

tion and enrolled for 2 or more years at community college before transferring to a 4-year institution.

As Figure 1 displays, 18% of the full sample were 2-Year Starters who transferred to a 4-year university, and 13% were 4-Year Starters who enrolled at a community college during their college pathway. When we examine just the 11,612 students who attended any community college, Figure 5 displays that more than half (57%) were 2-Year Starters and 43% were 4-Year Starters.

Figure 5. Starting Destinations among Bachelor's Graduates with Any Community College Enrollment (n=11,612).



Community College Enrollment Duration

Table 4 displays the community college enrollment durations (ranging from one to 15 terms) among bachelor's degree graduates with any community college, organized by the three patterns. Overall, 50% enrolled in one or two community college terms and about 70% enrolled in four or fewer terms. However, the number of terms varies by starting destination. Among 4-Year Starters, 71% enrolled for only one term and another 20% enrolled for two or less terms, suggesting that the vast majority of these students were community college visitors. Among 2-Year Starters, larger percentages of students enrolled at the community college for several terms, which is intuitive given how these enrollment patterns were conceptualized.

*Overall, 50% enrolled
in one or two
community college terms
and about 70%
enrolled in four or fewer terms.*

Table 4. Number of Terms Enrolled in Community College by Transfer Type for Graduates with Any Community College.

Number of CC Terms	4-Year Starter: Community College Enrollee (n=5,049)	2-Year Starter: 1 Year at CC (n=2,186)	2-Year Starter: 2+ Years at CC (n=4,377)	Any CC (n=11,612)
1 Term	71%	20%	0%	35%
2 Terms	20%	29%	3%	15%
3 Terms	6%	22%	6%	9%
4 Terms	2%	12%	18%	10%
5 Terms	1%	8%	18%	9%
6 Terms	<1%	4%	19%	8%
7 Terms	<1%	3%	14%	6%
8 Terms	<1%	1%	10%	4%
9 Terms	<1%	1%	5%	2%
10 Terms	0%	<1%	3%	1%
11 Terms	0%	<1%	2%	1%
12 Terms	0%	<1%	1%	<1%
13 Terms	0%	<1%	<1%	<1%
14 Terms	0%	0%	<1%	<1%
15 Terms	0%	0%	<1%	<1%

Enrollment and Transfer Patterns

This section dives deeper into the enrollment and transfer patterns for bachelor's graduates. The patterns pathways are reported by beginning year cohort (2011-12, 2010-11, and 2009-10) so they can be sorted and categorized by the number of years in which graduates were enrolled (or not) in college.

As previously noted, students' enrollment patterns are varied and complex. A semester-by-semester analysis of different enrollment patterns yields hundreds of iterations that are not digestible (See Appendix A for a detailed description of this). To identify a more digestible way of understanding these patterns, I aggregated students' enrollment records to the academic year. Table 4 illustrates sample enrollment patterns by the cohort start date and whether the student

was a 2-year or 4-year starter. For example, students who started in the 2011-2012 year and graduated in 2015 had four years of enrollment (Y1, Y2, Y3, Y4). For each year, a student was assigned a value of "2" if their highest enrollment was at a community college and a value of "4" if their highest enrollment was at a 4-year college. If students co-enrolled at a 2-year and 4-year, a value of "4" is displayed. In all three cohorts, many students had at least one year of non-enrollment, but to simplify the display, I only present enrollment patterns for students who were enrolled at least one fall, spring, or summer semester each academic year.

What follows is a review of the enrollment patterns among students in the analytic sample by the 2011-12, 2010-11, and 2009-10 cohorts. Each cohort is organized according to 2-Year and 4-Year Starters (i.e., their enrollment during their first year of college is either at a 2-year or 4-year).

Table 5. Sample Enrollment Patterns by Cohort and 2-Year or 4-Year Starters, Among Students with Any Community College Enrollment.

Cohort and 2-Year/4-Year Starter	Sample Pattern					
4-Year Enrollment Patterns (AY11-12 – 14-15)	Y1	Y2	Y3	Y4		
2-Year Starters	2	2	4	4		
4-Year Starters	4	2	4	4		
5-Year Enrollment Patterns (AY10-11 – 14-15)	Y1	Y2	Y3	Y4	Y5	
2-Year Starters	2	2	4	4	4	
4-Year Starters	4	4	4	2	4	
6-Year Enrollment Patterns (AY09-10 – 14-15)	Y1	Y2	Y3	Y4	Y5	Y6
2-Year Starters	2	2	4	4	4	4
4-Year Starters	4	2	4	2	4	4

2011-2012 Cohort: This is the sub-cohort of students who began college in 2011-12 and graduated by 2015, or within four academic years.

Table 6 illustrates 14 different annual enrollment patterns for students with an enrollment each of their four years, and the table is organized according to those students whose first year of enrollment was at the 2-year institution or 4-year institution. The large majority of students in this cohort began at a 4-year institution, which is not surprising because research suggests that only a small proportion of students who begin at a 2-year institution complete a bachelor's degree within four years (Horn & Skomsvold, 2011). Of those 2-Year Starters (n=1,040), the majority followed either a 2+2 pattern (50%) or a 1+3 pattern (38%). A smaller percent followed a 3+1 pattern (8%), and 2% of

students completed their bachelor's degree by only attending community colleges.

Of the 4-Year Starters, 99% enrolled at a 4-year college at least once every year, and only 1% transferred to a 2-year college for at least one entire year. However, among those students who had a "4444" enrollment pattern, 14% enrolled in at least one semester of community college during their postsecondary journey and 28% enrolled in at least two institutions (4-year and/or 2-year). That is, even those students following the most traditional pathway to a bachelor's degree (i.e., starting at a 4-year institution, enrolling at a 4-year each year, and completing a bachelor's degree in 4 years), more than a quarter of those students transferred institutions or credits.

Table 6. Enrollment Patterns of Students Who Started College in 2011-2012 and Completed a Bachelor's Degree in Four Years. (The most common patterns are highlighted blue)

Four Year Enrollment Pattern	Number of Students	Percent of 2-Year Starters	Percent of 4-Year Starters	Percent Enrolling in at least 1 Community College Term	Percent Enrolling in 2 or More Institutions
Two-Year Starters					
2222	25	2%			40%
2224	81	8%			
2244	523	50%			
2422	4	<1%			
2424	4	<1%			
2442	3	<1%			
2444	400	38%			
Total 2-Year Starters	1,040	100%			
Four-Year Starters					
4222	2		<1%		
4224	13		<1%		
4244	60		<1%		
4422	5		<1%		
4424	10		<1%		
4442	8		<1%		
4444	19,013		99%	14%	28%
Total 4-Year Starters	19,111		100%		
1 Year of Non-Enrollment	214				
Grand Total	20,151				

2010-2011 Cohort: This is the sub-cohort of students who began college in 2010-11 and graduated by 2015, or within five academic years.

Table 7 illustrates 22 different annual enrollment patterns for students with an enrollment each of their five years, and the table is organized according to those students whose first year of enrollment was at the 2-year institution

or 4-year institution. Similar to the 2011-2012 cohort, the majority of students in this cohort began at a 4-year institution. Of those 2-Year Starters (n=2,157), larger proportions of students followed either a 2+3 pattern (46%), a 1+4 pattern (26%), or a 3+2 pattern (22%). A smaller percent followed a 4+1 pattern (4%), and 1% of students completed their bachelor's degree by only attending community colleges.

Table 7. Enrollment Patterns of Students Who Started College in 2010-2011 and Completed a Bachelor's Degree in Five Years. (The most common patterns are highlighted blue)

Four Year Enrollment Pattern	Number of Students	Percent of 2-Year Starters	Percent of 4-Year Starters	Percent Enrolling in at least 1 Community College Term	Percent Enrolling in 2 or More Institutions
Two-Year Starters					
22222	25	1%			16%
22224	76	4%			
22244	485	22%			
22422	1	<1%			
22424	5	<1%			
22442	3	<1%			
22444	998	46%			
24224	2	<1%			
24244	7	<1%			
24424	2	<1%			
24442	1	<1%			
24444	552	26%			
Total 2-Year Starters	2,157	100%			
Four-Year Starters					
42224	8		<1%		
42244	42		1%		
42442	1		<1%		
42444	112		1%		
44224	13		<1%		
44244	45		1%		
44422	2		<1%		
44424	9		<1%		
44442	27		<1%		
44444	7,990		97%	17%	31%
Total 4-Year Starters	8,249		100%		
1 Year of Non-Enrollment	384				
Grand Total	10,790				

Of the 4-year starters, 97% enrolled at a 4-year college at least once every year, and about 3% transferred to a 2-year college for at least one entire year. However, among those students who had a “44444” enrollment pattern, 17% enrolled in at least one semester of community college during their postsecondary journey and 31% enrolled in at least two institutions (4-year and/or 2-year).

2009-2010 Cohort: This is the sub-cohort of students who began college in 2009-10 and graduated by 2015, or within six academic years.

Table 8 illustrates 38 different annual enrollment patterns for students with an enrollment each of their six years, and

the table is organized according to those students whose first year of enrollment was at the 2-year institution or 4-year institution. Similar to the previous two cohorts, a larger proportion of students in this cohort began at a 4-year institution, although the proportion of 2-Year Starters and 4-Year Starters was more similar than the previous two cohorts. Of those 2-Year Starters (n=2,130), larger proportions of students followed either a 2+4 pattern (32%), a 3+3 pattern (31%), a 1+5 pattern (17%), or a 4+2 pattern (14%). A smaller percent followed a 5+1 pattern (2%), and <1% of students completed their bachelor’s degree by only attending community colleges.

Of the 4-year starters, 90% enrolled at a 4-year college

Table 8. Enrollment Patterns of Students Who Started College in 2009-2010 and Completed a Bachelor’s Degree in Six Years. (The most common patterns are highlighted blue)

Four Year Enrollment Pattern	Number of Students	Percent of 2-Year Starters	Percent of 4-Year Starters	Percent Enrolling in at least 1 Community College Term	Percent Enrolling in 2 or More Institutions
Two-Year Starters					
222222	8	<1%			25%
222224	43	2%			
222242	1	<1%			
222244	308	14%			
222422	1	<1%			
222424	2	<1%			
222442	1	0%			
222444	666	31%			
224224	5	<1%			
224244	10	<1%			
224424	5	<1%			
224442	5	0%			
224444	673	32%			
242224	1	<1%			
242244	3	<1%			
242444	12	1%			
244244	6	<1%			
244422	1	<1%			
244424	3	<1%			
244442	4	<1%			
244444	372	17%			
Total 2-Year Starters	2,130	100%			

continued on next page

at least once every year, and about 10% transferred to a 2-year college for at least one entire year. However, among those students who had a “444444” enrollment pattern,

21% enrolled in at least one semester of community college during their postsecondary journey and 39% enrolled in at least two institutions (4-year and/or 2-year).

Table 8. Enrollment Patterns of Students Who Started College in 2009-2010 and Completed a Bachelor’s Degree in Six Years. *cont.*

Four Year Enrollment Pattern	Number of Students	Percent of 2-Year Starters	Percent of 4-Year Starters	Percent Enrolling in at least 1 Community College Term	Percent Enrolling in 2 or More Institutions
Four-Year Starters					
422222	3		<1%		
422224	5		<1%		
422244	25		1%		
422444	50		2%		
424244	1		<1%		
424444	58		2%		
442222	1		<1%		
442224	8		<1%		
442244	15		1%		
442442	1		<1%		
442444	44		1%		
444224	5		<1%		
444244	30		1%		
444422	3		<1%		
444424	11		<1%		
444442	22		1%		
444444	2,670		90%	21%	39%
Total 4-Year Starters	2,952		100%		
1 Year of Non-Enrollment	936				
Grand Total	6,018				

“Among students who had a “444444” enrollment pattern, 21% enrolled in at least one semester of community college during their postsecondary journey and 39% enrolled in at least two institutions (4-year and/or 2-year)”

Variation in Transfer Type

There are important differences in transfer types, and this section examines differences in transfer type by six categories based on graduates' institutions and their characteristics:

- Bachelor's Degree-Granting Institution Name
- Bachelor's Degree-Granting Institutional Type (Public/Independent)
- High School Graduate Type (Michigan Public HS, Michigan Private HS, Out-of-State HS)
- Sex
- Race/Ethnicity
- Associate's Degree Completion

Transfer Type by Bachelor's Degree-Granting Institution Name

Table 9 and Table 10 display the percent of bachelor's degree graduates by transfer type and by bachelor's degree-

granting institution; Table 9 is public universities and Table 10 is independent colleges and universities. Institutions with the largest percent of graduates who attended any community college are near the top of the tables, and institutions with the smallest percent of graduates who attended any community college are near the bottom of the tables. Table 9 shows that about half of Michigan's public universities (7 universities) have more than 40% of bachelor's graduates who attended any community college; more graduates at these universities were 2-Year Starters than 4-Year Starters, although many had a considerable percent of 4-Year Starters. The three universities with the smallest percentage of graduates with any community college transfer are Michigan State University, University of Michigan-Ann Arbor, and Central Michigan University, which also happen to be the three universities that produce the largest number of bachelor's degrees. In contrast to the universities at the top of Table 9, the universities at the bottom of the table tend to have a larger percentage of 4-Year Starters than 2-Year Starters.

Table 9. Percent Transfer by Public Institution and Transfer Type.

Public Institution Name	Number of Total Bachelor's Graduates	Percent 4-Year Starters: CC Enrollee	Percent 2-Year Starter: 1 Year at CC	Percent 2-Year Starter: 2+ Years at CC	Percent Any CC (Sum of Previous 3 Columns)
Western Michigan University	2,750	21.7%	7.9%	19.5%	49.1%
Wayne State University	1,877	20.6%	8.0%	20.2%	48.9%
Oakland University	1,942	18.7%	8.4%	21.7%	48.8%
Ferris State University	1,571	15.4%	7.6%	24.4%	47.4%
Eastern Michigan University	1,861	10.6%	8.2%	26.4%	45.2%
University of Michigan-Flint	712	7.0%	17.6%	17.4%	42.0%
Grand Valley State University	3,336	19.0%	6.3%	14.4%	40.1%
Lake Superior State University	340	15.3%	5.9%	15.3%	36.5%
Saginaw Valley State University	1,010	18.9%	5.1%	10.8%	34.9%
University of Michigan-Dearborn	815	5.8%	6.6%	22.5%	34.8%
Michigan Technological University	897	13.5%	2.8%	7.6%	23.9%
Northern Michigan University	944	8.3%	5.4%	10.3%	23.9%
Michigan State University	6,969	8.6%	5.0%	1.7%	15.4%
University of Michigan-Ann Arbor	5,753	11.0%	1.5%	2.5%	15.0%
Central Michigan University	3,233	9.0%	1.2%	0.4%	10.6%

Of the 26 independent colleges and universities in Table 10, about 21 have more than 40% of bachelor's degrees graduates who attended any community colleges. Although many of the independent colleges and universities confer

a much smaller number of bachelor's degrees than public universities, a larger percentage of their graduates tend to utilize the community college.

Table 10. Percent Transfer by Independent Institution and Transfer Type.

Private University Name	Number of Total Bachelor's Graduates	Percent 4-Year Starters: CC Enrollee	Percent 2-Year Starter: 1 Year at CC	Percent 2-Year Starter: 2+ Years at CC	Percent Any CC (Sum of Previous 3 Columns)
Northwestern Michigan College	18	55.6%	38.9%	5.6%	100.0%
Walsh College	118	6.8%	11.9%	79.7%	98.3%
Adrian College	17	0.0%	76.5%	17.6%	94.1%
Andrews University	23	0.0%	34.8%	56.5%	91.3%
Cornerstone University	44	6.8%	29.5%	54.5%	90.9%
Aquinas College	60	8.3%	30.0%	50.0%	88.3%
Lawrence Technological University	32	0.0%	34.4%	50.0%	84.4%
Cleary University	12	16.7%	16.7%	50.0%	83.3%
The Robert B Miller College	11	18.2%	27.3%	36.4%	81.8%
Rochester College	69	10.1%	13.0%	56.5%	79.7%
Hope College	48	8.3%	47.9%	22.9%	79.2%
Albion College	27	14.8%	29.6%	33.3%	77.8%
Davenport University	209	5.3%	21.5%	50.7%	77.5%
Northwood University	331	17.5%	8.8%	41.7%	68.0%
University of Detroit Mercy	374	34.0%	8.6%	9.4%	51.9%
Spring Arbor University	238	15.5%	10.9%	24.8%	51.3%
College for Creative Studies	163	31.3%	8.0%	10.4%	49.7%
Marygrove University	80	6.3%	12.5%	30.0%	48.8%
Madonna University	89	12.4%	6.7%	27.0%	46.1%
Calvin College	232	37.5%	3.4%	4.7%	45.7%
Finlandia University	16	0.0%	12.5%	31.3%	43.8%
Baker College	433	6.2%	9.9%	12.9%	29.1%
Olivet College	111	16.2%	5.4%	4.5%	26.1%
Alma College	209	18.7%	1.9%	2.9%	23.4%
Kettering University	163	10.4%	4.3%	5.5%	20.2%
Kalamazoo College	176	9.1%	0.6%	2.3%	11.9%

“About half of Michigan’s public universities (7 universities) have more than 40% of bachelor’s graduates who attended any community college.”

Transfer Type by Bachelor's Degree-Granting Institutional Type

Figure 6 and Figure 7 display the percent of graduates by institutional type and by transfer type. Figure 6 includes the full sample (n=37,353) and displays the distribution of transfer type (any transfer and any community college transfer) by public and independent institutions. Figure 7 displays only the sub-sample of students who attended any community college (n=11,612) and displays the distribution by 4-Year Starters and 2-Year Starters by public and independent institutions. Overall, Figure 6 shows that a larger percent of graduates from independent institutions (58%) ever transferred (including lateral transfer) compared to graduates from public institutions (41%). Similarly, Figure 6 shows that about half of graduates from independent institutions attended any community college (51%) and about a third of graduates from public institutions attended any community college (29%).

Figure 7 includes only the sub-sample of 2-year and 4-Year Starters who attended any community college (n=11,612). Among private institution graduates who attended any community college, the largest percentage (46%) began at a 2-year and stayed there for two or more years prior to transfer. Among public institution graduates who attended any community college, the largest proportion (45%) began college at a 4-year and enrolled in a community college after their first year.

Figure 6. Percent of Graduates by Institutional Type (Public and Independent) and Transfer Type for Full Sample (n=37,353).

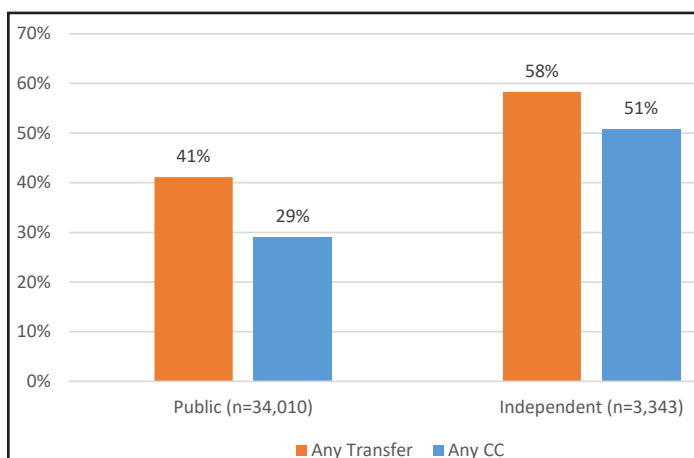
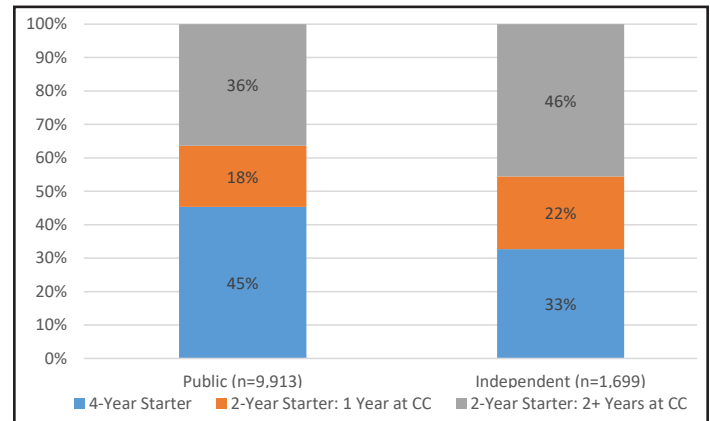


Figure 7. Percent of Graduates by Institutional Type (Public and Independent) and Transfer Type for Sub-Sample of Community College Enrollees (n=11,612).



Transfer Type by High School Type

Figure 8 and Figure 9 display the percent of graduates by high school type and by transfer type. Figure 8 includes the full sample (n=37,353) and displays the distribution transfer type (any transfer and any community college transfer) by high school type. Figure 9 displays only the sub-sample of students who attended any community college (n=11,612) and displays the distribution by 4-Year Starters and 2-Year Starters by high school type. Figure 8 illustrates that graduates from out-of-state high schools had lower rates of any transfer and any community college transfer than Michigan high school graduates.

Figure 9 includes only the sub-sample of 2-year and 4-Year Starters who attended any community college (n=11,612). The most notable observation in Figure 9 is that among out-of-state high school graduates that attended any community college, only a third (33%) were 4-year starters, meaning that most began their education at a community college; and a larger percent stayed at the community college for 2 or more years compared to just one year. This suggests that many out-of-state graduates complete bachelor's degrees by beginning at community colleges, at least among graduates who enroll in the community college.

Figure 8. Percent Transfer by High School Type and Transfer Type for Full Sample (n=37,353).

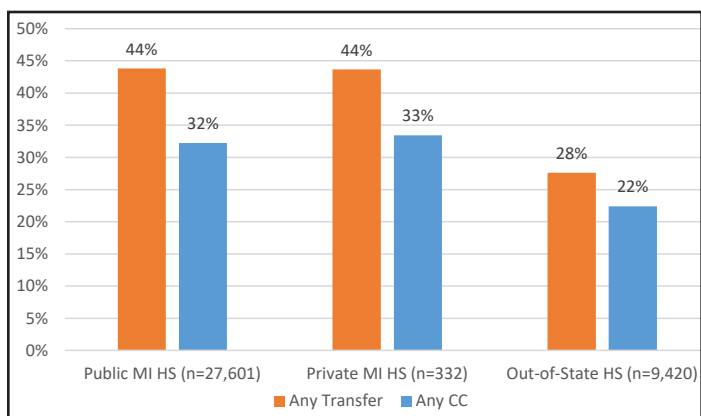
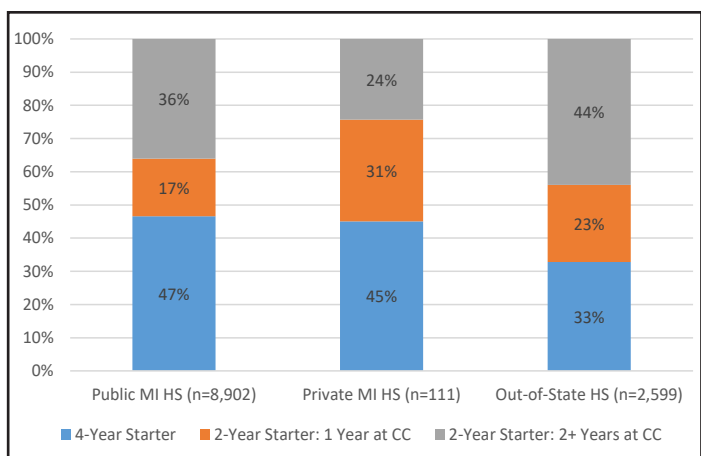


Figure 9. Percent of Graduates by High School Type and Transfer Type for Sub-Sample of Community College Enrollees (n=11,612).



Transfer Type by Sex

Figure 10 and Figure 11 display the percent of graduates by sex and by transfer type. Figure 10 includes the full sample (n=37,353) and displays the distribution of transfer type (any transfer and any community college transfer) by sex. Figure 11 displays only the sub-sample of students who attended any community college (n=11,612) and displays the distribution by 4-Year Starters and 2-Year Starters by sex. On average, female students tend to be more mobile than male students in terms of any transfer and any community college transfer: those with an unreported sex tend to be the least mobile. However, there is no difference in the percent of students who enroll in the community college in the first or first and second years.

Figure 11 includes only the sub-sample of 2-year and 4-year starters who attended any community college (n=11,612). Among students who attended any community college, males were slightly more likely to begin at a community college and females were slightly more likely to be 4-Year Starters.

Figure 10. Percent Transfer by Sex and Transfer Type for Full Sample (n=37,353).

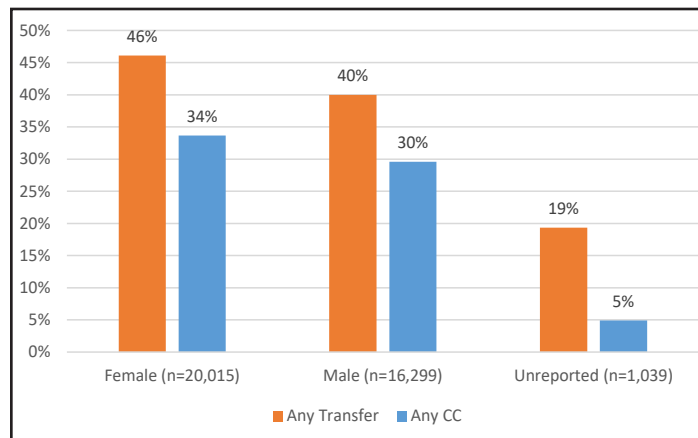
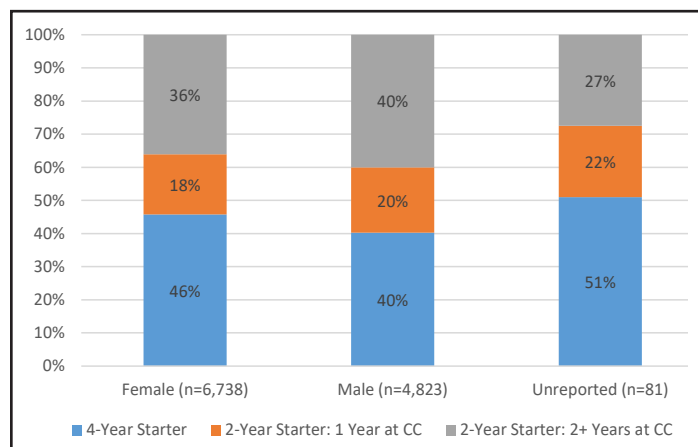


Figure 11. Percent of Graduates by Sex and Transfer Type for Sub-Sample of Community College Enrollees (n=11,612).



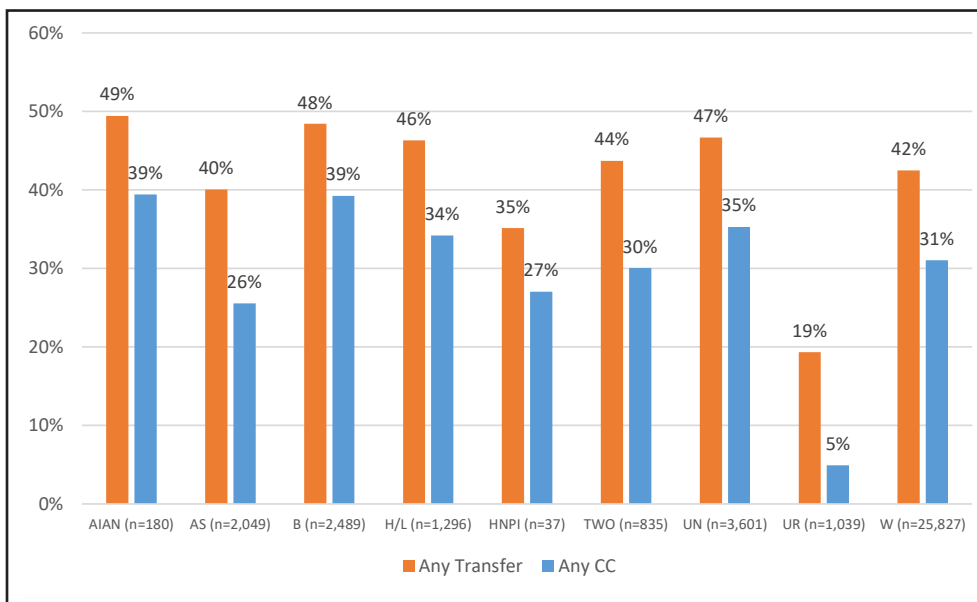
Transfer Type by Race/Ethnicity

Figure 12 and Figure 13 display the percent of graduates by race/ethnicity and by transfer type. Figure 12 includes the full sample (n=37,353) and displays the distribution of transfer type (any transfer and any community college transfer) by race/ethnicity. Figure 13 displays only the sub-sample of students who attended any community college (n=11,612) and displays the distribution by 4-Year Starters and 2-Year Starters by race/ethnicity. On average, American Indian or Alaska Native, Black/African American, Unknown

Race, and Hispanic graduates were consistently more mobile across all transfer types. Alternatively, Asian and White Students, and students with an Unreported race/ethnicity had the lowest transfer rates across all transfer types.

Figure 13 includes only the sub-sample of 2-Year and 4-Year Starters who attended any community college (n=11,612). On average, graduates that were Asian, Black, Two or More Races, and Unreported race/ethnicity were more likely to be 4-Year Starters compared to graduates in other racial/ethnic groups.

Figure 12. Percent Transfer by Race/Ethnicity and Transfer Type for Full Sample (n=37,353).



Note:

AIAN=American Indian or Alaskan Native;

AS=Asian;

B=Black;

H/L=Hispanic/Latinx;

HNPI=Hawaiian Native or Pacific Islander;

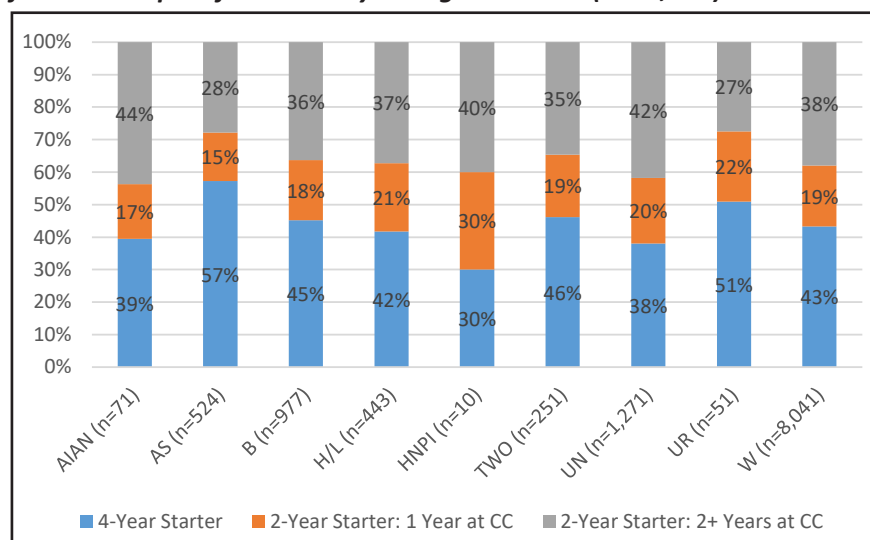
TWO=Two or More Races;

UN=Unknown;

UR=Unreported;

W=White

Figure 13. Percent of Graduates by Race/Ethnicity and Transfer Type for Sub-Sample of Community College Enrollees (n=11,612).



Note:

AIAN=American Indian or Alaskan Native;

AS=Asian;

B=Black;

H/L=Hispanic/Latinx;

HNPI=Hawaiian Native or Pacific Islander;

TWO=Two or More Races;

UN=Unknown;

UR=Unreported;

W=White

Section 2: Transfer Programs

This section focuses on graduates' programs and majors. The section examines the programs in which graduates enrolled and completed bachelor's degrees and how enrollment and completion vary by transfer type. This section also examines movement between programs among students and transfer students.

Frequency of Bachelor's Degree Graduates by Classification of Instructional Program (CIP)

Bachelor's graduates were categorized based on the 2-digit Classification of Instructional Program (CIP) code for this analysis.⁴ Table 11 displays the 2-digit CIP name for all bachelor's degree recipients along with the number and percent of graduates (n=35,458).⁵ The table is organized by CIPs with the largest number of graduates and shows

that about 75% of all graduates are concentrated in the ten largest CIP codes:

1. Business, Management, Marketing, and Related Support Services
2. Health Professions and Related Programs
3. Engineering
4. Biological and Biomedical Sciences
5. Psychology
6. Social Sciences
7. Communication, Journalism, and Related Programs
8. Education
9. Visual and Performing Arts
10. Parks, Recreation, Leisure, and Fitness Studies

The remaining 25% of bachelor degree recipients represent the 26 other 2-digit CIP categories which are displayed in Table 11.

Table 11. Number and Percent of Bachelor's Degree Recipients by CIP Code (n=35,458) Among All Graduates.

Classification of Instructional Programs (CIP) Name	N	Percent
Business, Management, Marketing, and Related Support Services	6,342	17.9%
Health Professions and Related Programs	3,563	10.1%
Engineering	2,678	7.6%
Biological and Biomedical Sciences	2,426	6.8%
Psychology	2,267	6.4%
Social Sciences	2,235	6.3%
Communication, Journalism, and Related Programs	2,143	6.0%
Education	1,999	5.6%
Visual and Performing Arts	1,838	5.2%
Parks, Recreation, Leisure, and Fitness Studies	1,116	3.2%
Homeland Security, Law Enforcement, Firefighting and Related Protective Services	927	2.6%
Computer and Information Sciences and Support Services	924	2.6%
Public Administration and Social Service Professions	896	2.5%
English Language and Literature/Letters	788	2.2%
Multi/Interdisciplinary Studies	666	1.9%
Engineering Technologies and Engineering-Related Fields	657	1.9%
Foreign Languages, Literatures, and Linguistics	516	1.5%
Mathematics and Statistics	475	1.3%
Physical Sciences	473	1.3%
Family and Consumer Sciences/Human Sciences	435	1.2%
Natural Resources and Conservation	426	1.2%

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Table 11. Number and Percent of Bachelor's Degree Recipients by CIP Code (n=35,458) Among All Graduates. *cont.*

Classification of Instructional Programs (CIP) Name	N	Percent
History	400	1.1%
Liberal Arts and Sciences, General Studies and Humanities	315	0.9%
Agriculture, Agriculture Operations, and Related Sciences	180	0.5%
Area, Ethnic, Cultural, Gender, and Group Studies	176	0.5%
Philosophy and Religious Studies	129	0.4%
Communications Technologies/Technicians and Support Services	104	0.3%
Legal Professions and Studies	104	0.3%
Architecture and Related Services	95	0.3%
Transportation and Materials Moving	91	0.3%
Mechanic and Repair Technologies/Technicians	34	0.1%
Personal and Culinary Services	17	0.1%
Theology and Religious Vocations	17	0.1%
Leisure and Recreational Activities	3	<0.1%
Library Science	2	<0.1%
Military Science, Leadership and Operational Art	1	0.0%

Table 12 displays the percent of bachelor's graduates by transfer type and by CIP. The table is ordered by largest number of bachelor's degrees to smallest number of bachelor's degrees. The table illustrates how bachelor's graduates in different disciplines transfer from community colleges in different patterns. For example, Health Professions and Related Programs graduates rely heavily on the community college (40%), whereas Engineering graduates are among graduates that use the community college the least (23%). The table also illustrates that for most CIP codes, more 2-Year Starters tend to stay at the community college for two or more years compared to one year, which aligns with Figure 1. Only in a few CIP codes (e.g., Agriculture, Agriculture Operations, and Related Sciences; Transportation and Materials Moving; Leisure and Recreational Activities) does a larger percent of 2-Year Starters transfer after their first year compared to sometime after their second year of enrollment in the community college.

Table 12 also illustrates that for some CIP categories with

larger numbers of bachelor's degree graduates, an equal or larger percent of transfer students are 4-Year Starters compared to 2-Year Starters (e.g., Health Professions and Related Programs; Engineering; Biological and Biomedical Sciences, Park; Social Sciences, and Parks, Recreation, Leisure, and Fitness Studies). This suggests that community colleges play a critical role in bachelor's degree education in the largest programs not just for those who begin at a community college but for those who begin at a 4-year institution.

Among CIP programs with smaller numbers of bachelor's degree graduates in Table 12, there is also variation in the percent of graduates attending any community college and among transfer type. For example, half of graduates in Public Administration and Social Services attended a community college (49%), whereas only 21% of graduates in Foreign Languages, Linguistics, and Literatures attended a community college.

Table 12. Percent of Bachelor's Graduates by Transfer Type and CIP Category.

Classification of Instructional Programs (CIP)	Total N Grads in CIP	4-Year Starter: CC Enrollee	2-Year Starter: 1 Year at CC	2-Year Starter: 2+ Years at CC	Total: Any CC (Sum of Previous 3 Columns)
Business, Management, Marketing, and Related Support Services	6,342	13%	6%	18%	37%
Health Professions and Related Programs	3,563	20%	8%	12%	40%
Engineering	2,678	13%	3%	7%	23%
Biological and Biomedical Sciences	2,426	13%	4%	5%	23%
Psychology	2,267	13%	7%	12%	32%
Social Sciences	2,235	11%	4%	7%	22%
Communication, Journalism, and Related Programs	2,143	12%	6%	10%	28%
Education	1,999	15%	7%	13%	35%
Visual and Performing Arts	1,838	13%	5%	9%	27%
Parks, Recreation, Leisure, and Fitness Studies	1,116	17%	5%	8%	30%
Homeland Security, Law Enforcement, Firefighting and Related Protective Services	927	13%	7%	26%	46%
Computer and Information Sciences and Support Services	924	11%	4%	11%	27%
Public Administration and Social Service Professions	896	16%	7%	25%	48%
English Language and Literature/Letters	788	11%	5%	11%	27%
Multi/Interdisciplinary Studies	666	13%	6%	12%	31%
Engineering Technologies and Engineering-Related Fields	657	17%	6%	8%	31%
Foreign Languages, Literatures, and Linguistics	516	11%	4%	6%	21%
Mathematics and Statistics	475	10%	4%	9%	23%
Physical Sciences	473	16%	4%	7%	27%
Family and Consumer Sciences/Human Sciences	435	14%	4%	11%	29%
Natural Resources and Conservation	426	9%	6%	11%	26%
History	400	9%	6%	11%	26%
Liberal Arts and Sciences, General Studies and Humanities	315	17%	8%	18%	43%
Agriculture, Agriculture Operations, and Related Sciences	180	12%	12%	4%	29%
Area, Ethnic, Cultural, Gender, and Group Studies	176	10%	5%	6%	20%
Philosophy and Religious Studies	129	12%	7%	14%	33%

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Table 12. Percent of Bachelor's Graduates by Transfer Type and CIP Category. *cont.*

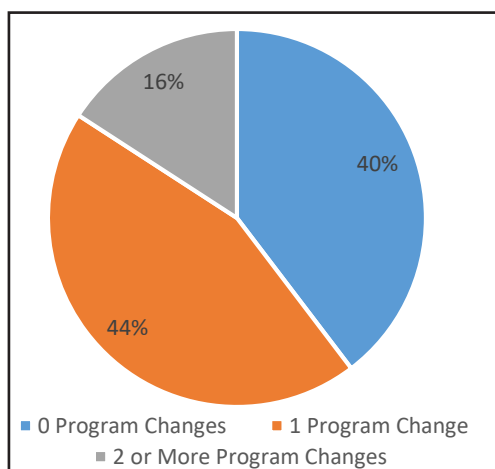
Classification of Instructional Programs (CIP)	Total N Grads in CIP	4-Year Starter: CC Enrollee	2-Year Starter: 1 Year at CC	2-Year Starter: 2+ Years at CC	Total: Any CC (Sum of Previous 3 Columns)
Communications Technologies/Technicians and Support Services	104	20%	7%	25%	52%
Legal Professions and Studies	104	15%	6%	13%	34%
Architecture and Related Services	95	11%	7%	15%	33%
Transportation and Materials Moving	91	27%	14%	9%	51%
Mechanic and Repair Technologies/Technicians	34	26%	9%	9%	44%
Personal and Culinary Services	17	18%	6%	41%	65%
Theology and Religious Vocations	17	6%	18%	18%	41%
Leisure and Recreational Activities	3	0%	33%	0%	33%
Library Science	2	0%	0%	0%	0%
Military Science, Leadership and Operational Art	1	0%	100%	0%	100%

Program Changes among All Graduates and Transfers

Research suggests that many college students change their major and programs (Leu, 2017) and transfer students are no exception. The transfer literature has documented the phenomenon of credit loss (Bowls, 1988; Monaghan & Attewell, 2015; Pincus & De-Camp, 1989)—students losing credits during transfer—and some credit loss is because students change their majors. Credits from their old majors or programs do not apply to their new programs. Although the data used for this report cannot assess the transfer of credits or application of credits, the data allows us to assess if bachelor's graduates change programs and the type of program changes that are made. This section examines how many bachelor's graduates change majors, the number of major changes, and types of major changes.

To conduct this analysis, students' 2-digit bachelor's degrees CIP codes were used. Figure 14 displays the number of programs changes based on the number of CIP codes in which bachelor's graduates were enrolled. On average, about 40% of bachelor's degree graduates completed a bachelor's degree in the same 2-digit CIP code in which they first started college, meaning they had no program changes. This means that the majority (60%) of graduates who start college in one program changed their program prior to completing a bachelor's degree. Figure 14 shows that 44% of bachelor's graduates had one program change, and 16% of graduates had two or more program changes. A program change based on a 2-digit CIP

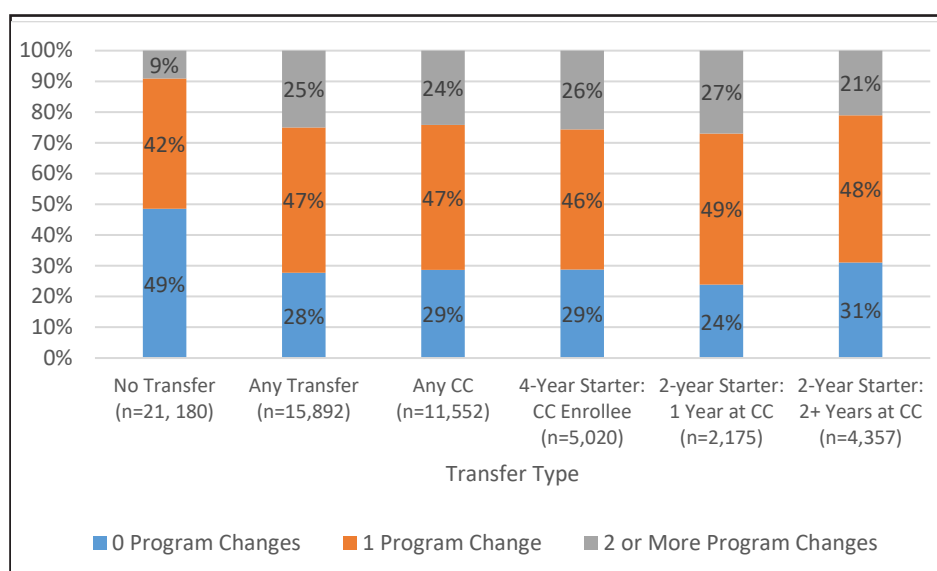
Figure 14. Percent of Students by Number of Program Changes (n=35,458).



code is significant because changes between 2-digit CIP codes often represent significant disciplinary changes (e.g., a change from biology to business), which likely means significant differences in students' curricula and the potential for credit loss.

How does the number of program changes differ by transfer type? Figure 15 displays the number of program changes by transfer type and for graduates who did not transfer. There are three important observations from this figure. First, non-transfers and transfers are about just as likely to have one program change (42% of non-transfers and 47% of transfers). Second, the primary difference between non-transfers and transfers is that a higher proportion of transfers have two or more program changes and a lower proportion of transfers have zero program changes. This suggests that transfer graduates' programs and majors fluctuate more than non-transfers. This is not entirely unexpected because many community college students in a transfer program have a liberal arts or general education CIP code/program, and this may be less common for non-transfers who may start college in their major program. Third, there are few differences in the number of program changes among 4-Year Starters and 2-Year Starters who transfer. However, 2-Year Starters who transfer after their first year are slightly more likely to change their program two or more times relative to 2-Year Starters who transfer after two or more years.

Figure 15. Number of Program Changes by Transfer Type and No Transfer.



code is significant because changes between 2-digit CIP codes often represent significant disciplinary changes (e.g., a change from biology to business), which likely means significant differences in students' curricula and the potential for credit loss.

How does the number of program changes differ by transfer type? Figure 15 displays the number of program changes by transfer type and for graduates who did not transfer. There are three important observations from this figure. First, non-transfers and transfers are about just as likely to have one program change (42% of non-transfers and 47% of transfers). Second, the primary difference between non-transfers and transfers is that a higher proportion of transfers have two or more program changes and a lower proportion of transfers have zero program changes. This suggests that transfer graduates' programs and majors fluctuate more than non-transfers. This is not entirely unexpected because many community college students in a transfer program have a liberal arts or general education CIP code/program, and this may be less common for non-transfers who may start college in their major program. Third, there are few differences in the number of program changes among 4-Year Starters and 2-Year Starters who transfer. However, 2-Year Starters who transfer after their first year are slightly more likely to change their program two or more times relative to 2-Year Starters who transfer after two or more years.

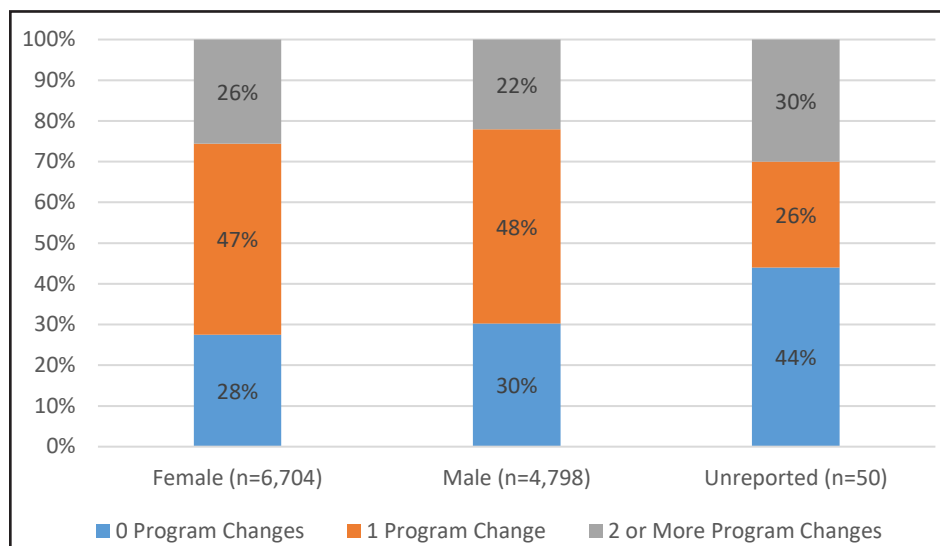
Program Changes by Demographic Characteristics among Graduates with Any Community College

The next set of figures (Figure 16 through Figure 20) displays program changes by graduates' demographic characteristics among graduates with any community college transfer (n=11,552). As displayed in the previous figure (Figure 15), among graduates with any community college transfer, 29% did not change programs (one CIP Program), 47% had one program change (two CIP programs), and 24% had two or more program changes (3 or more CIP programs). Differences in the demographic characteristics in the following set of figures can be compared to these averages for the population of graduates with any community college transfer.

Figure 16 displays differences in program changes by sex among graduates with any community college transfer, and suggests there are few differences in program changes between female and male students, except a slightly larger proportion of female graduates have two or more program changes.

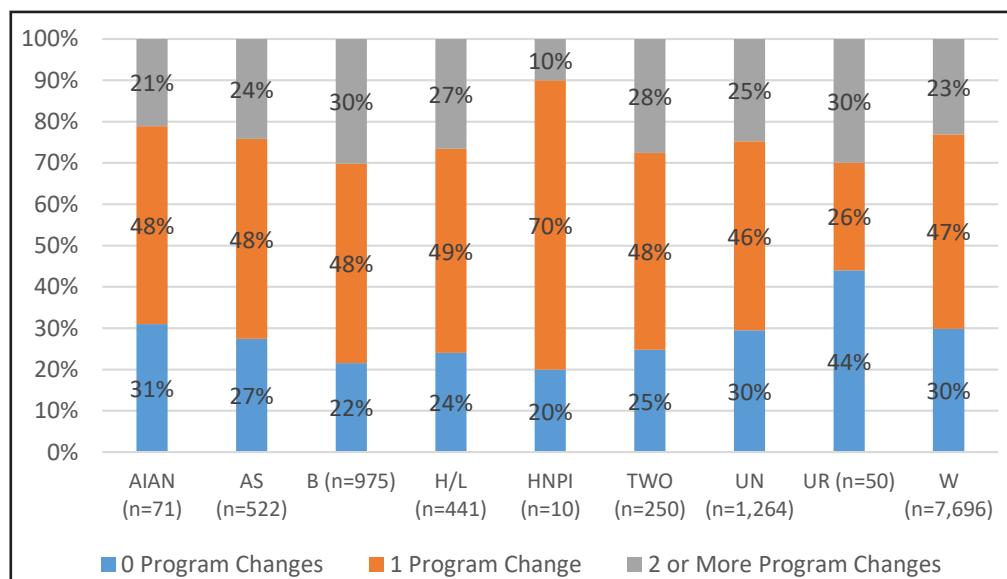
Figure 17 displays program changes by race/ethnicity among graduates with any community college transfer.

Figure 16. Program Changes by Sex (n=11,552).



There were few differences in the percent of students with one program change among race/ethnicities, with the exception of Hawaiian Native or Pacific Islander graduates and graduates with an unreported graduates, which both had a small sample size. Only small differences were observed among race/ethnicities in the percent of graduates that had no program changes or two or more program changes. The largest differences were observed for Black students, Hispanic/Latinx students, and students with Two or More Races.

Figure 17. Program Changes by Race/Ethnicity (n=11,552).



Note:
 AIAN=American Indian or Alaskan Native;
 AS=Asian;
 B=Black;
 H/L=Hispanic/Latinx;
 HNPI=Hawaiian Native or Pacific Islander;
 TWO=Two or More Races;
 UN=Unknown;
 UR=Unreported;
 W=White

es, all of which had a slightly larger percentage of graduates that had two or more program changes. Figure 18 displays program changes by high school among graduates with any community college transfer. A larger percent of graduates with any community college transfer from private high schools (40%) and out-of-state high schools (32%) did not change programs relative to graduates from public Michigan high schools (28%).

Figure 18. Program Changes by High School (n=11,552).

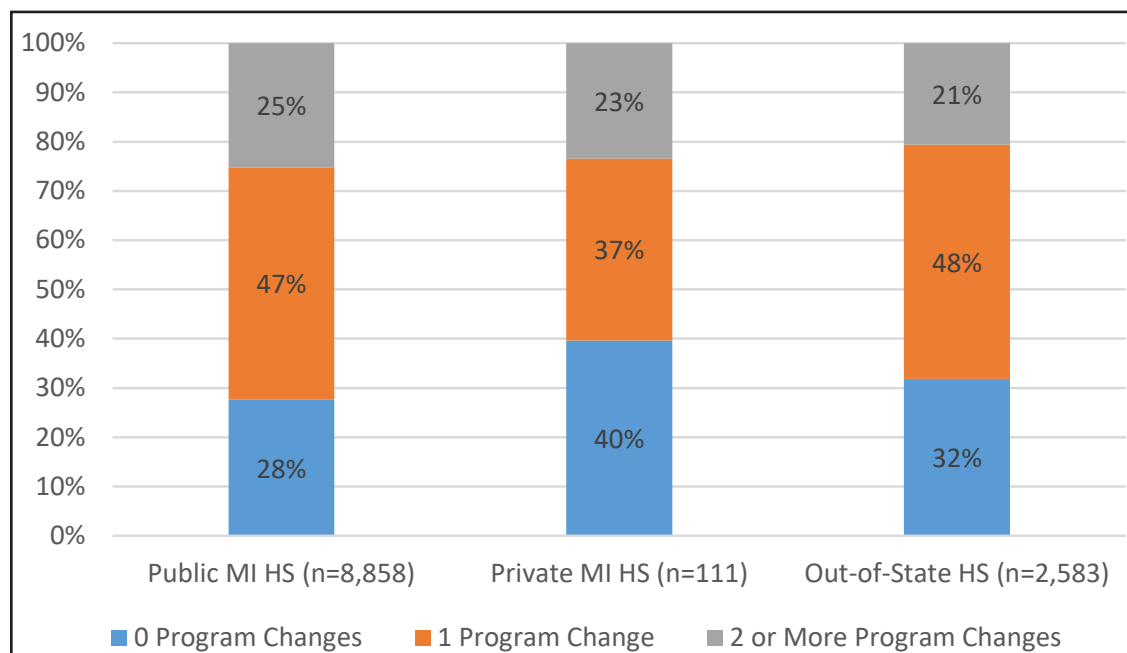


Figure 19. Program Changes by Institutional Type (Public or Independent) (n=11,552).

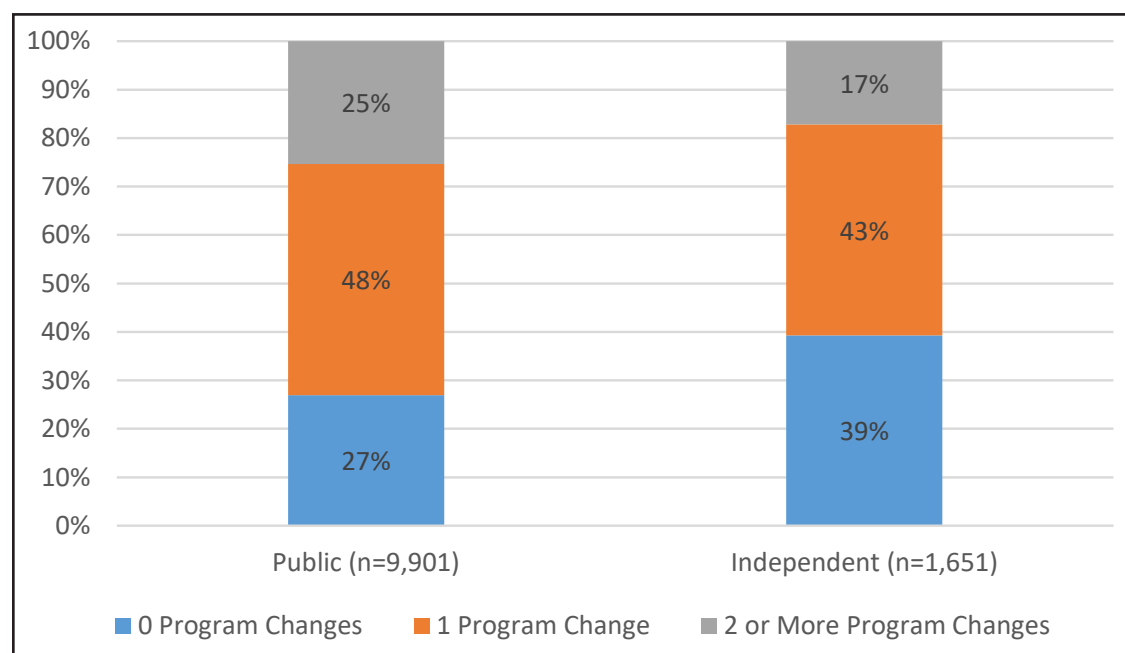
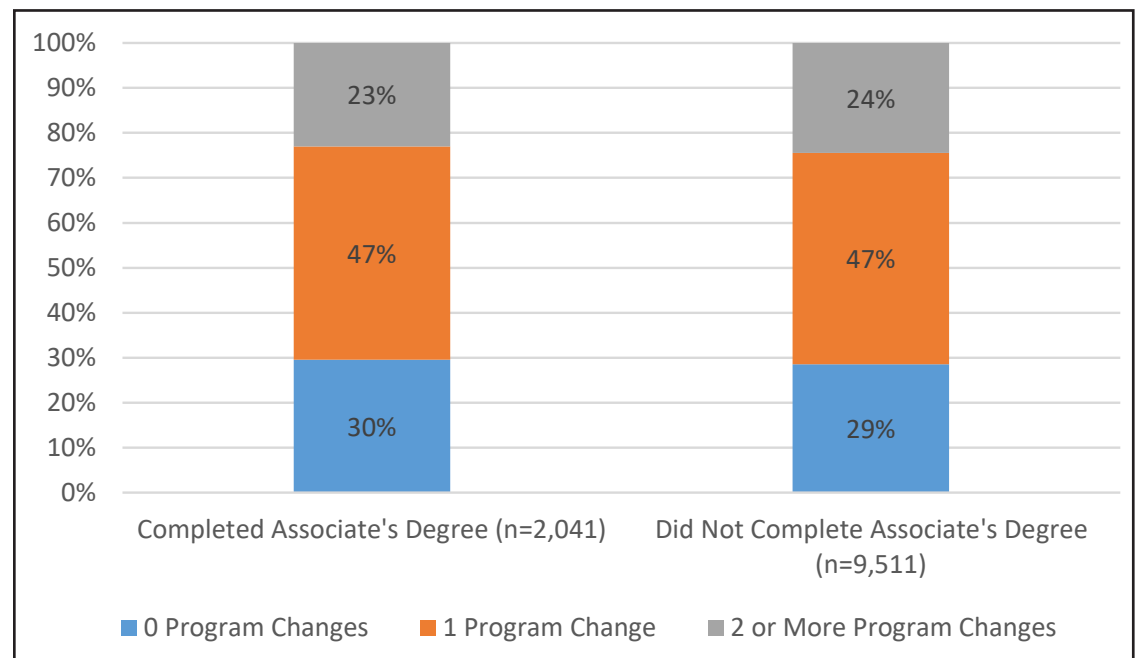


Figure 19 displays program changes by institutional type (public or independent colleges) among graduates with any community college transfer. A larger percent of graduates from independent colleges had no program changes (39%) relative to public colleges (27%).

Figure 20 displays program changes by associate's degree completion among graduates with any community college transfer. The figure suggests there are no differences in program changes between bachelor's degree graduates with any community college who completed an associate's degree and did not complete an associate's degree.

Figure 20. Program Changes by Associate's Degree Completion (n=11,552).



Movement between Programs

Graduates' movement between programs is complex to digest and understand given the multiple number of programs and CIP codes. To better understand movement between programs, graduates' first program CIP code and their bachelor's degree CIP code were condensed into eleven categories developed by colleagues at the Community College Research Center (specific category and CIP code details available upon request). These categories include:

- Arts, Humanities, Communications, & Design
- Business
- Computer & Information Sciences
- Education & Child Care
- Health
- Human Services & Public Safety
- Industrial & Applied Technologies
- Liberal Arts/General Studies
- Other Career and Technical Education (CTE)
- Social & Behavioral Science
- STEM

At the end of this section are four Sankey charts that illustrate the movement between programs for four specific groups of students (Figures 21, 23, 25, 27):

- All Graduates (includes graduates without community college enrollment)
- Graduates with Any Community College
- 4-Year Starters: CC Enrollees
- 2-Year Starters

An additional four Sankey charts (Figures 22, 24, 26, 28) are provided for these same four groups, and these charts exclude students who began in a liberal arts or general studies program (all students with a CIP code of 24, which NCES defines as "Liberal Arts and Sciences, General Studies, and Humanities"). Students who begin college with an undeclared major are often coded with a 24 CIP code. Many community college students begin in undeclared or liberal arts programs.

The Sankey charts illustrate how students move among all programs, even for those who do not begin in a liberal arts or general studies program. The widest bands in Figure 25 through Figure 28 suggest that the largest percentage of students who begin in a program category typically also finish in that program category.

Which program categories see the least and most movement? Table 13 illustrates two different ways to answer this

question specifically for graduates who were 2-Year Starters (Note: Table 13 is based on the sub-sample of students in Figure 27 who were 2-Year Starters). This table illustrates the relative proportion of students who transfer out of and into different programs. The middle column of Table 13 displays the percent of 2-Year Starters in a given program category who begin in a program category and complete a bachelor's degree in the same category. For example, among all 2-Year Starters whose first program was in Education & Child Care, 70% completed a bachelor's degree in Education & Child Care. More than half of 2-Year Starters who began in Human Services & Public Safety (54%) and Health (51%) also completed bachelor's degrees in the same program category. For the remaining seven categories, less than half of 2-Year Starters completed a bachelor's degree in the same program category in which they began. For example, of those 2-Year Starters who began in Business, only 17% also completed a bachelor's degree in Business. In other words, a large proportion of 2-Year Starters who begin college in Business will not graduate with a bachelor's degree in Business.

The far right column of Table 13 displays the percentage of 2-Year Starter graduates who also began in the same program category. For example, of all 2-Year Starters who completed a bachelor's degree in Health, 71% started their program in that same program category. In five of the program categories, more than half of graduates who completed in a program category also began in the same program category when they started college at a community college: Health (71%), Computer & Information Sciences (58%), Business (58%), STEM (56%), and Education & Child Care (51%). Alternatively, of 2-Year Starters who completed a bachelor's degree in Social & Behavioral Sciences, only 17% also began in that program category. In other words, the majority of 2-Year Starters who complete a bachelor's degree in Social & Behavioral Sciences began their community college career in a different program category.

Collectively, the table illustrates which program categories that either (a) send a large proportion of graduates into other programs; or (b) receive a large proportion of graduates from other programs. Programs that send a larger proportion of graduates who are 2-Year Starters into other programs are Business; Industrial & Applied Technologies; STEM; Computer & Information Sciences; Arts, Humanities, Communication, & Design; and Social & Behavioral Sciences. Alternatively, programs that receive a larger proportion of graduates who are 2-Year Starters from other programs include Social & Behavioral Sciences; Industrial &

Applied Technologies; Human Services & Public Safety; and Arts, Humanities, Communication, & Design. This movement between programs among 2-Year Starters is critical to understand because it has implications for how transfer

program curricula are designed and how programs account for students who will likely be transferring from or into different programs.

Table 13. Movement between Program Categories among 2-Year Starters (n=3,348).

Program Category	Percent of Program Category Starters that Started and Finished in Program Category (Excludes CIP Code 24)	Percent of Program Category Completers that Started in Program Category (Excludes CIP Code 24)
Education & Child Care	70%	51%
Human Services & Public Safety	54%	43%
Health	51%	71%
Social & Behavioral Sciences	47%	18%
Arts, Humanities, Communication, & Design	43%	43%
Computer & Information Sciences	42%	58%
STEM	38%	56%
Industrial & Applied Technologies	38%	23%
Business	17%	58%
Other CTE	2%	0%

Note: Table excludes students who whose first program or bachelor's degree had a CIP Code of 24—Liberal Arts and Sciences, General Studies, and Humanities.

Program Movement by Community College

A final analysis of program movement examines differences in program category for 2-year Starters by the beginning community college. Table 14 lists each community college and the number of 2-Year Starters at the college who had a valid CIP code for the beginning program and bachelor's degree program, and who did not begin with a CIP code of 24 (liberal arts/general studies/humanities). Table 14 also lists the percent of students that did NOT move program categories. In other words, they began community college in one program category and completed a bachelor's degree in the same program category. On average, 25% of 2-Year Starters did not change program categories, meaning 75% changed program categories. Because this analysis excludes students in liberal arts/general studies programs, this means that only one in four graduates who began in

a major program at a community college completed their bachelor's degree in the same program category. As Table 14 shows, this percent also varied considerably by community college. Gogebic Community College and Alpena Community College had the largest percentage of 2-Year Starters who completed a bachelor's degree in the same program category in which they began at 61% and 46%, respectively. Among the remaining colleges, about a third of the colleges ranged between 10-20%, a third between 20-30%, and a third between 30-40%. Although these data do not explain this variation or the overall low percentage of 2-Year Starters who begin and complete a bachelor's degree in the same program category, the data suggest the need to better understand why this percentage is so low and how these changes impact students' success and progression toward the bachelor's degree.

Table 14. Number and Percent of 2-Year Starters who Did Not Change Program Categories, by Community College.

Community College	N	Percent
Gogebic Community College	33	61%
Alpena Community College	54	46%
Northwestern Michigan College	178	39%
Bay de Noc Community College	74	35%
Lansing Community College	378	35%
Henry Ford College	306	34%
Lake Michigan College	138	33%
Glen Oaks Community College	19	32%
Grand Rapids Community College	517	31%
Montcalm Community College	46	30%
Washtenaw Community College	357	29%
Mid Michigan Community College	53	28%
Schoolcraft College	400	28%
Oakland Community College	638	26%
Delta College	331	25%
Southwestern Michigan College	49	24%
Kirtland Community College	31	23%
Mott Community College	302	21%
North Central Michigan College	74	20%
Kellogg Community College	128	19%
Kalamazoo Valley Community College	296	17%
Jackson College	151	17%
Macomb Community College	647	16%
Muskegon Community College	183	16%
West Shore Community College	39	15%
Wayne County Community College District	209	15%
Monroe County Community College	82	12%
St Clair County Community College	127	12%
Average	--	25%

Figure 21 ALL GRADUATES: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Includes 24 CIP Code) (n=32,343).

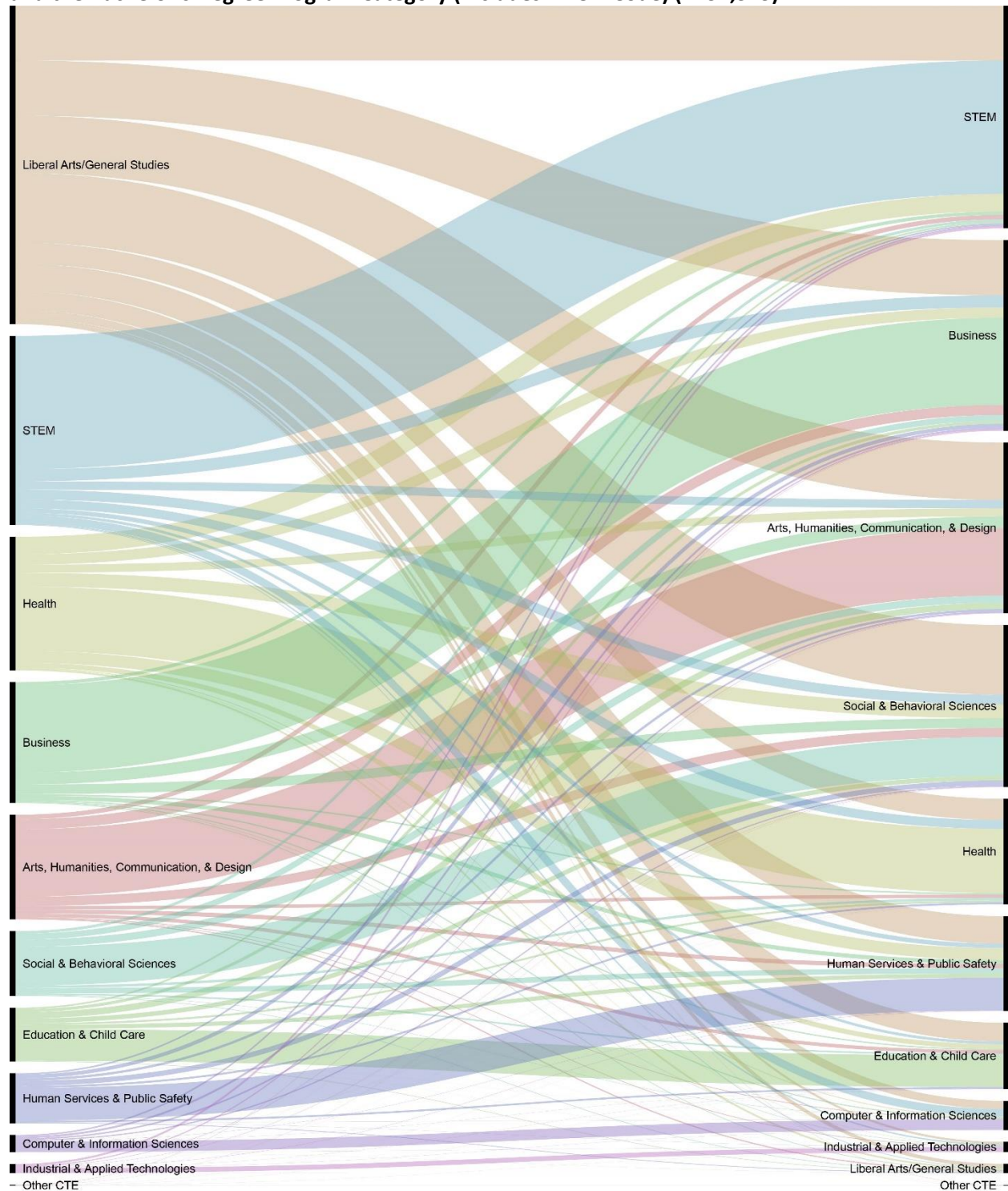


Figure 22. GRADUATES WITH ANY COMMUNITY COLLEGE: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Includes 24 CIP Code) (n=10,152).

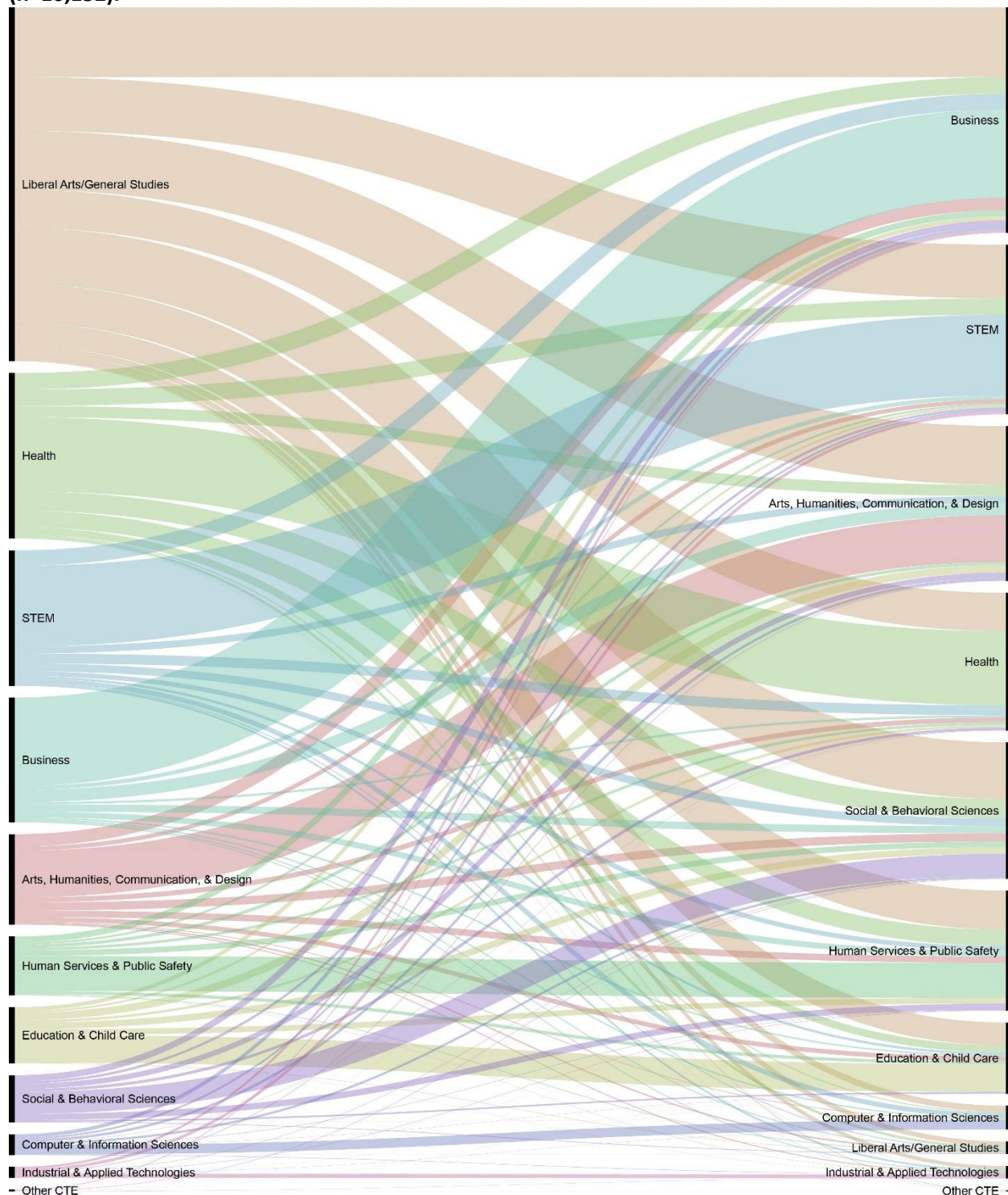


Figure 23. 2-YEAR STARTERS: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Includes 24 CIP Code) (n=5,712).

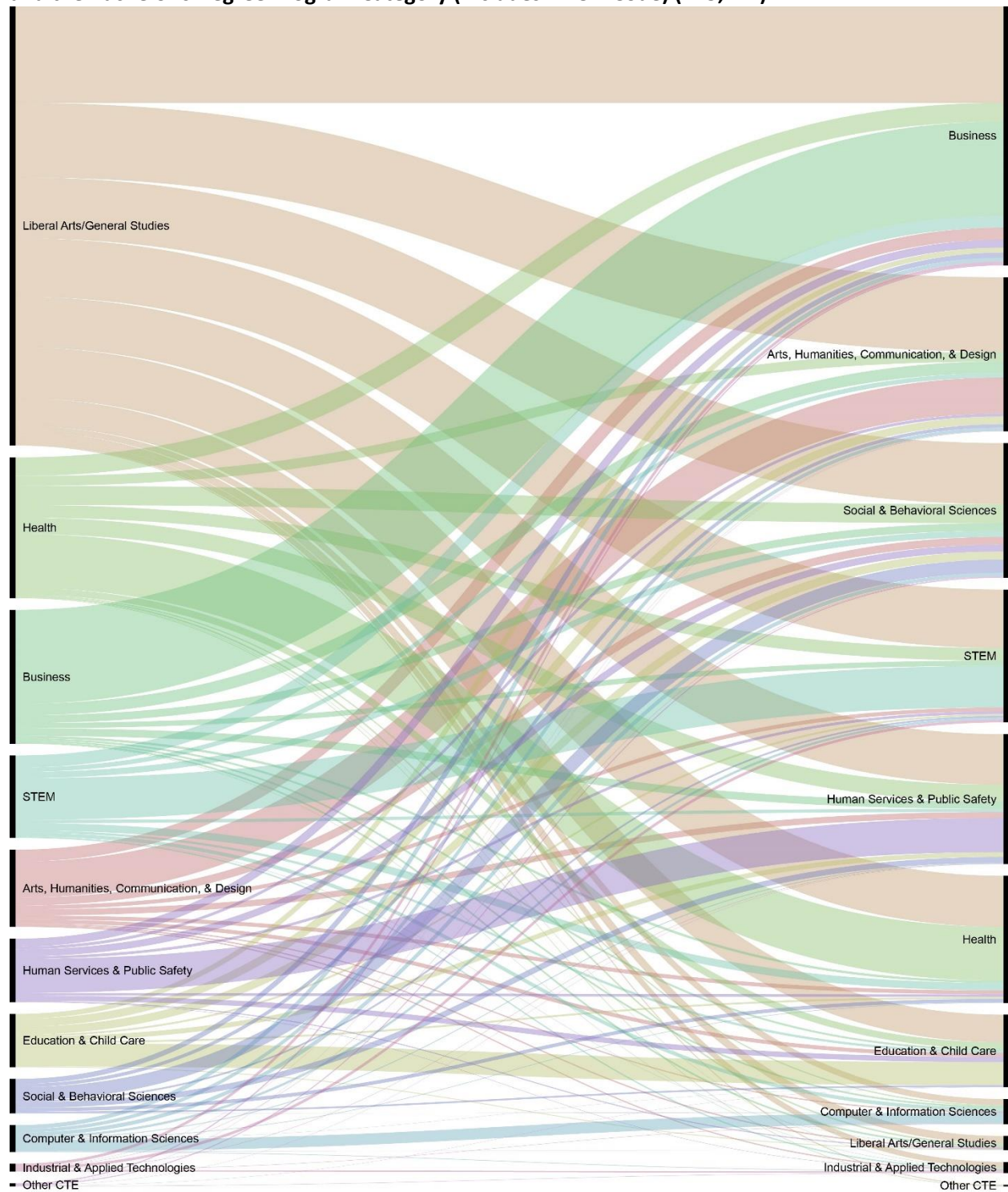


Figure 24. 4-YEAR STARTERS: CC ENROLLEES: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Includes 24 CIP Code) (n=4,440).

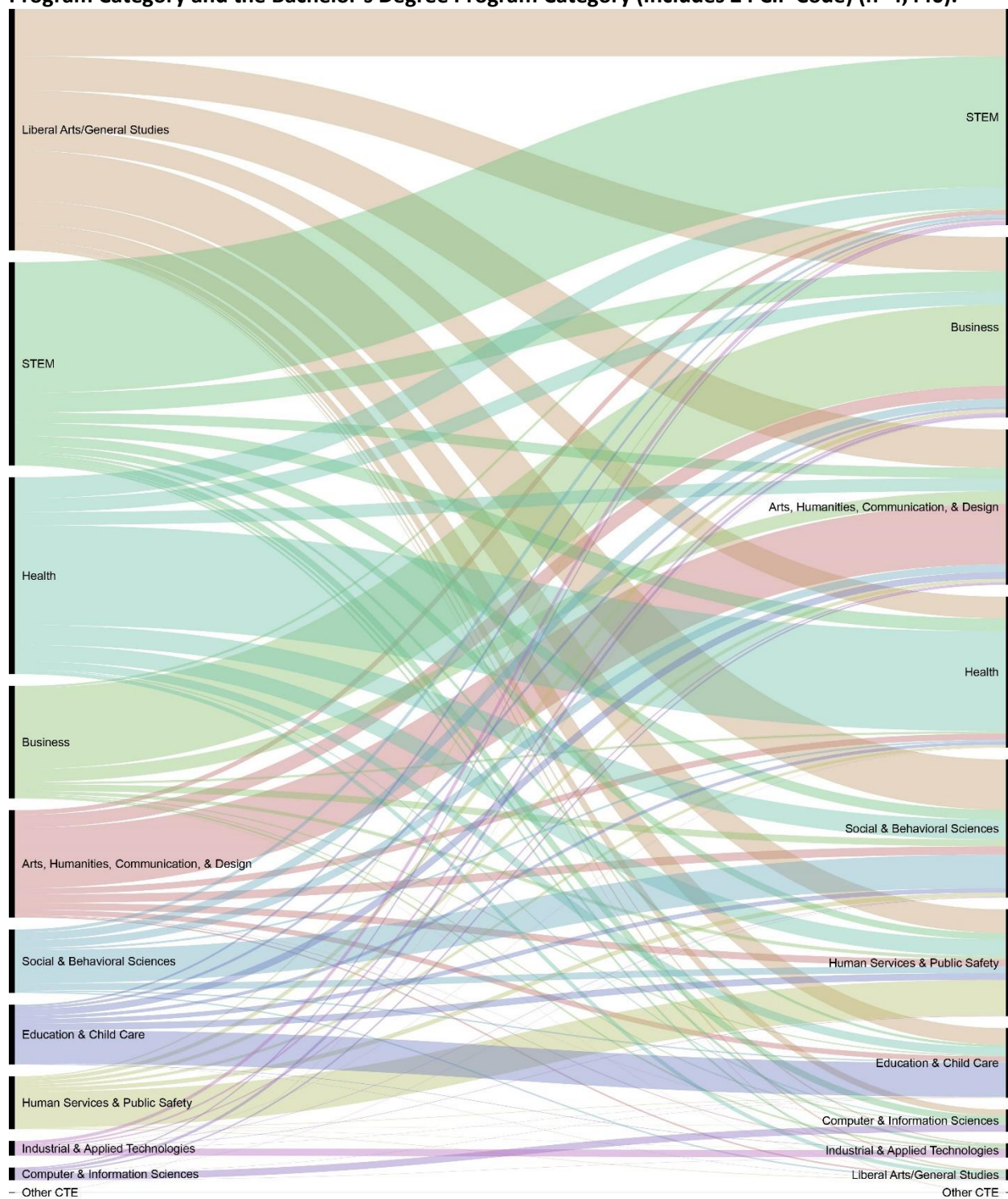


Figure 25. ALL GRADUATES: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Excludes 24 CIP Code) (n=22,648).

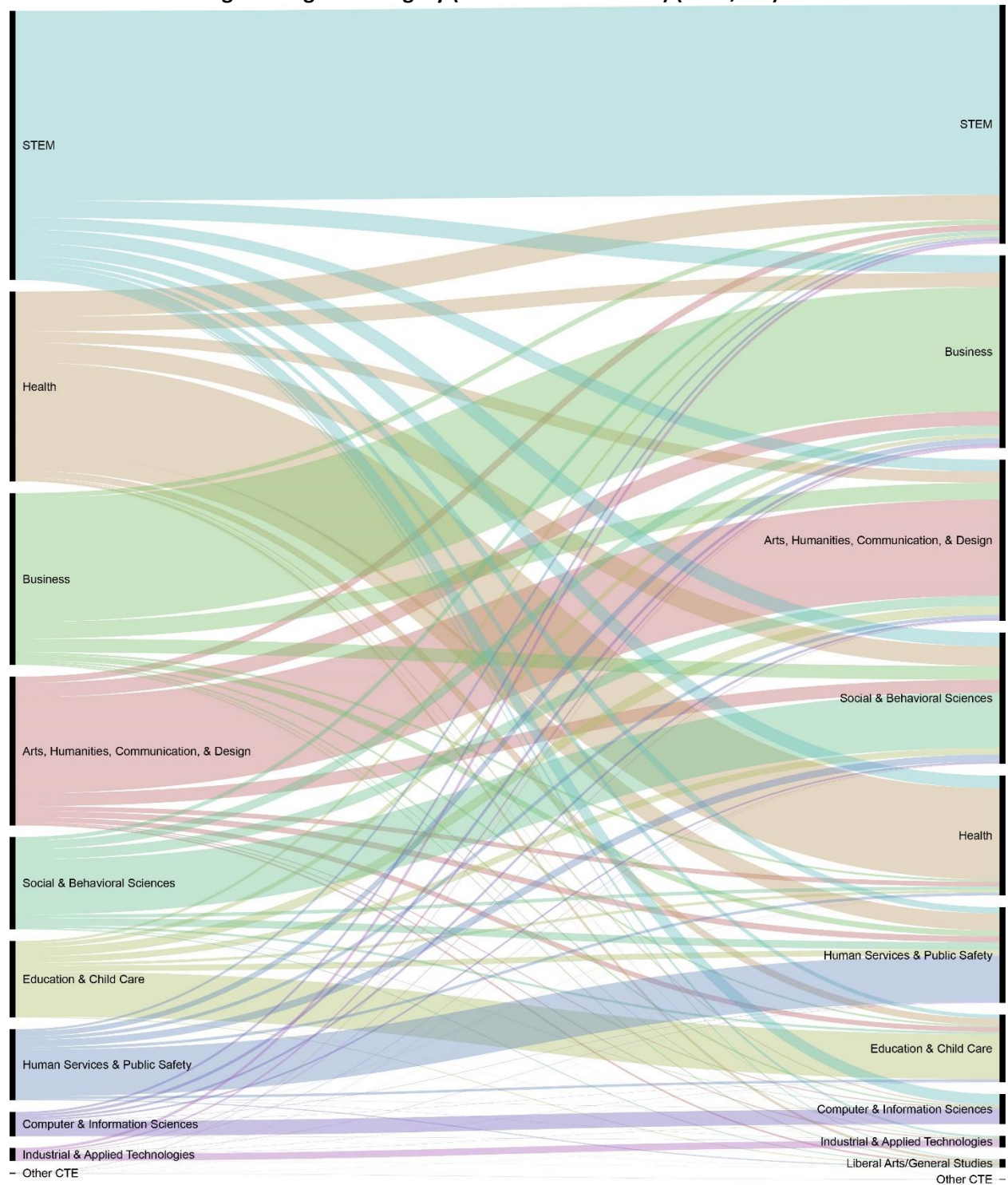


Figure 26. GRADUATES WITH ANY COMMUNITY COLLEGE: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Excludes 24 CIP Code) (n=6,782).

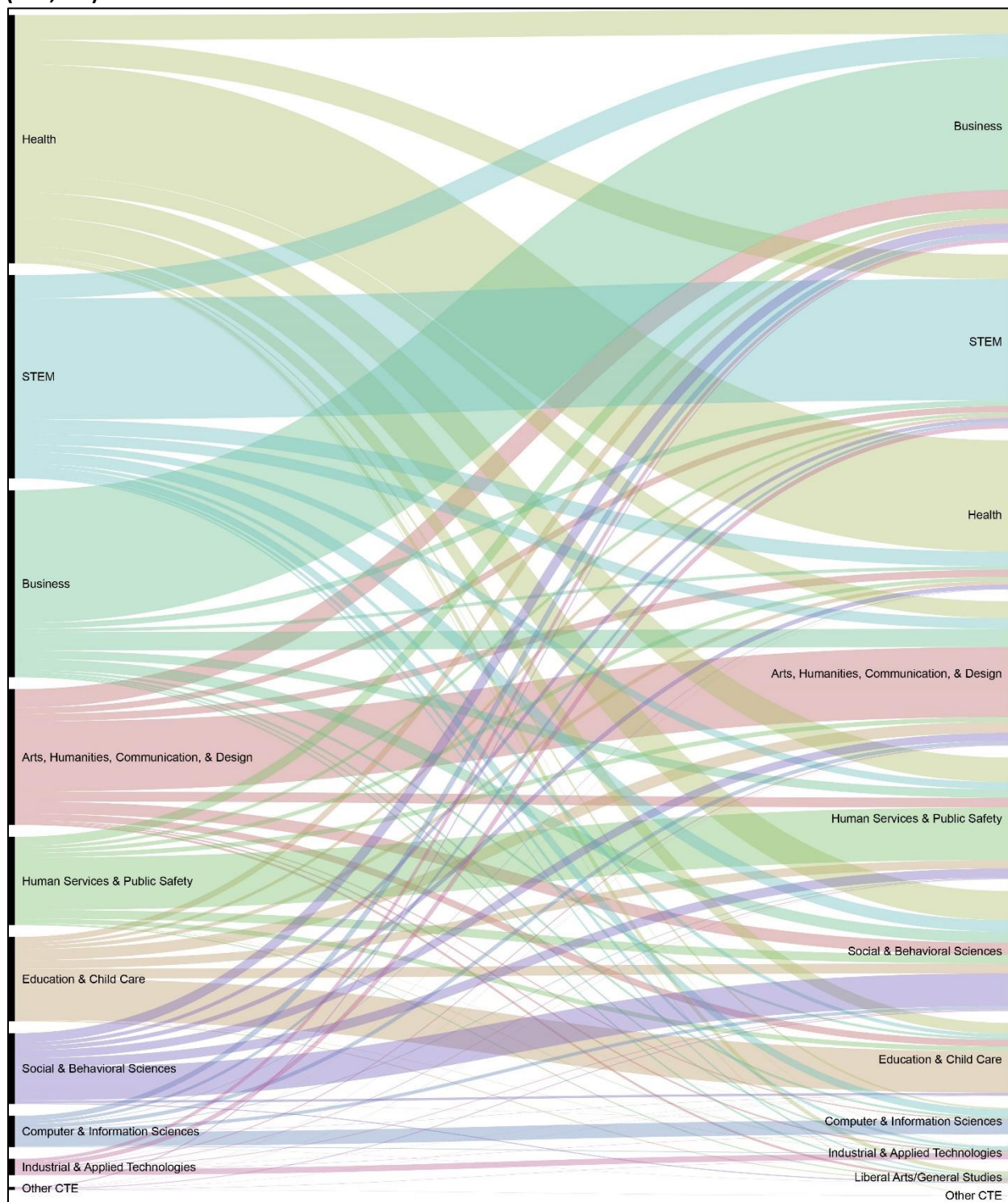


Figure 27. 2-YEAR STARTERS: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Excludes 24 CIP Code) (n=3,348).

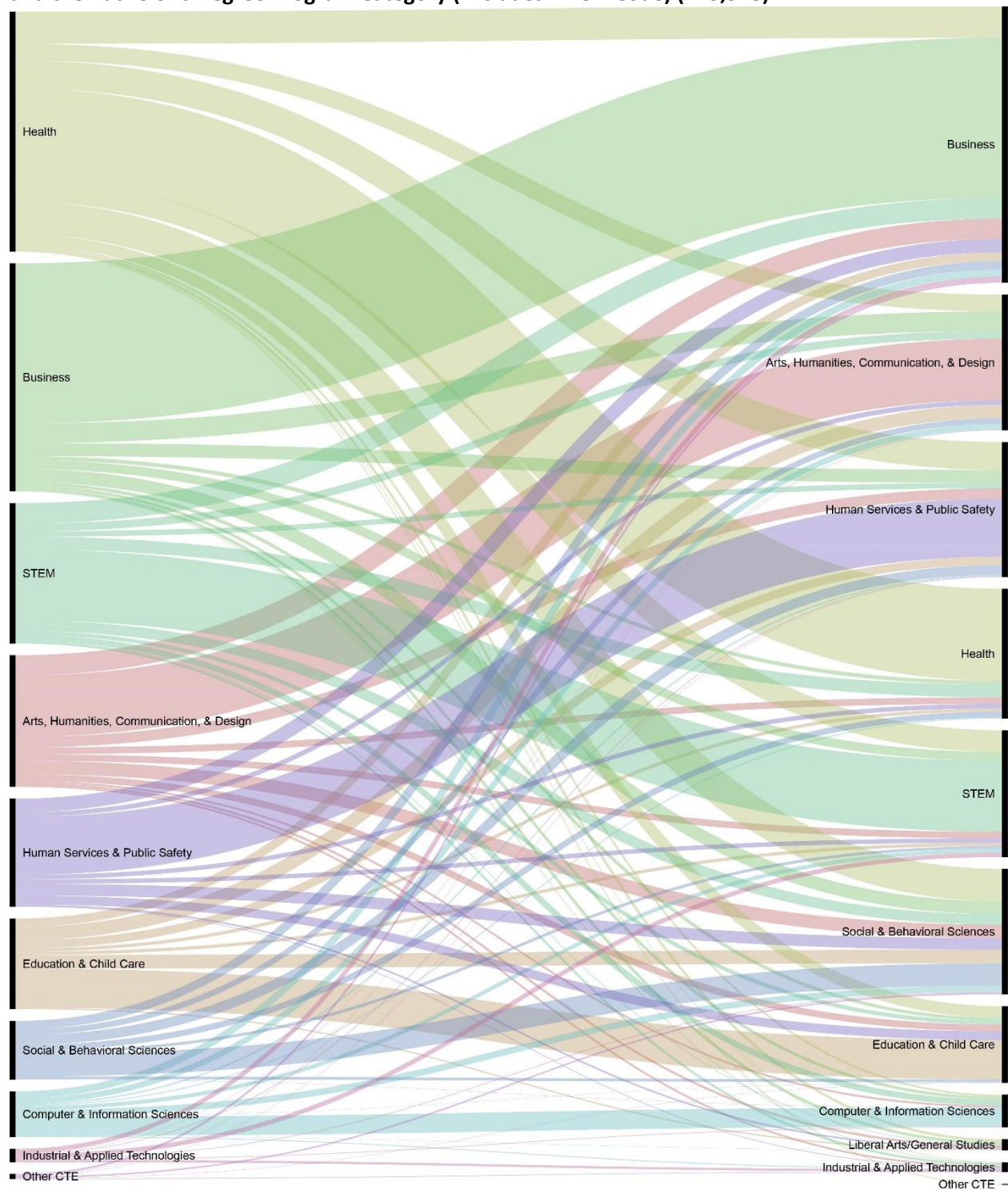
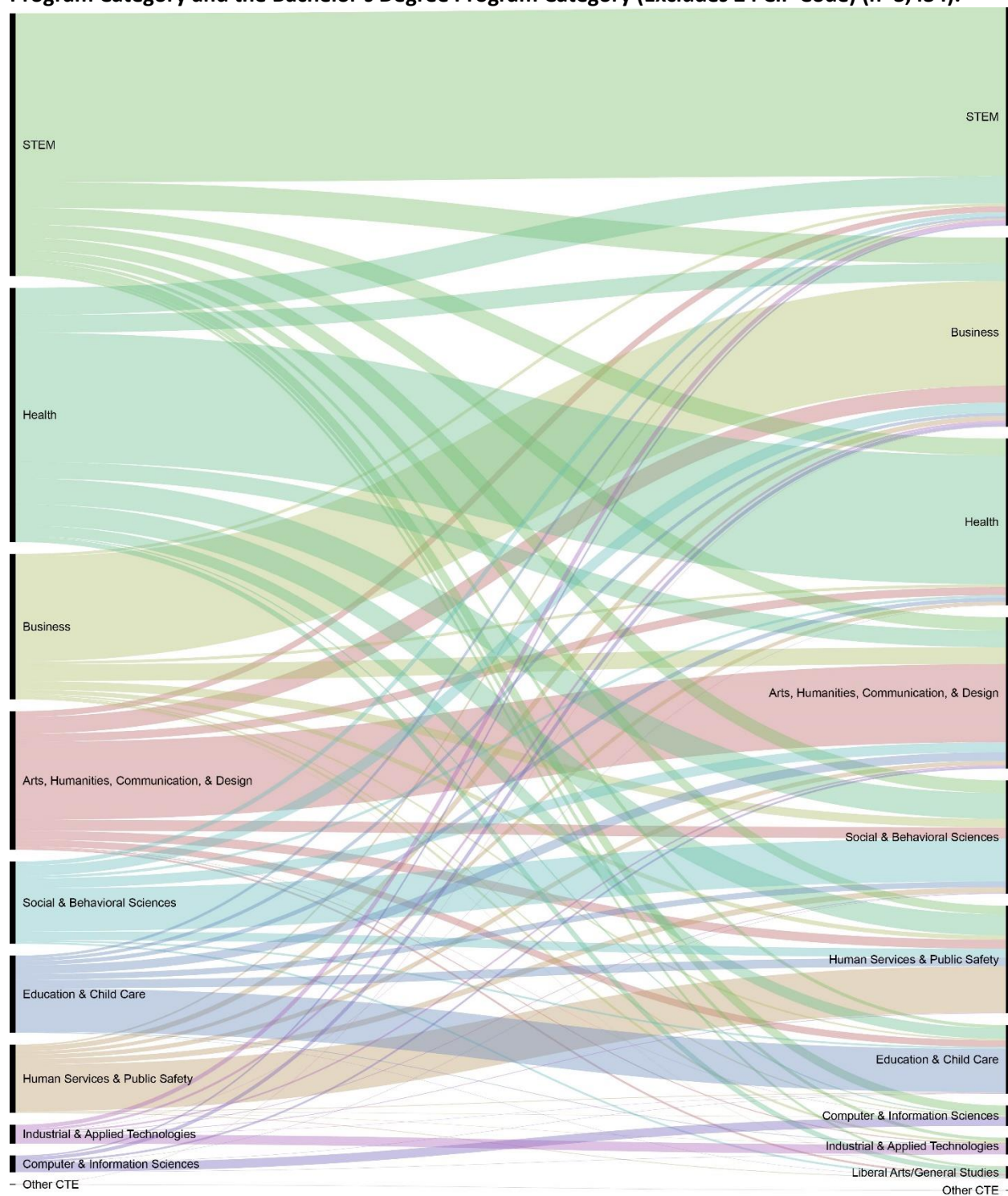


Figure 28. 4-YEAR STARTERS: CC ENROLEES: Sankey Diagram Displaying Movement between First Program Category and the Bachelor's Degree Program Category (Excludes 24 CIP Code) (n=3,434).

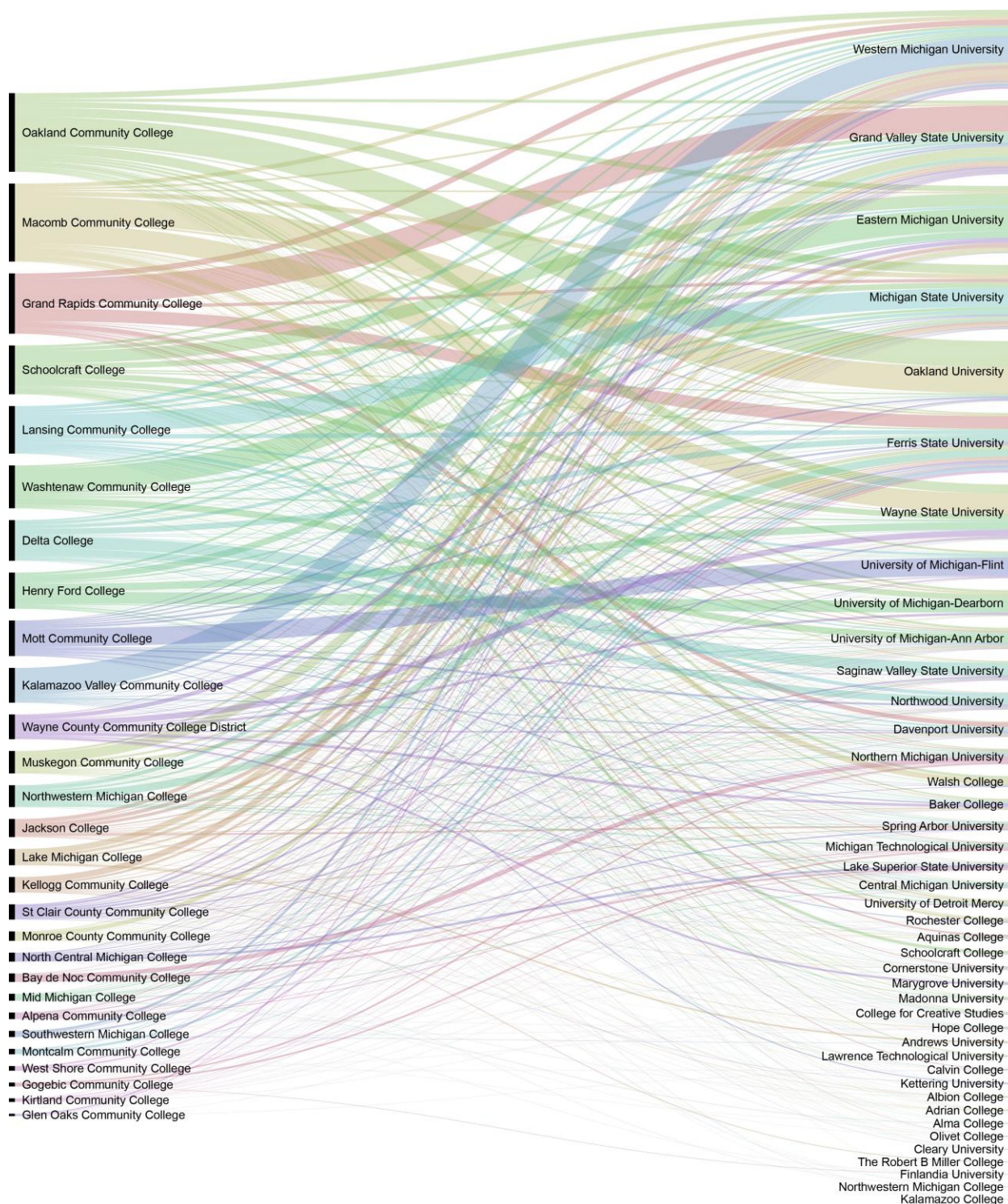


Section 3: Transfer Places

This last section examines the places—or the institutions—that bachelor’s graduates transfer. One way to understand transfer among community colleges and 4-year institutions is to examine the multiple 2-year and 4-year partnerships based on where students first attend a community college and where they complete their bachelor’s degree. The number of community colleges and 4-year institutions in Michigan produces hundreds of pairs of transfer sending and receiving partnerships. In some cases, hundreds of students transfer between a pair of 2-year and 4-year institutions, and in other cases, only a few students transfer between a pair of 2-year and 4-year institutions. To illustrate this complexity and the multiple partnerships, Figure 29 is a Sankey diagram for 2-Year Starters (n=6,153). The bands in the Sankey figure are proportional to the number of students moving between institutions; wider bands rep-

resent more students. Figure 29 illustrates major sending and receiving partnerships among community colleges and 4-year institutions. For example, the largest proportion of students who start at Oakland Community College transfer to Oakland University. However, Figure 29 shows that Oakland Community College students transfer to 4-year institutions all over the state. Similarly, a quick glance at any 4-year institution on the Sankey figure suggests that they receive transfer students from community colleges all over the state. Overall, the Sankey figure illustrates the complexity of transfer among Michigan bachelor’s graduates. Although there are dominant pathways and partnerships, community college students transfer to 4-year institutions all over the state. Individual Sankey diagrams for each community college are listed in Appendix B.

Figure 29. Sending and Receiving Destinations among Students with Any CC.



To identify the dominant 2-year and 4-year partnerships, I sorted bachelor's degree graduates by the community college they first attended; this analysis included students that attended any community college (2-Year or 4-Year starters). Bachelor's graduates were then sorted by the 4-year institutions with the largest number of graduates. For example,

there were 54 bachelor's graduates that attended Alpena Community College, and the largest percentage of these students completed their bachelor's degree at Grand Valley State University (15%) or Ferris State University (15%). Thus, Grand Valley State University and Ferris State University are the most common 4-year partners for Alpena

Community College attendees. Table 15 displays the top 4-year institutional partners based on the percent of graduates who attended the 2-year institution and graduated from the 4-year institution. This list is valuable to community colleges because it illustrates where their transfer students are most likely to complete a bachelor's degree. For a longer list of 2-year and 4-year partnerships, Appendix C displays the top four partnerships for each community college.

Table 15 also illustrates which 4-year institutions are most likely to be strong transfer partners with multiple community colleges in the state. Among the 28 community colleges, Western Michigan University is the top partner for five community colleges, followed by Eastern Michigan University and Ferris State University, that are each the top partners for four community colleges.

Table 15. Top Partnerships among 2-Year and 4-Year Institutions, by Beginning Community College.

Beginning 2-Year College	Bachelor's Degree-Granting Institution	N	Percent of Grads who Attended 2-Year
Alpena Community College	Grand Valley State University and Ferris State University	8	15%
Bay de Noc Community College	Northern Michigan University	38	51%
Delta College	Saginaw Valley State University	88	27%
Glen Oaks Community College	Western Michigan University	11	58%
Gogebic Community College	Northern Michigan University and Michigan Technological University	13	39%
Grand Rapids Community College	Grand Valley State University	225	44%
Henry Ford College	University of Michigan-Dearborn	101	33%
Jackson College	Eastern Michigan University	31	20%
Kalamazoo Valley Community College	Western Michigan University	211	72%
Kellogg Community College	Western Michigan University	53	41%
Kirtland Community College	Ferris State University	6	19%
Lake Michigan College	Western Michigan University	51	37%
Lansing Community College	Michigan State University	140	37%
Macomb Community College	Oakland University	220	34%
Mid Michigan College	Saginaw Valley State University	7	13%
Monroe County Community College	Eastern Michigan University	38	46%
Montcalm Community College	Ferris State University	18	40%
Mott Community College	University of Michigan-Flint	153	51%
Muskegon Community College	Grand Valley State University	84	46%
North Central Michigan College	Lake Superior State University	20	27%
Northwestern Michigan College	Ferris State University	62	35%
Oakland Community College	Oakland University	230	36%
Schoolcraft College	Eastern Michigan University	106	26%
Southwestern Michigan College	Western Michigan University	21	42%
St Clair County Community College	Grand Valley State University	20	16%
Washtenaw Community College	Eastern Michigan University	195	54%
Wayne County Community College District	Wayne State University	49	24%
West Shore Community College	Ferris State University	14	36%

Endnotes

¹ The terms *2-year institution* and *community college* are used interchangeably in the report.

² Excludes 40 students who received their bachelor's degree from public community colleges.

³ Note: National Student Clearinghouse estimates suggest that this figure is approximately 52% for all Michigan degree completers in 2015-2016. The sample in this study was limited to enrollments after 2009-2010, so students' dual enrollment credits at a 2-year institution and students who took longer than six years to graduate are not included in this analysis.

⁴ For a description of CIP codes, see: <https://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>

⁵ The sample is 35,458 because the CIP code was missing for 1,895 students in the analytic sample.

References

- Adelman, C. (2005). Moving into town—and moving on: The community college in the lives of traditional-age students. Washington, DC: U.S. Department of Education.
- Bowles, D. (1988). Transferability in the liberal arts and sciences. In C. Prager (Ed.), *Enhancing articulation and transfer* (pp. 27-38). San Francisco, CA: Jossey-Bass.
- Horn, L., & Skomsvold, P. (2011). *Community college student outcomes: 1994–2009* (NCES 2012-253). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Leu, K. (2017). *Beginning college students who change their majors within 3 years of Enrollment*. NCES 2018-434. Washington, D.C.: U.S. Department of Education, National Center for Education Statistics.
- Monaghan, D. B., & Attewell, P. (2015). The community college route to the bachelor's degree. *Educational Evaluation and Policy Analysis*, 37(1), 70-91. doi:10.3102/0162373714521865
- Pincus, F., & DeCamp, S. (1989). Minority community college students who transfer to four-year colleges: A study of a matched sample of B.A. recipients and non-recipients *Community Junior College Research Quarterly of Research and Practice*, 13, 191-219. doi:10.1080/0361697890130306
- Taylor, J. L., & Jain, D. (2017). Multiple dimensions and meanings of transfer: The transfer function in American higher education. *Community College Review*, 45(4), 273-293.

Appendix A: Semester-by-Semester Enrollment Patterns

A semester-by-semester analysis of student enrollment patterns produces an unwieldy number of enrollment patterns. To illustrate this, I created enrollment sequences for fall and spring for all students who started in 2010-2011 and completed by 2015 (n=10,970). This generated 10 digits (one digit per fall and spring semester) where 0=not enrolled, 2=2-year enrollment, and 4=4-year enrollment. If students were enrolled at both a 2-year and 4-year in the same semester, a value of 4 is displayed. Of these students, the “44-44-44-44-44” enrollment pattern whereby students enrolled during the fall and spring at a 4-year institution for all five years represented only 55% of the students. The remaining 45% of students are represented among 682 other enrollment sequences. Here are a few examples of enrollment patterns and the number of students in each enrollment pattern:

- 00-44-44-44-44 (n=95)
- 04-22-44-44-44 (n=5)
- 20-20-44-44-44 (n=11)
- 20-22-24-04-04 (n=1)
- 22-22-20-44-44 (n=22)
- 22-22-44-44-44 (n=517)
- 40-00-00-42-44 (n=1)
- 44-44-04-44-44 (n=63)
- 44-44-22-44-04 (n=1)
- 44-44-44-44-22 (n=8)

This list of semester-by-semester enrollment patterns among all students in the analytic sample could go on for pages and is not digestible. However, this illustration shows the complexity of student enrollment patterns. It illustrates that bachelor’s degree recipients move back and forth between institutions and they pause their enrollment prior to completing a bachelor’s degree.

Appendix B: Sankey Figures for Top Sending and Receiving Institutions among 2-Year Starters

Note: All 2-year and 4-year partnerships in these graphs represent the 2-year and 4-year partnerships based on where graduates first attend a community college and where they complete their bachelor’s degree. These sending and receiving institutions apply only to students who were 2-year starters and do not include students who were 4-year starters. These charts illustrate the primary bachelor’s degree receiving institutions for each community college.

Figure B1. Alpena Community College (n=57 graduates)



Figure B2. Bay de Noc Community College (n=74 graduates)

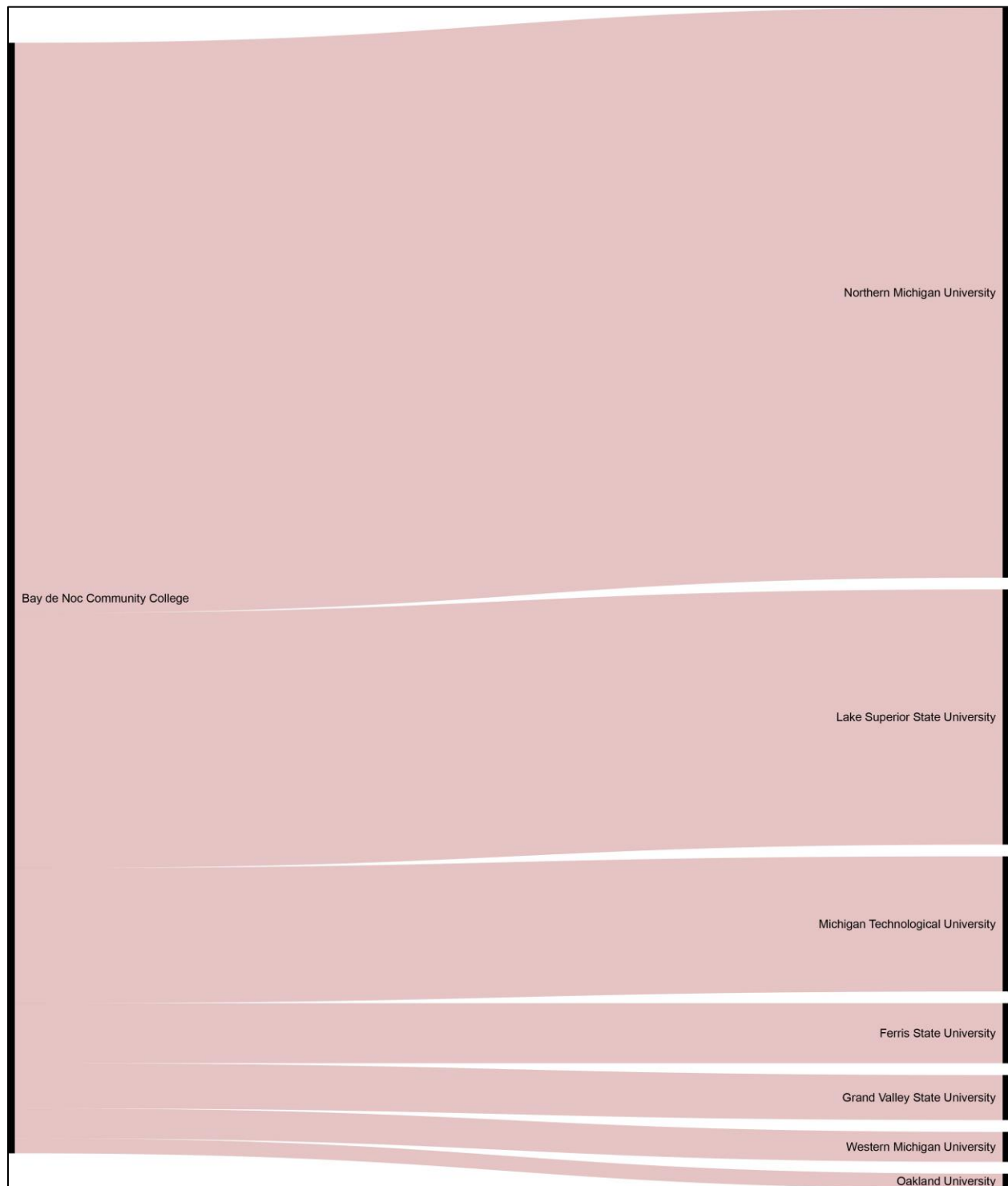


Figure B3. Delta College (n=356 graduates)

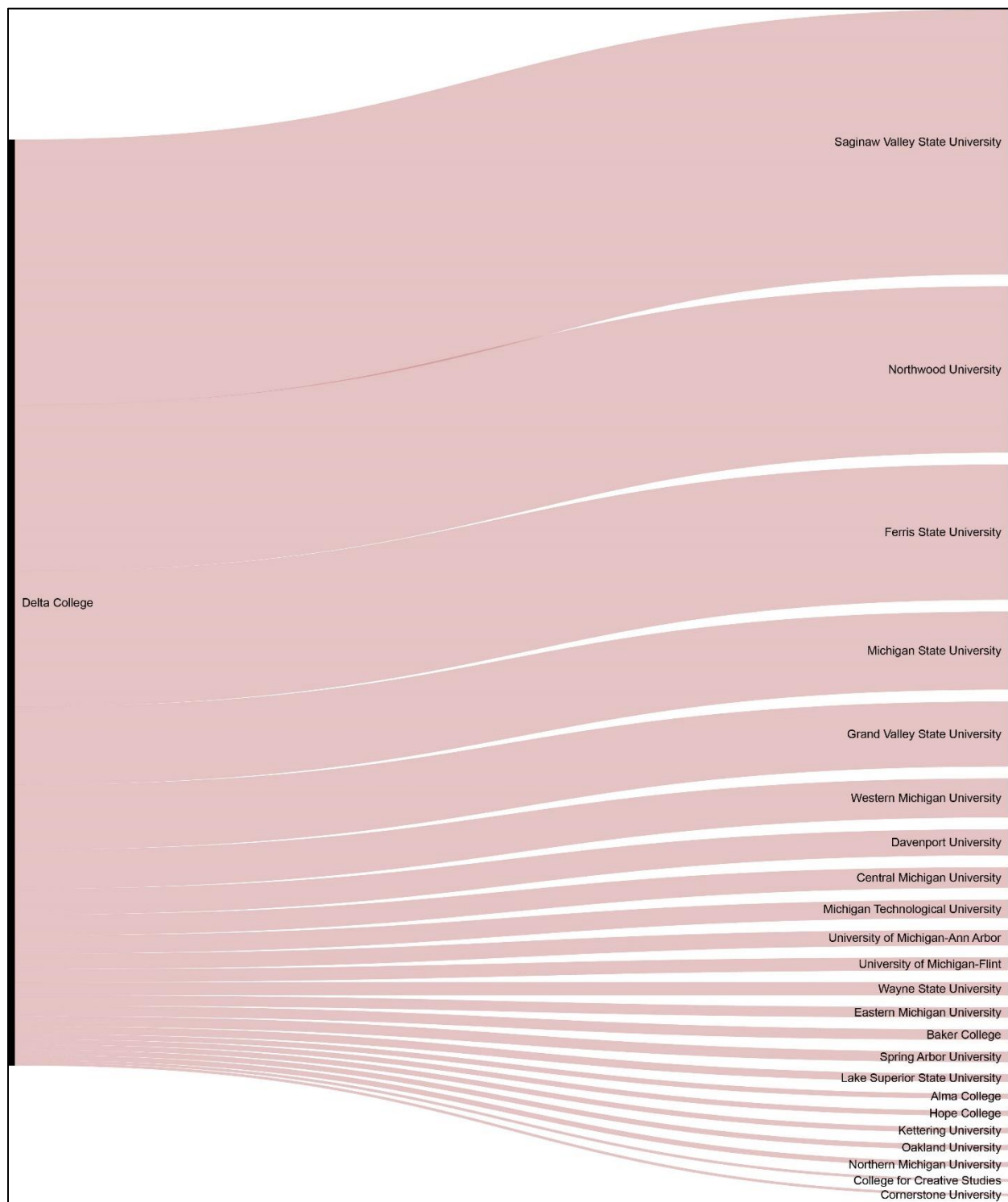


Figure B4. Glen Oaks Community College (n=20 graduates)

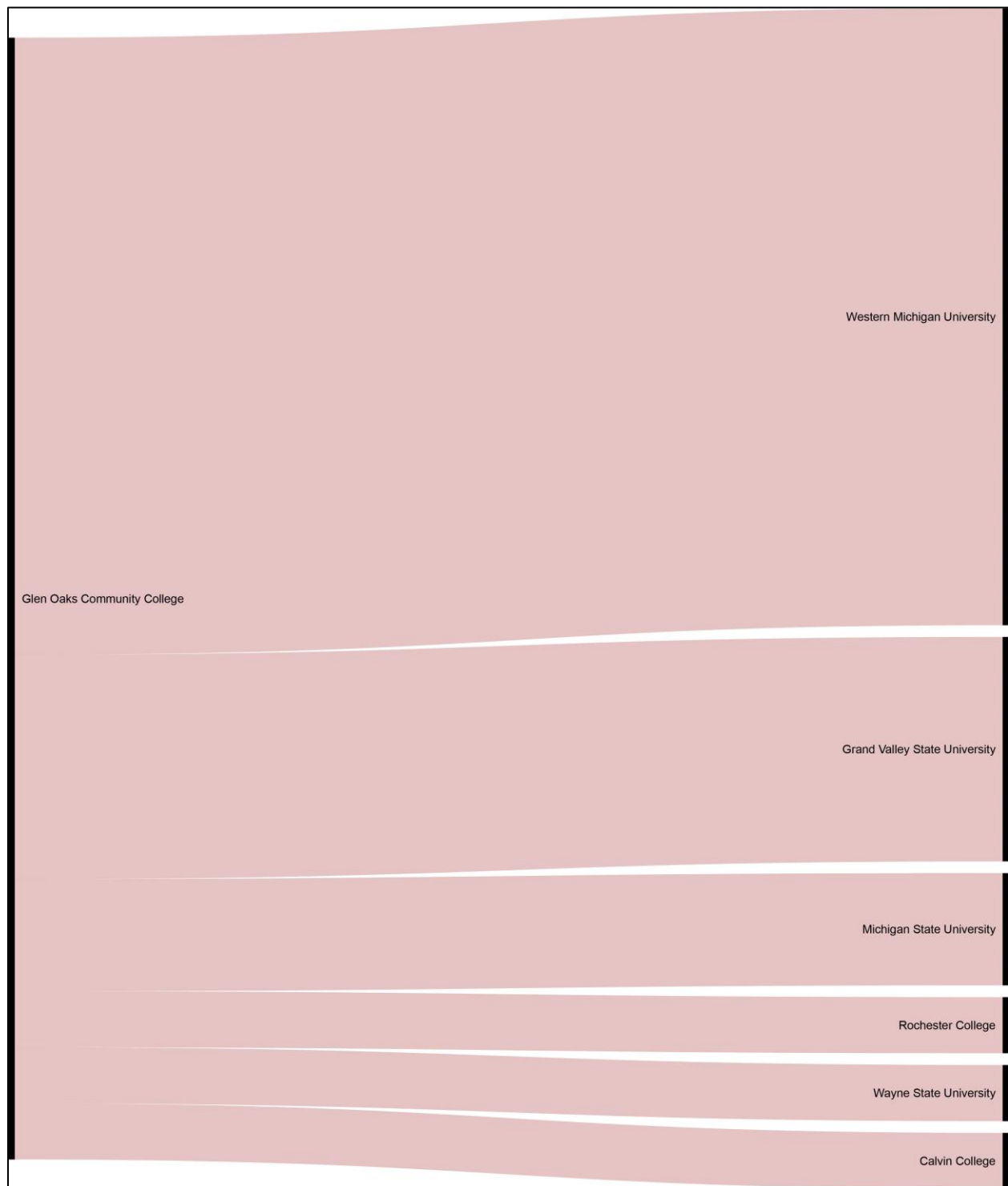


Figure B5. Gogebic Community College (n=34 graduates)



Figure B6. Grand Rapids Community College (n=528 graduates)

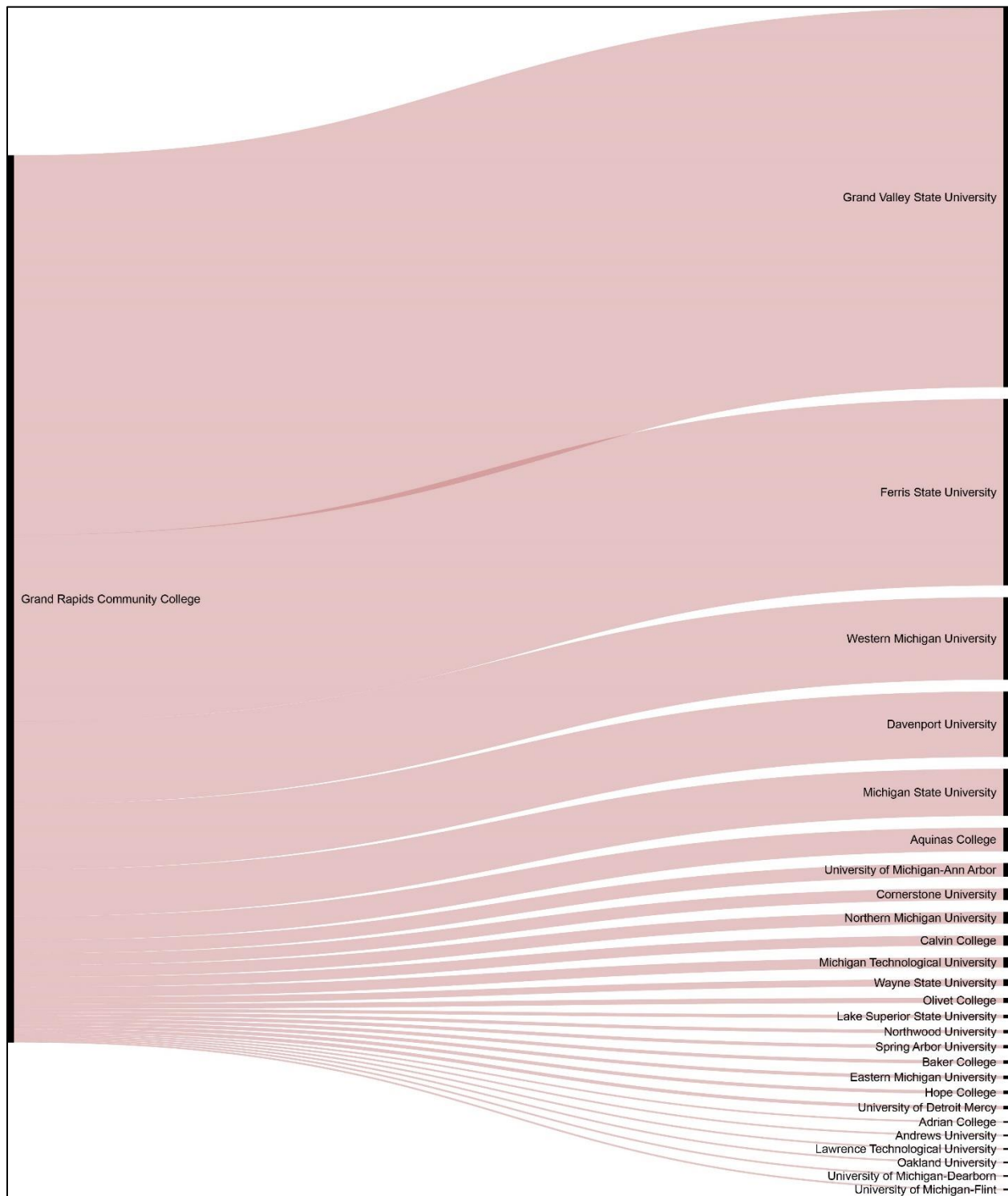


Figure B7. Henry Ford College (n=316 graduates)

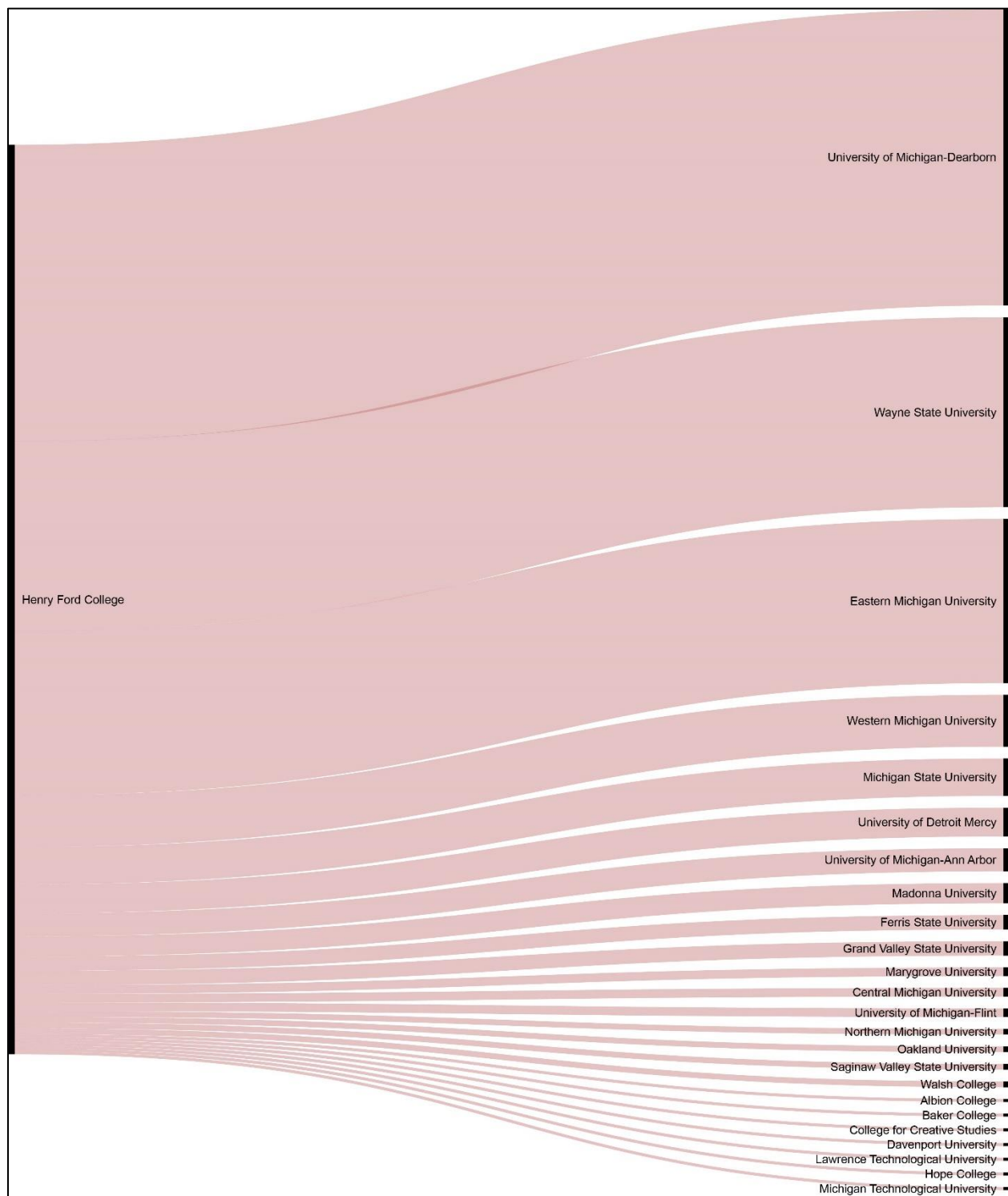


Figure B8. Jackson College (n=159 graduates)

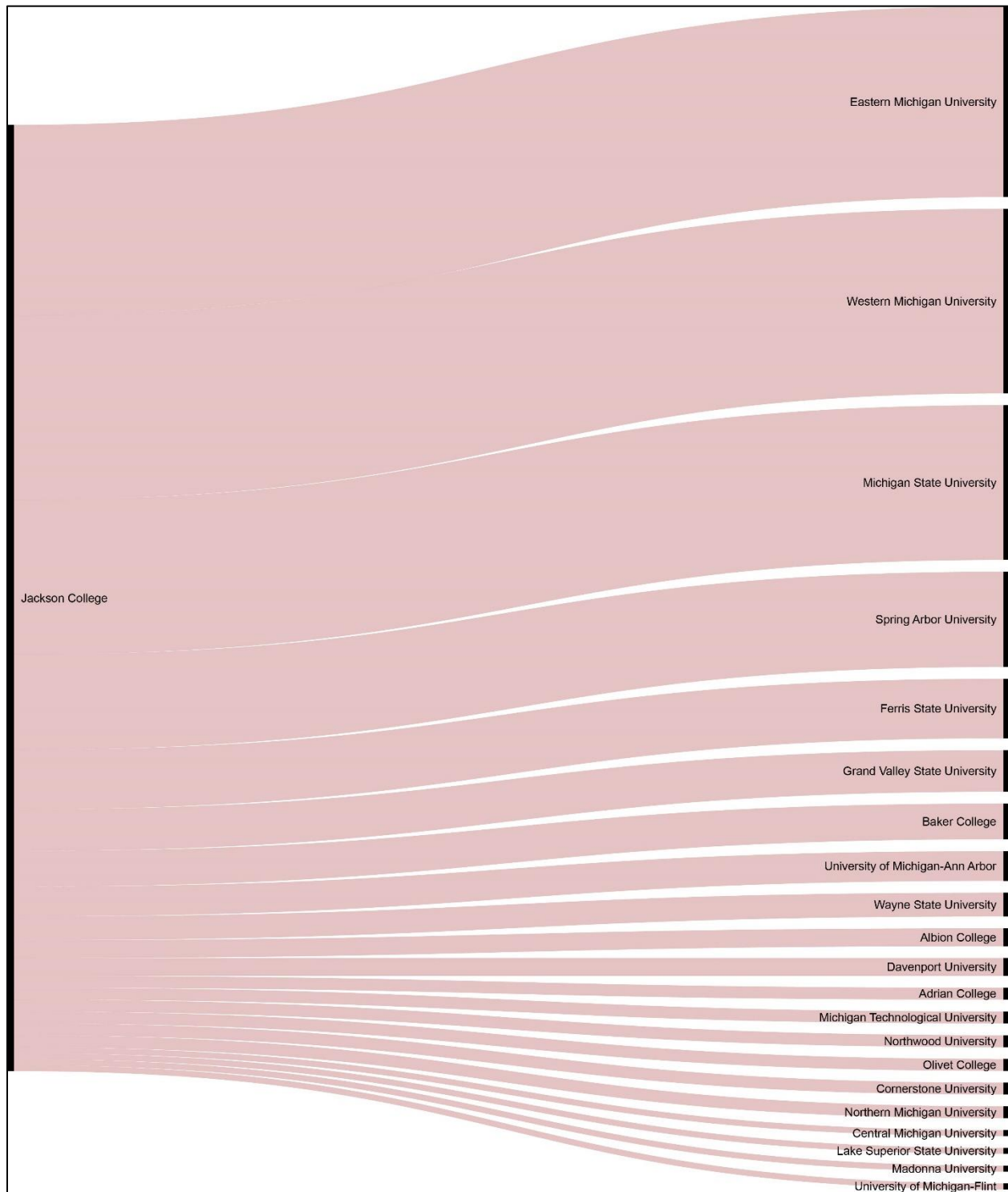


Figure B9. Kalamazoo Community College (n=304 graduates)

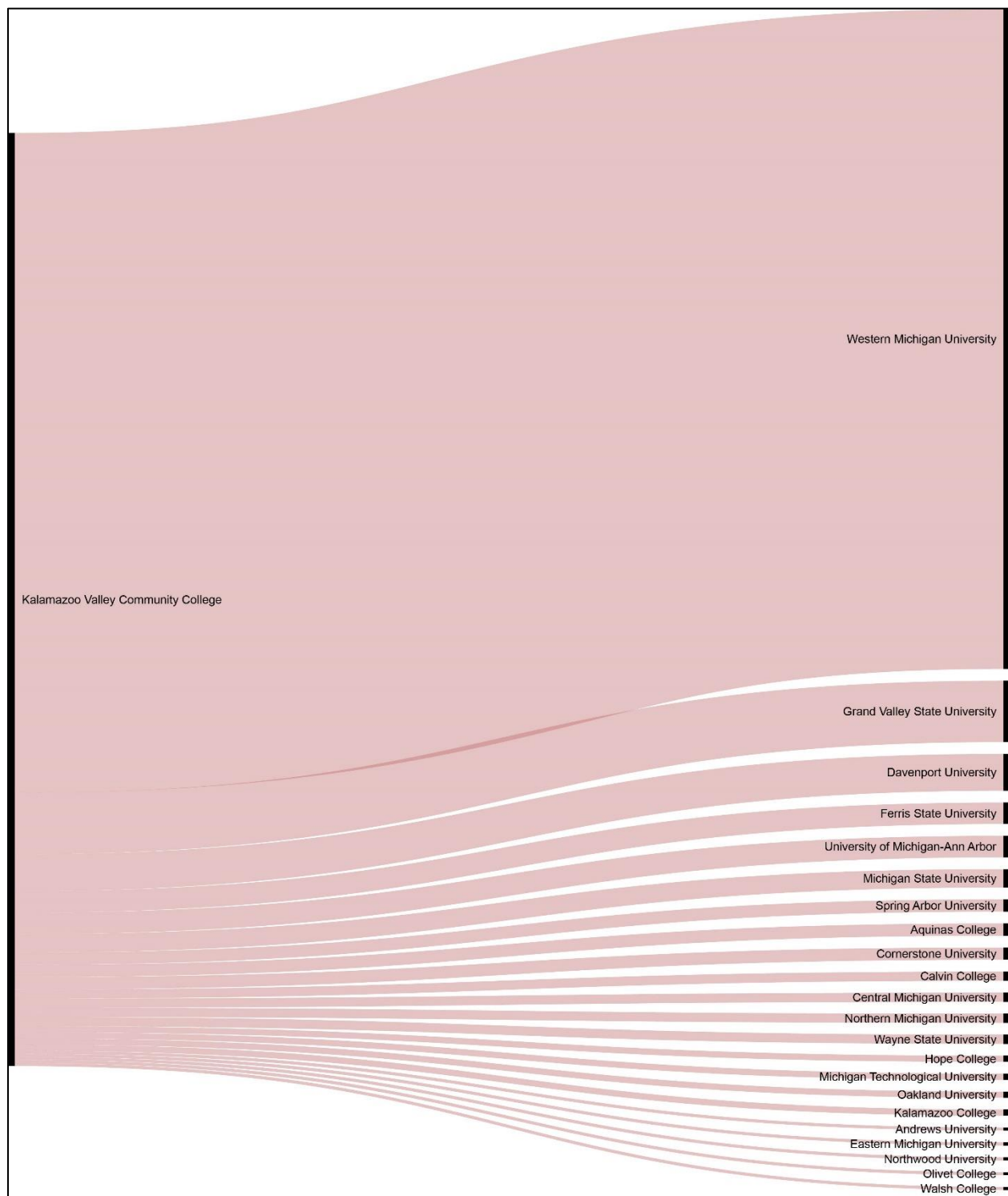


Figure B10. Kellogg Community College (n=136 graduates)

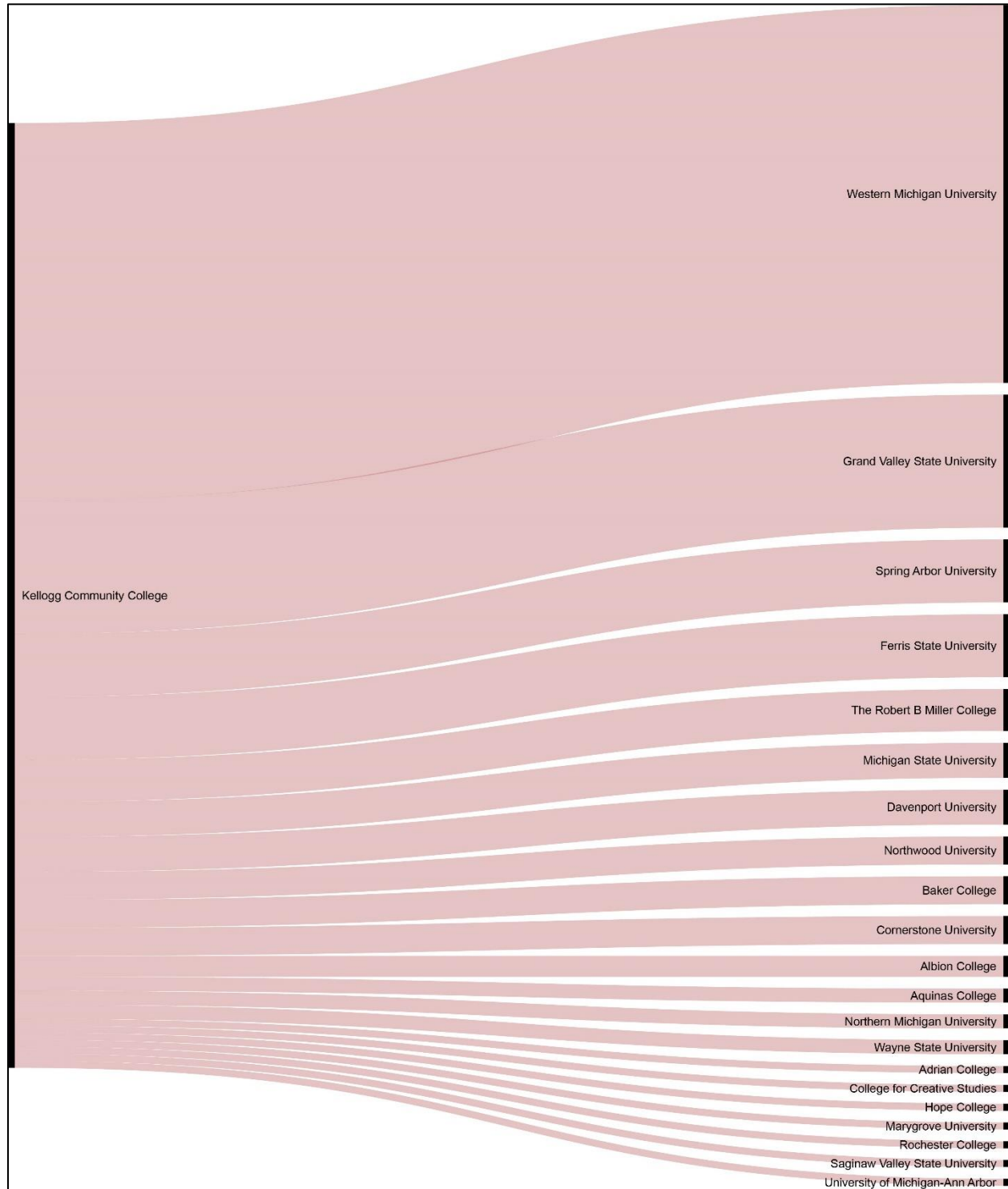


Figure B11. Kirtland Community College (n=131 graduates)

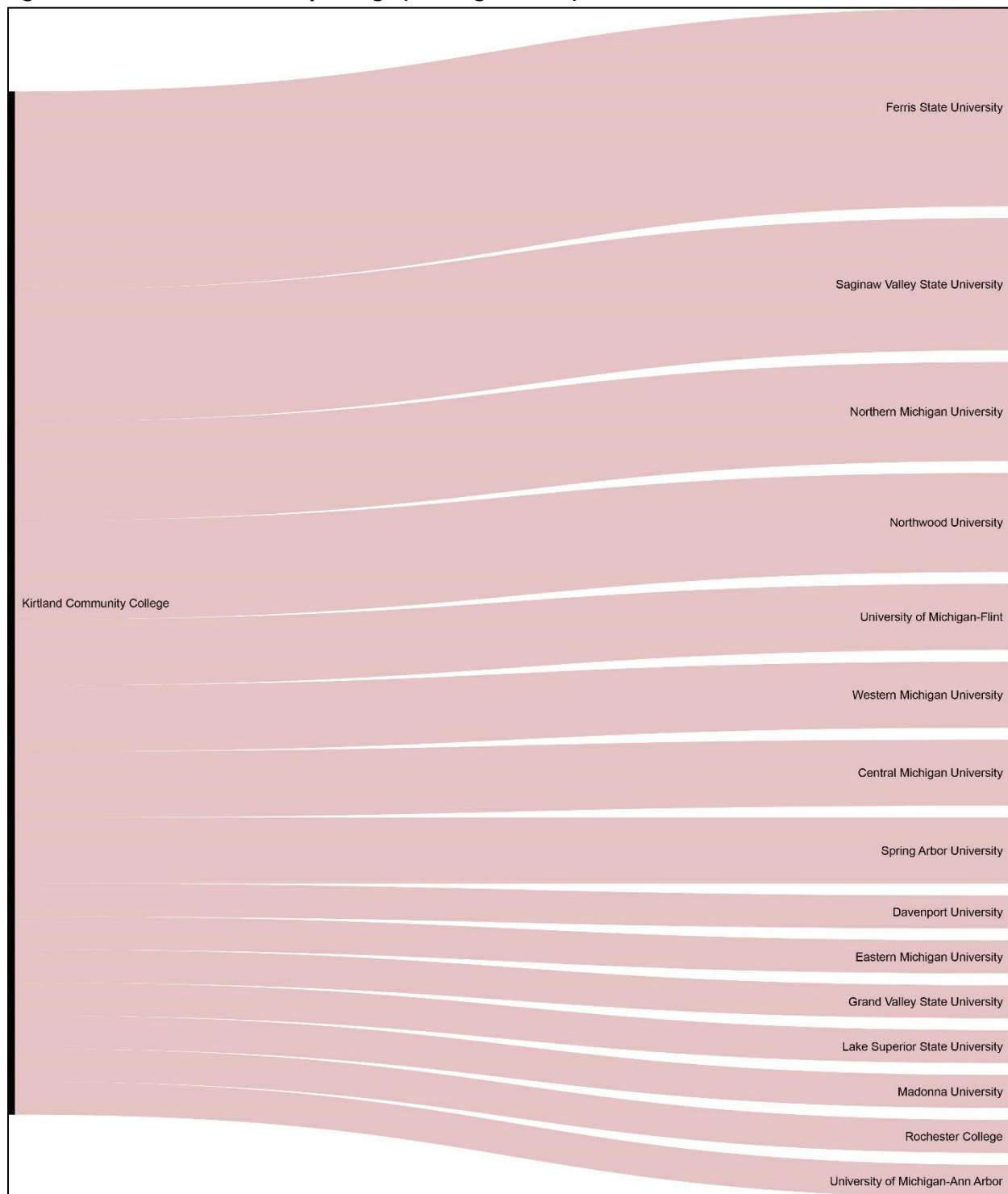


Figure B12. Lake Michigan College (n=142 graduates)

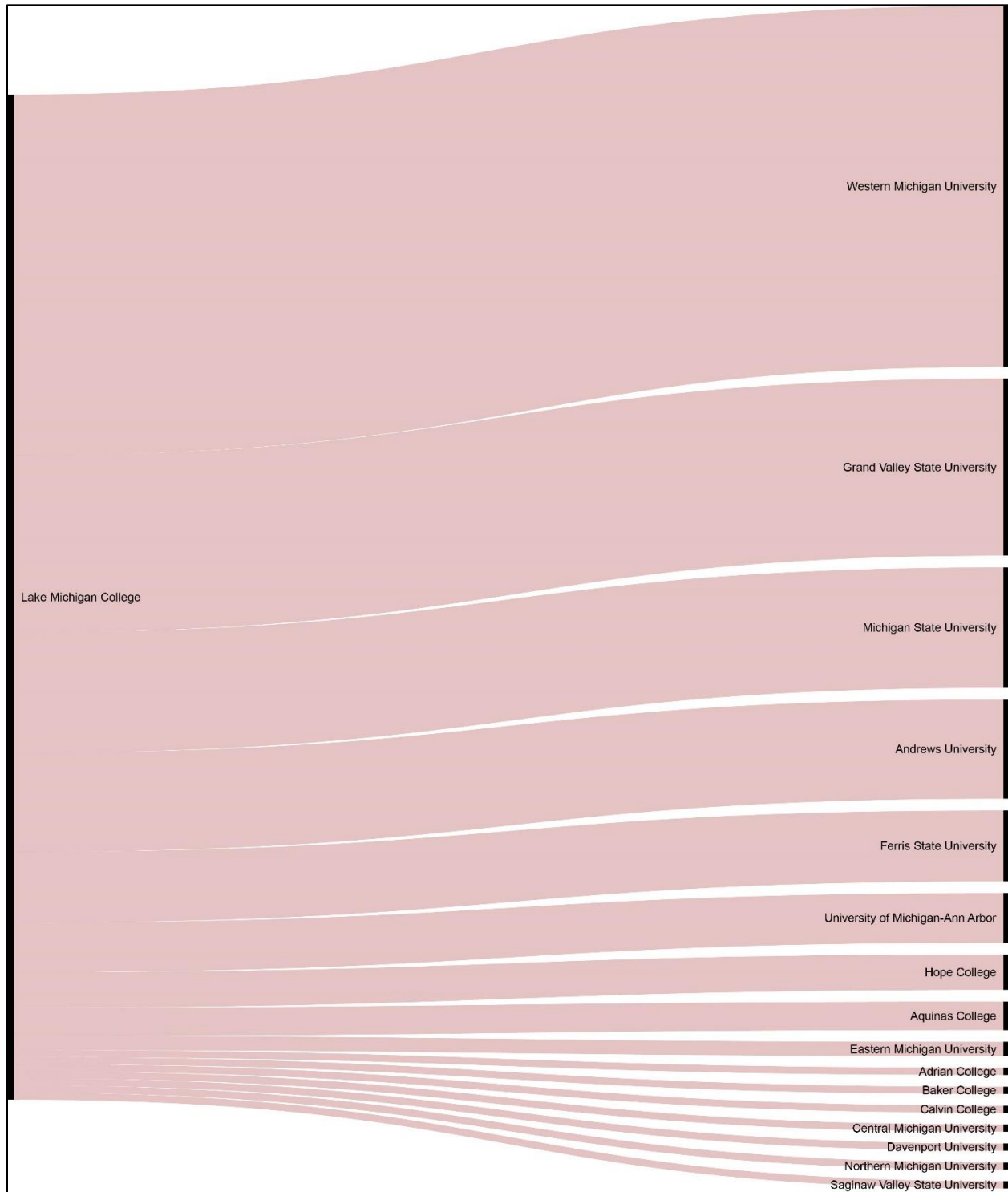


Figure B13. Lansing Community College (n=416 graduates)

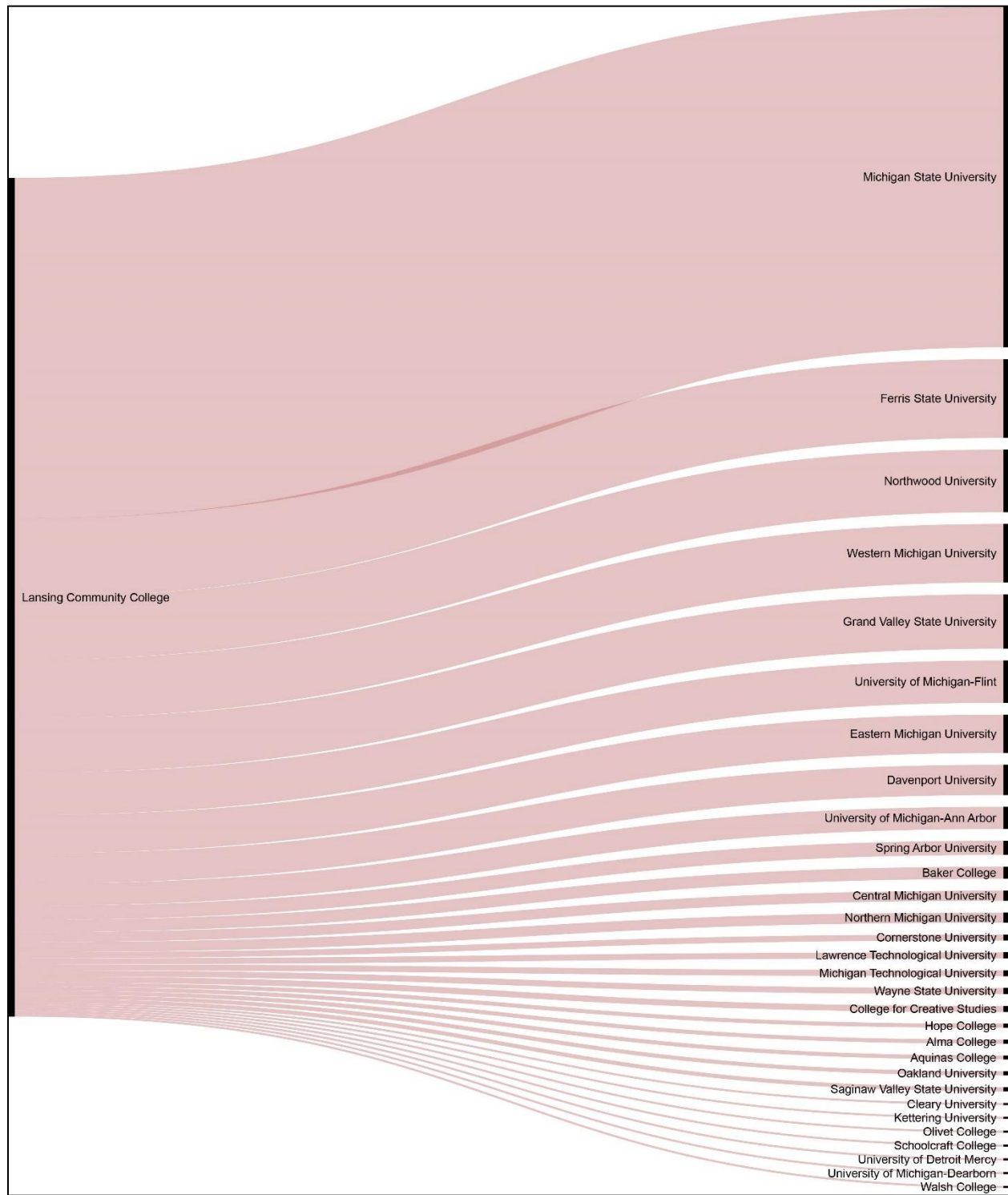


Figure B14. Macomb Community College (n=683 graduates)

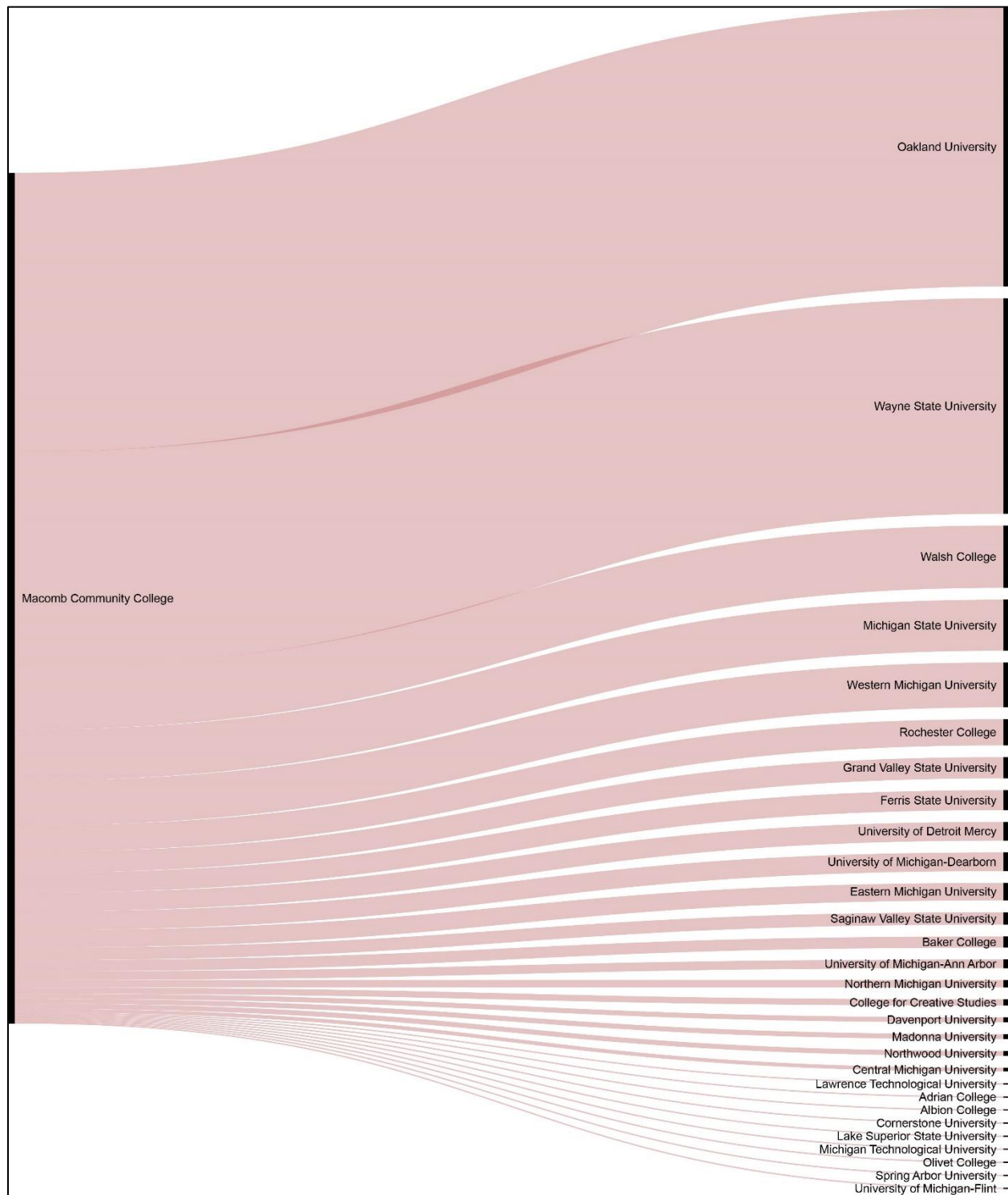


Figure B15. Mid Michigan College (n=60 graduates)

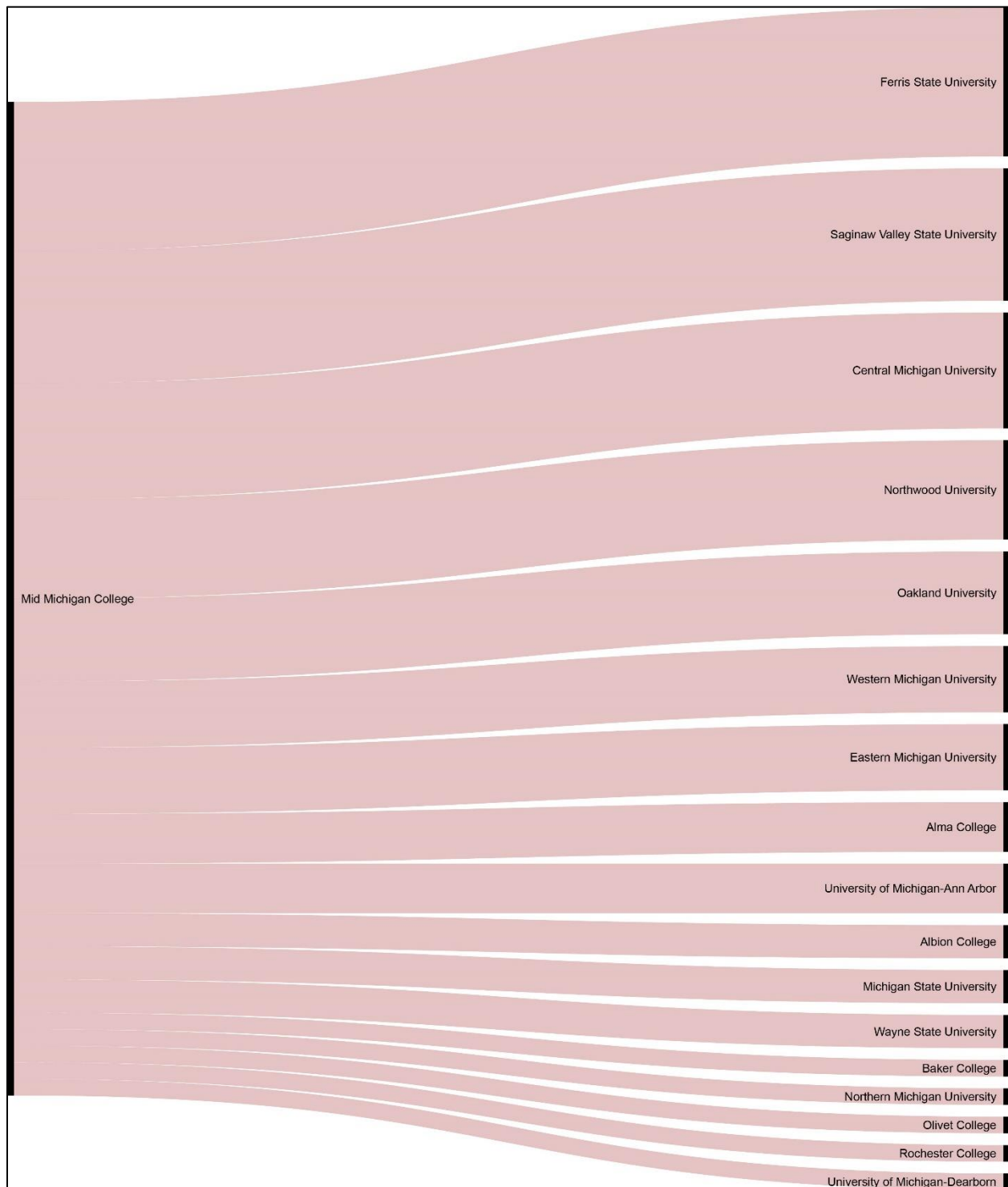


Figure B16. Monroe County Community College (n=82 graduates)

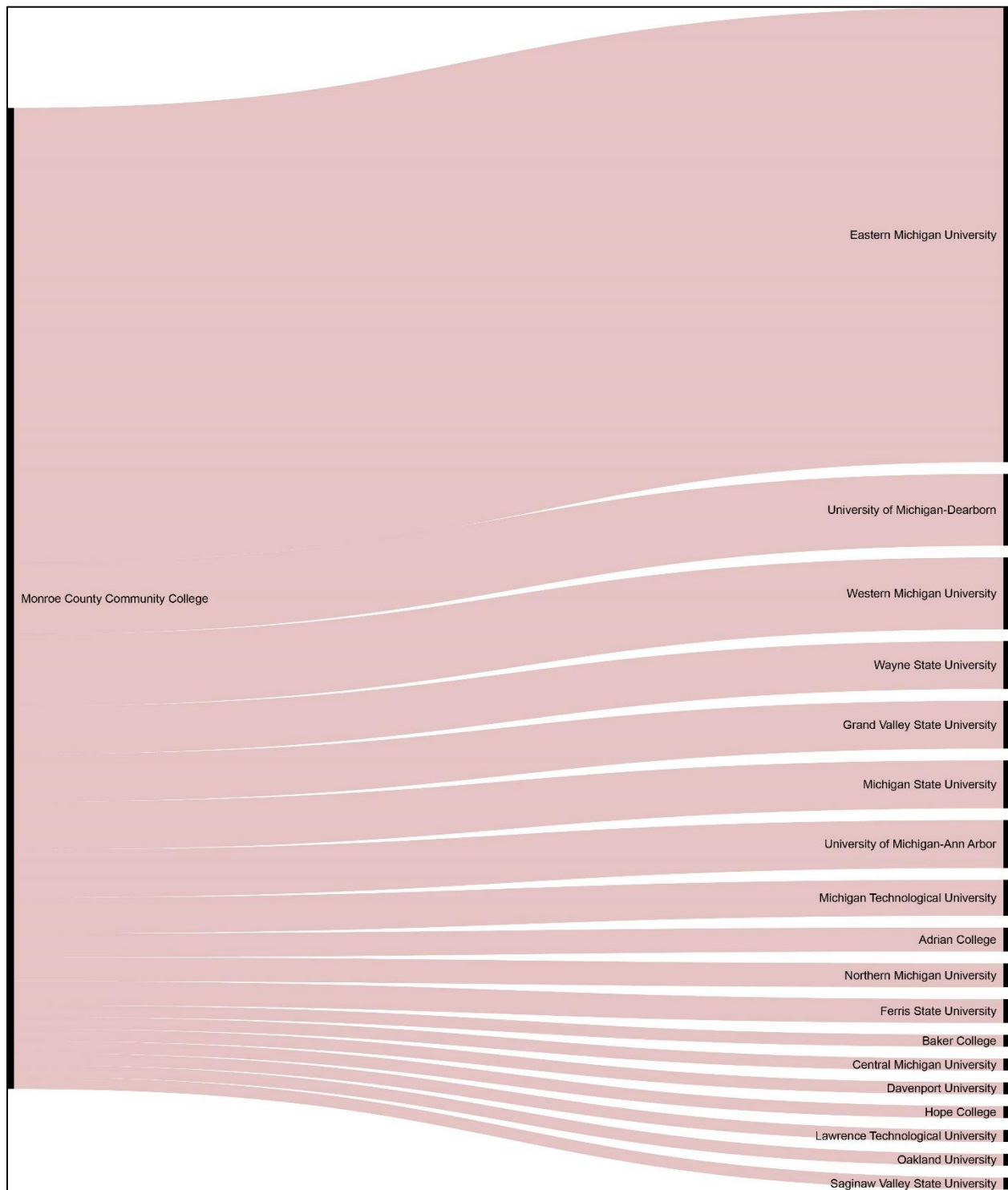


Figure B17. Montcalm Community College (n=47 graduates)

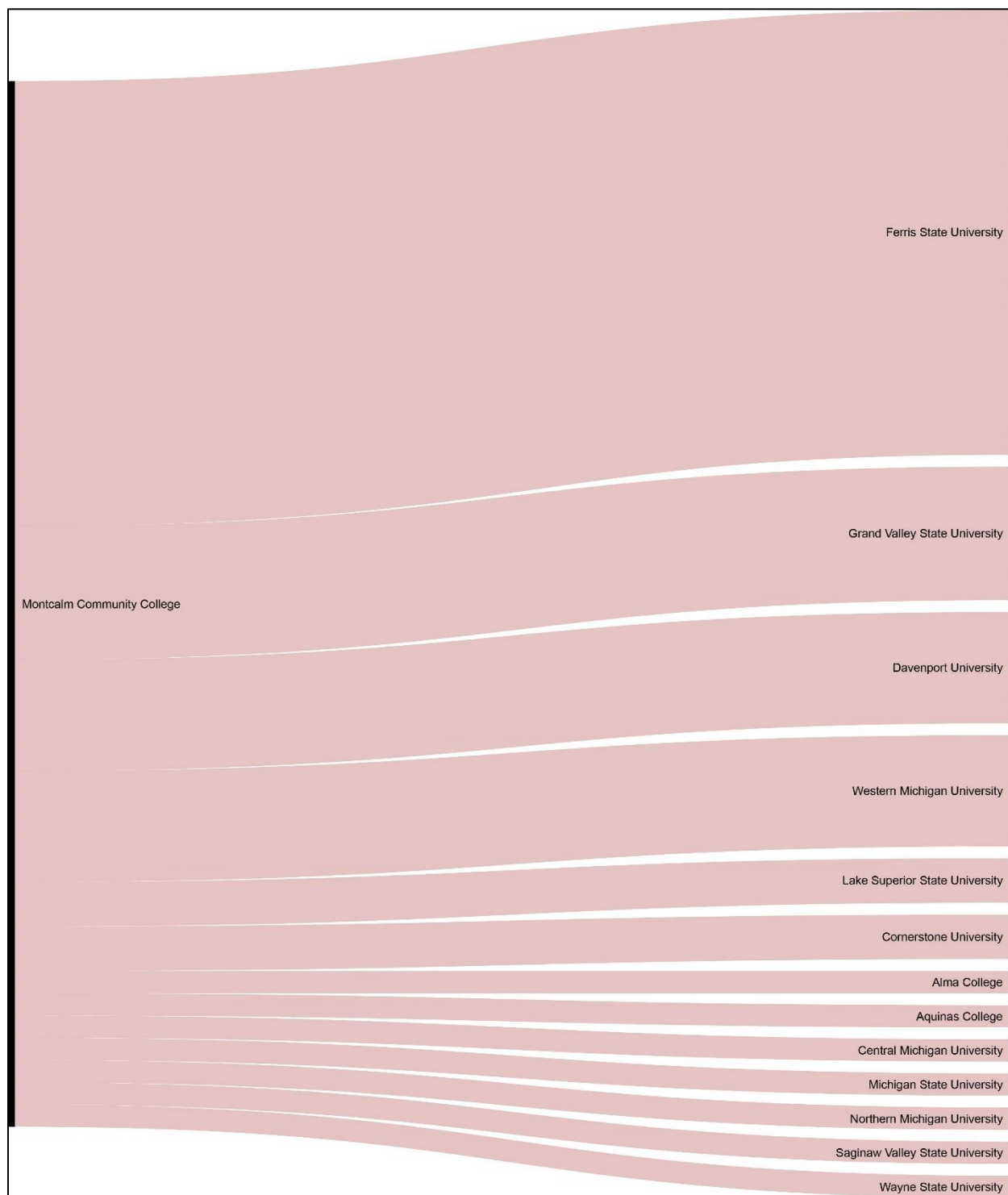


Figure B18. Mott Community College (n=311 graduates)

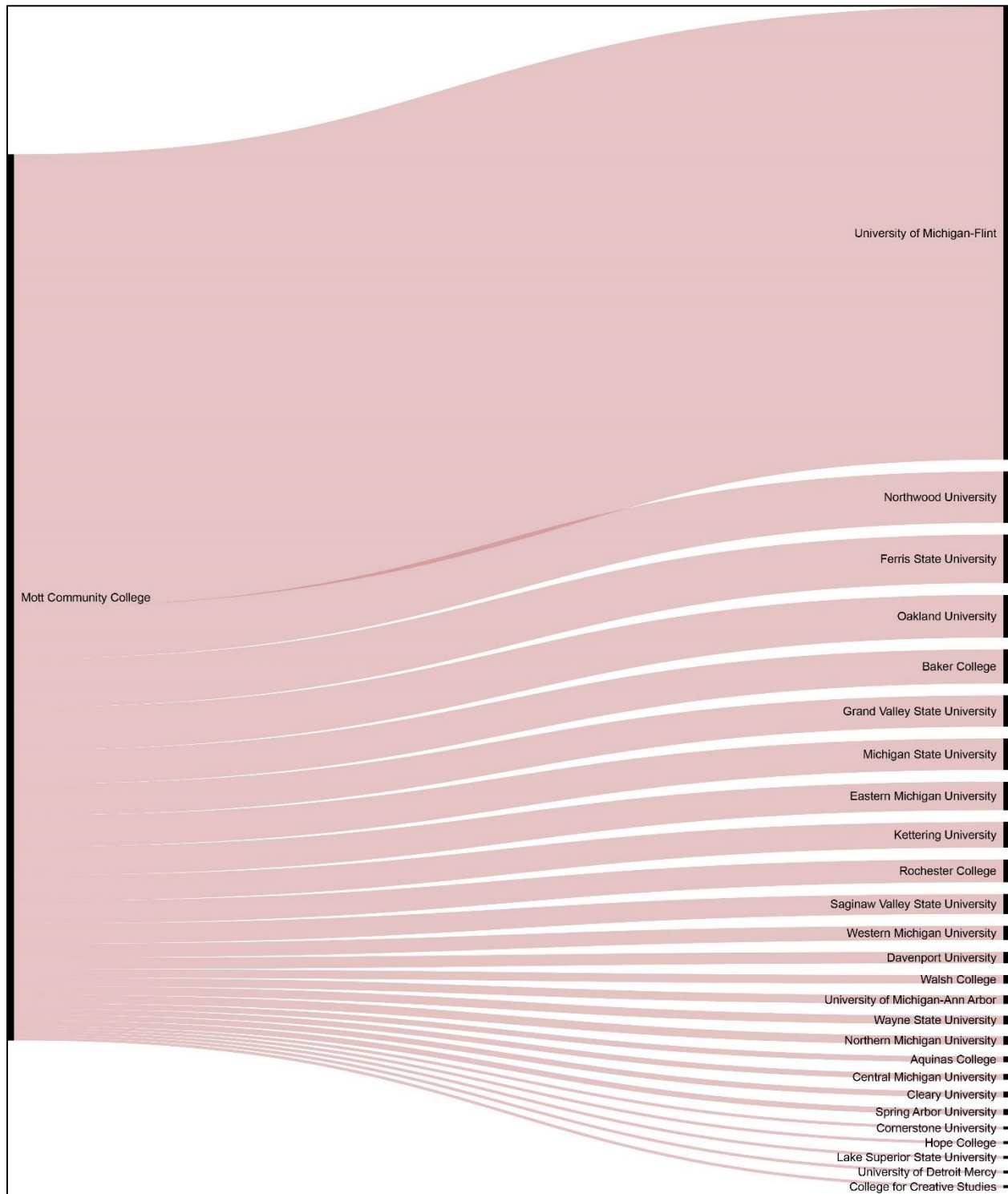


Figure B19. Muskegon Community College (n=196 graduates)

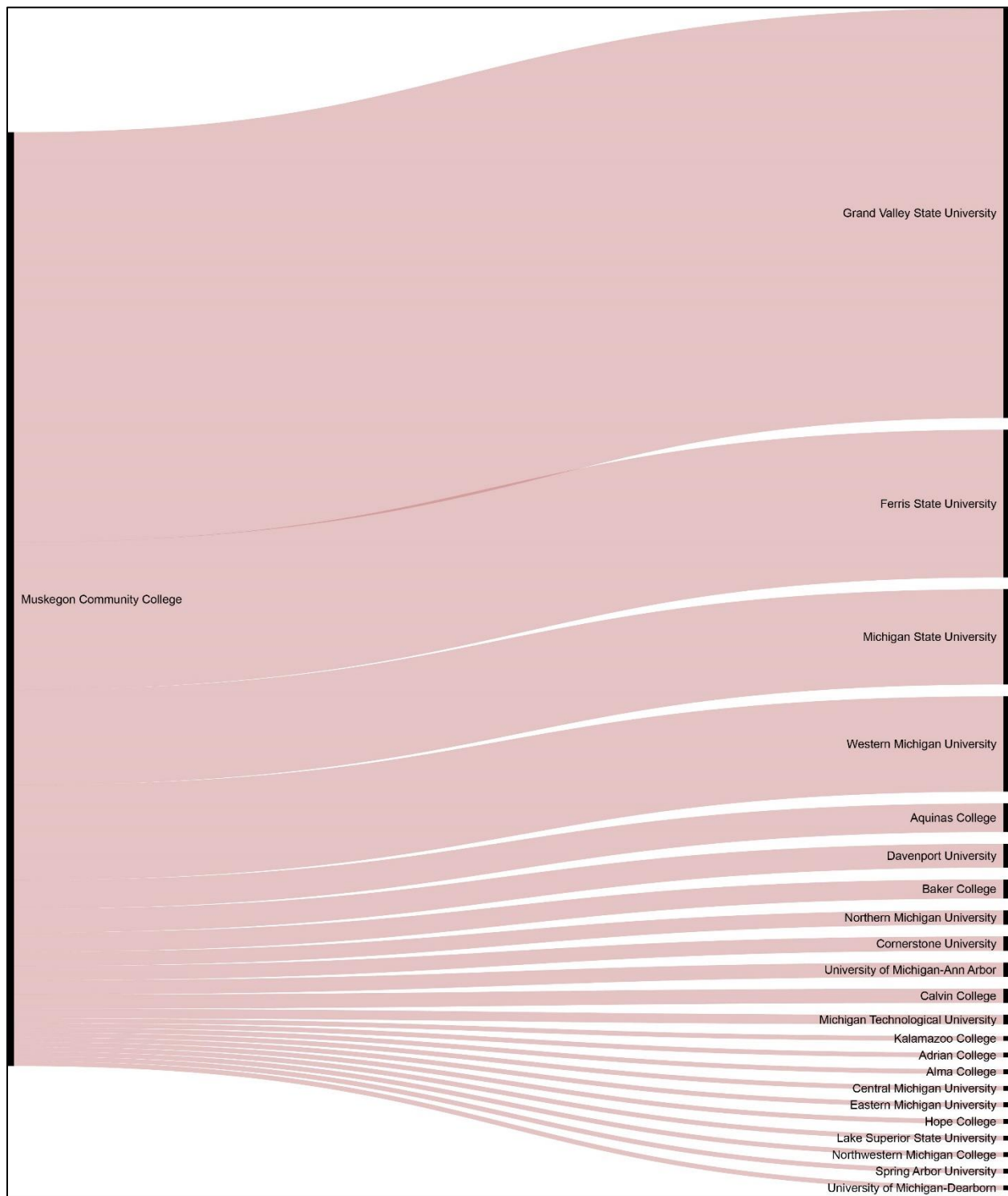


Figure B20. North Central Community College (n=78 graduates)

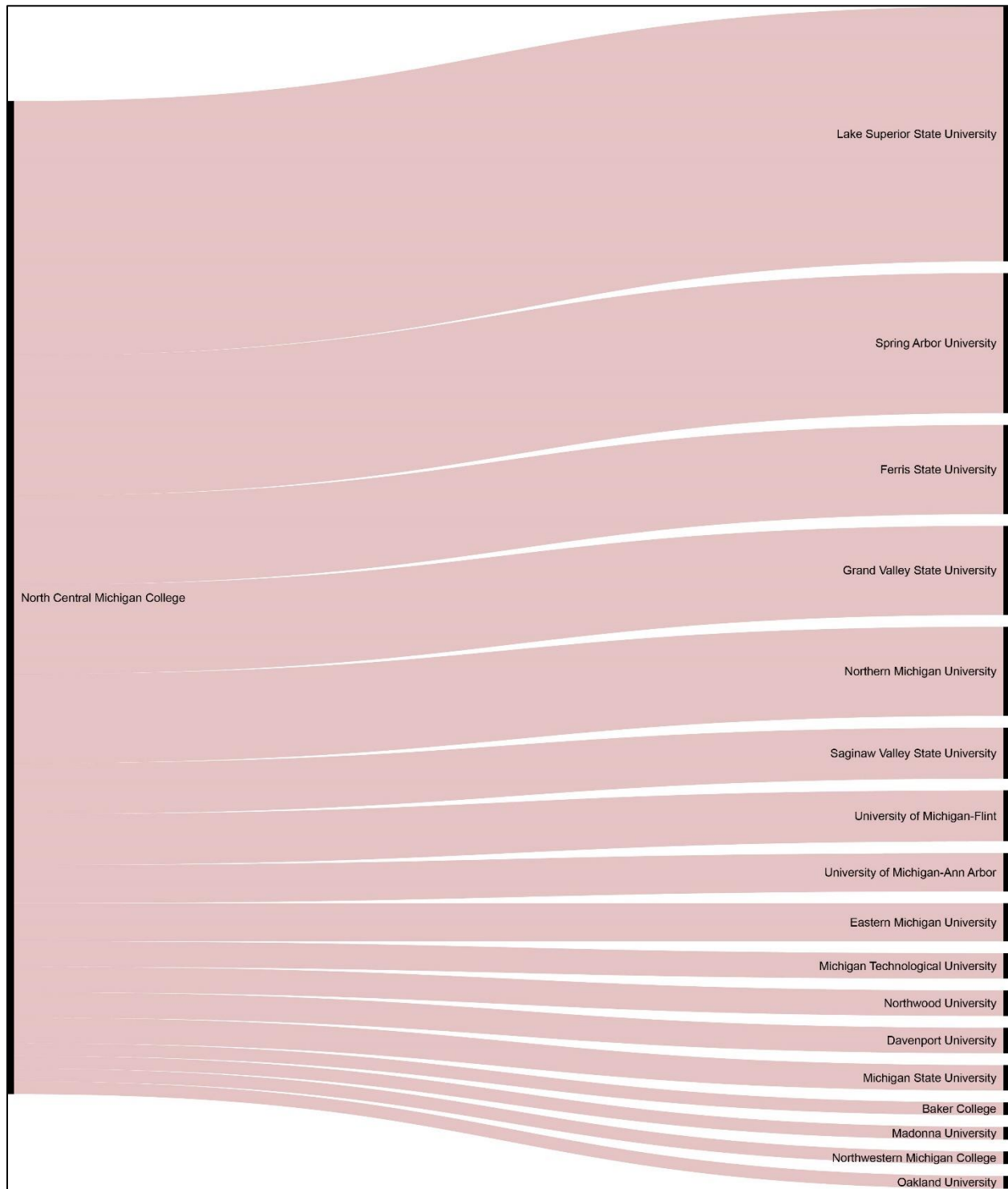


Figure B21. Northwestern Michigan College (n=191 graduates)

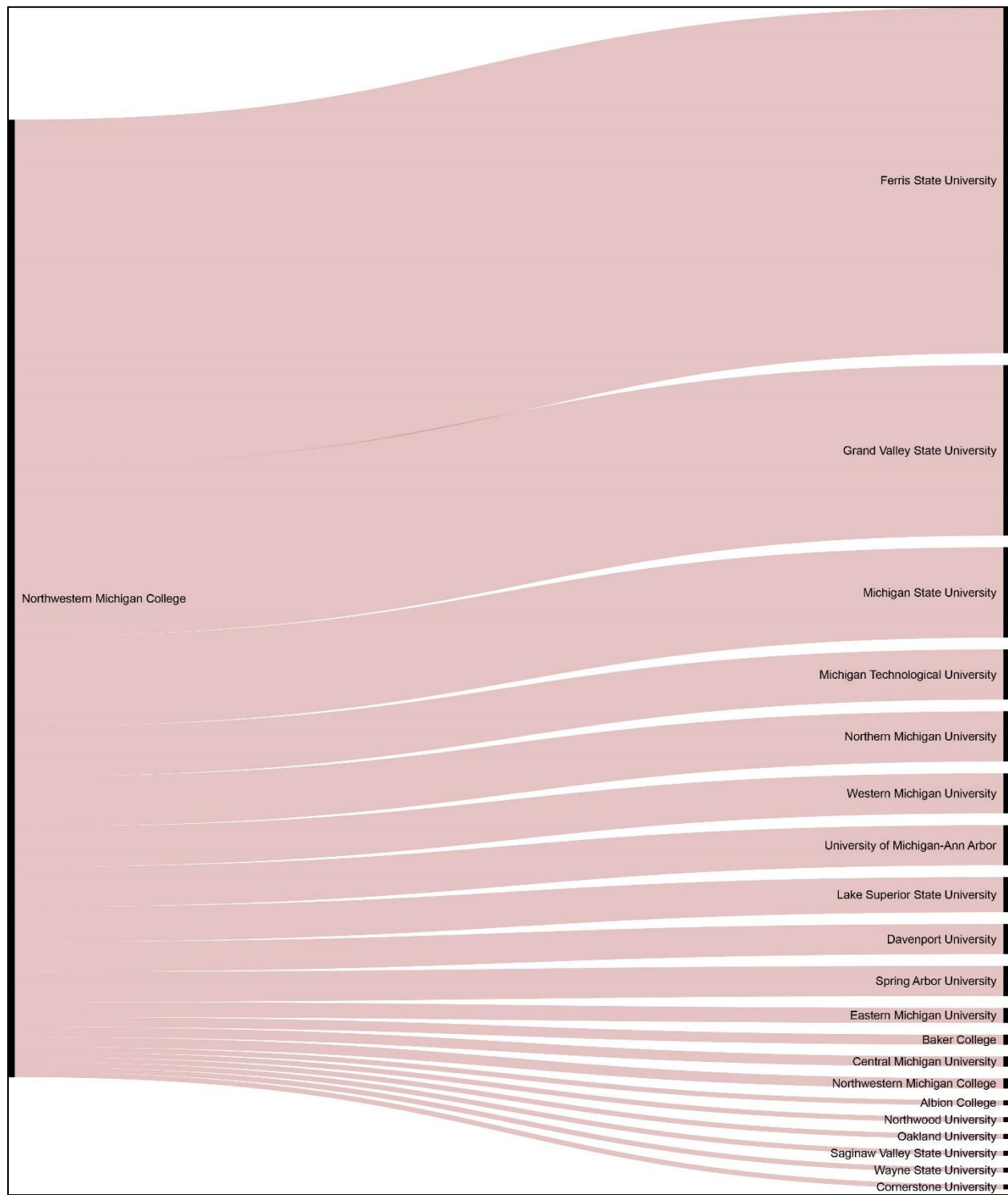


Figure B22. Oakland Community College (n=689 graduates)

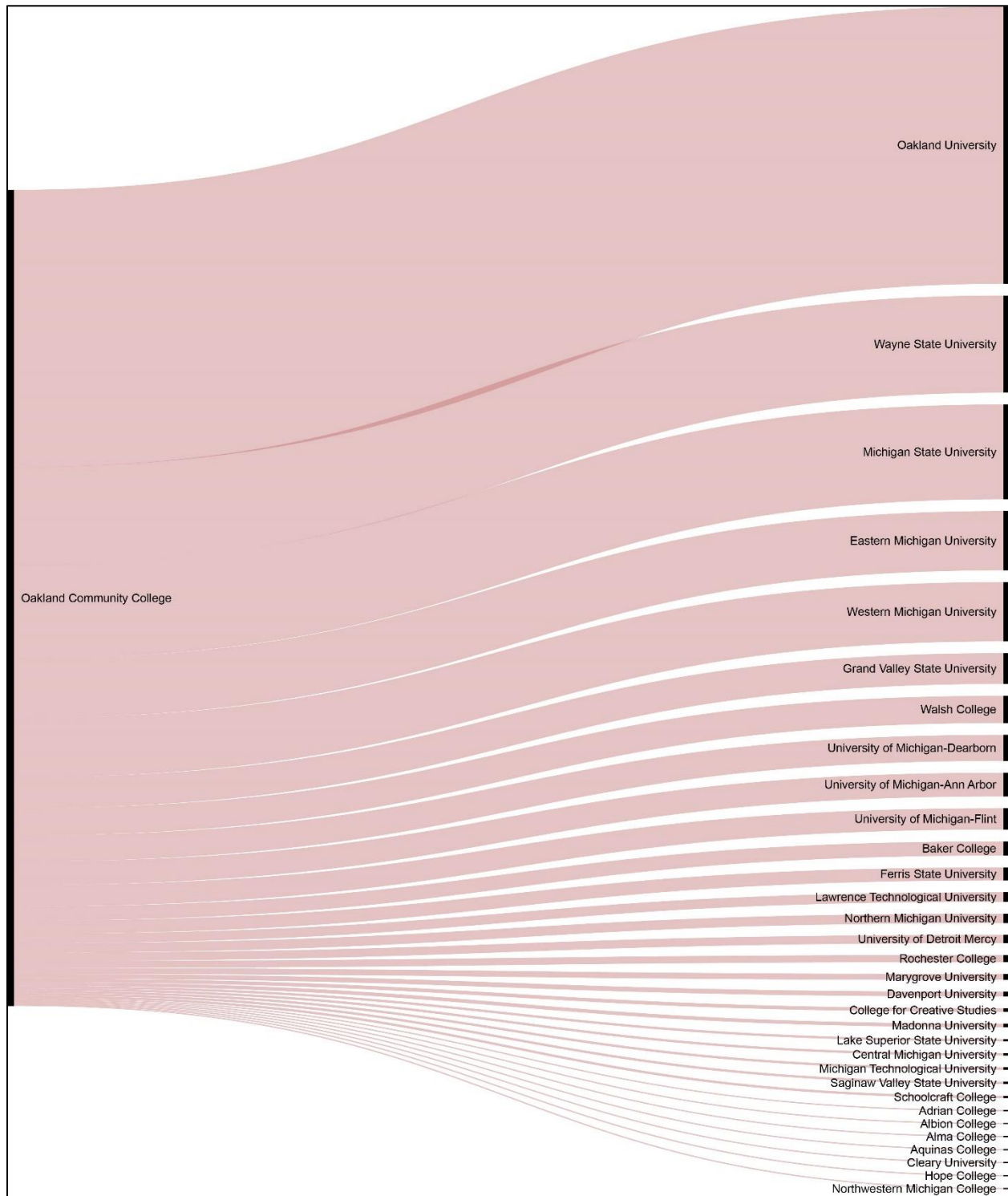


Figure B23. Schoolcraft College (n=427 graduates)

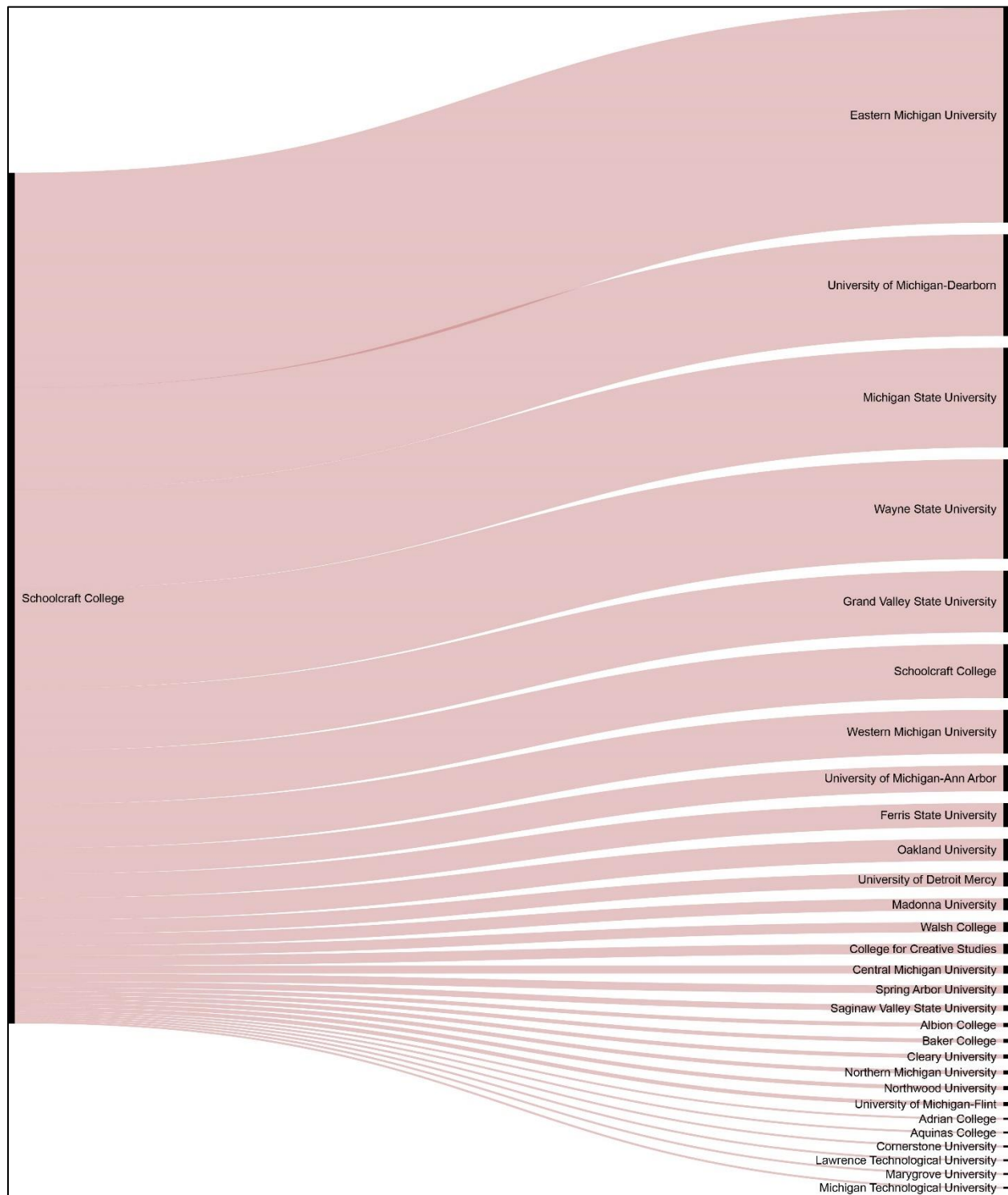


Figure B24. Southwestern College (n=53 graduates)

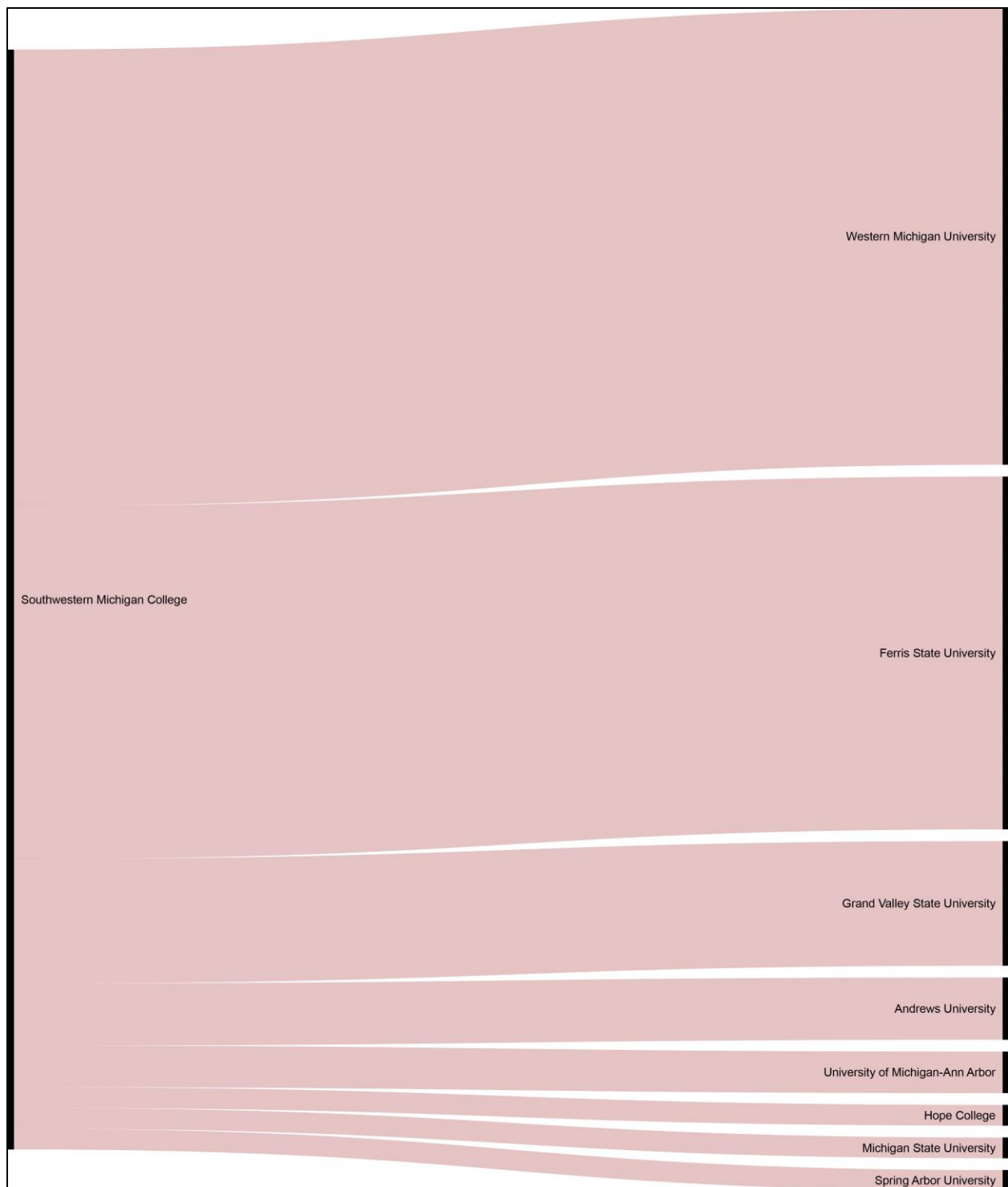


Figure B25. St. Clair County Community College (n=133 graduates)

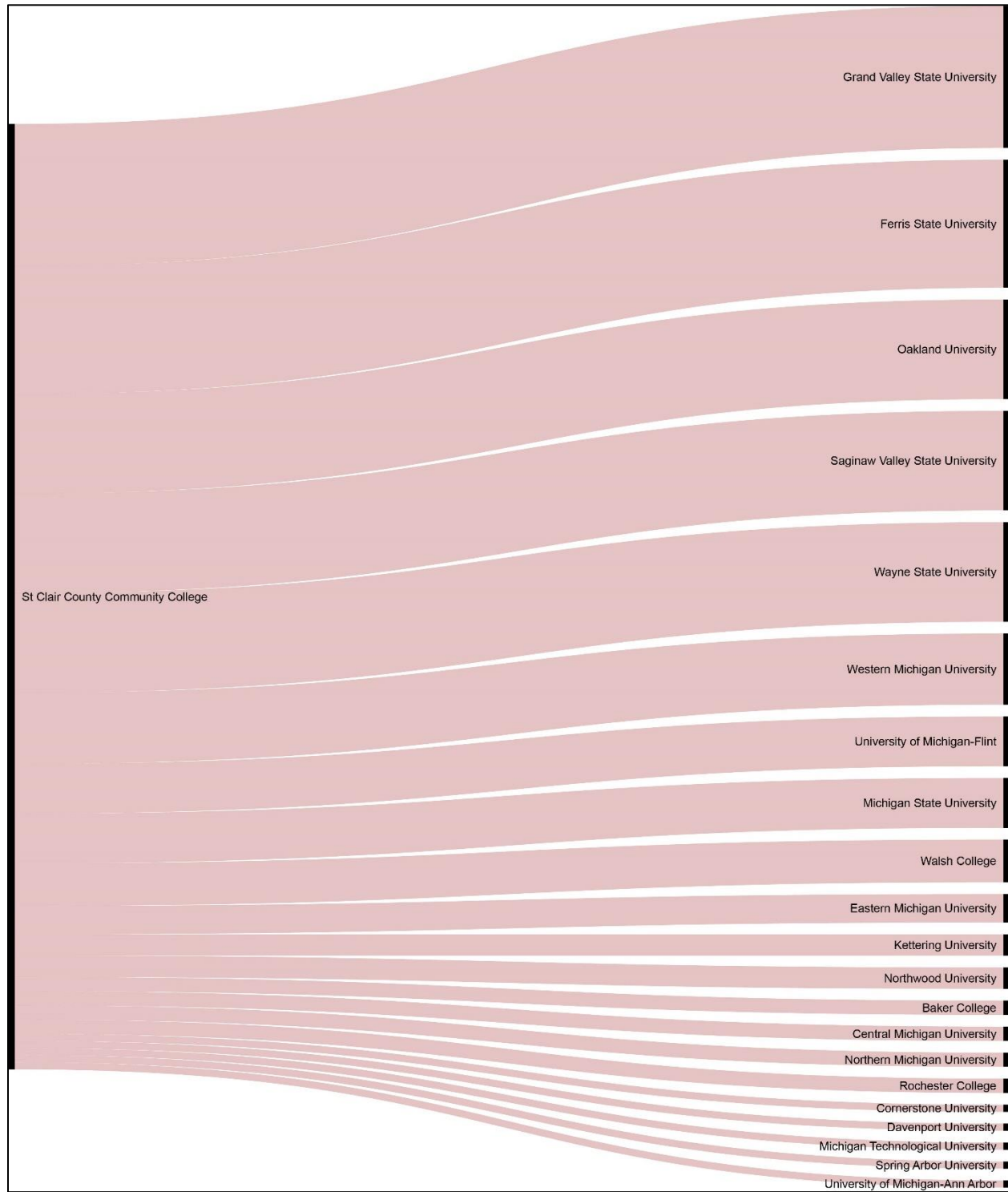


Figure B26. Washtenaw Community College (n=375 graduates)

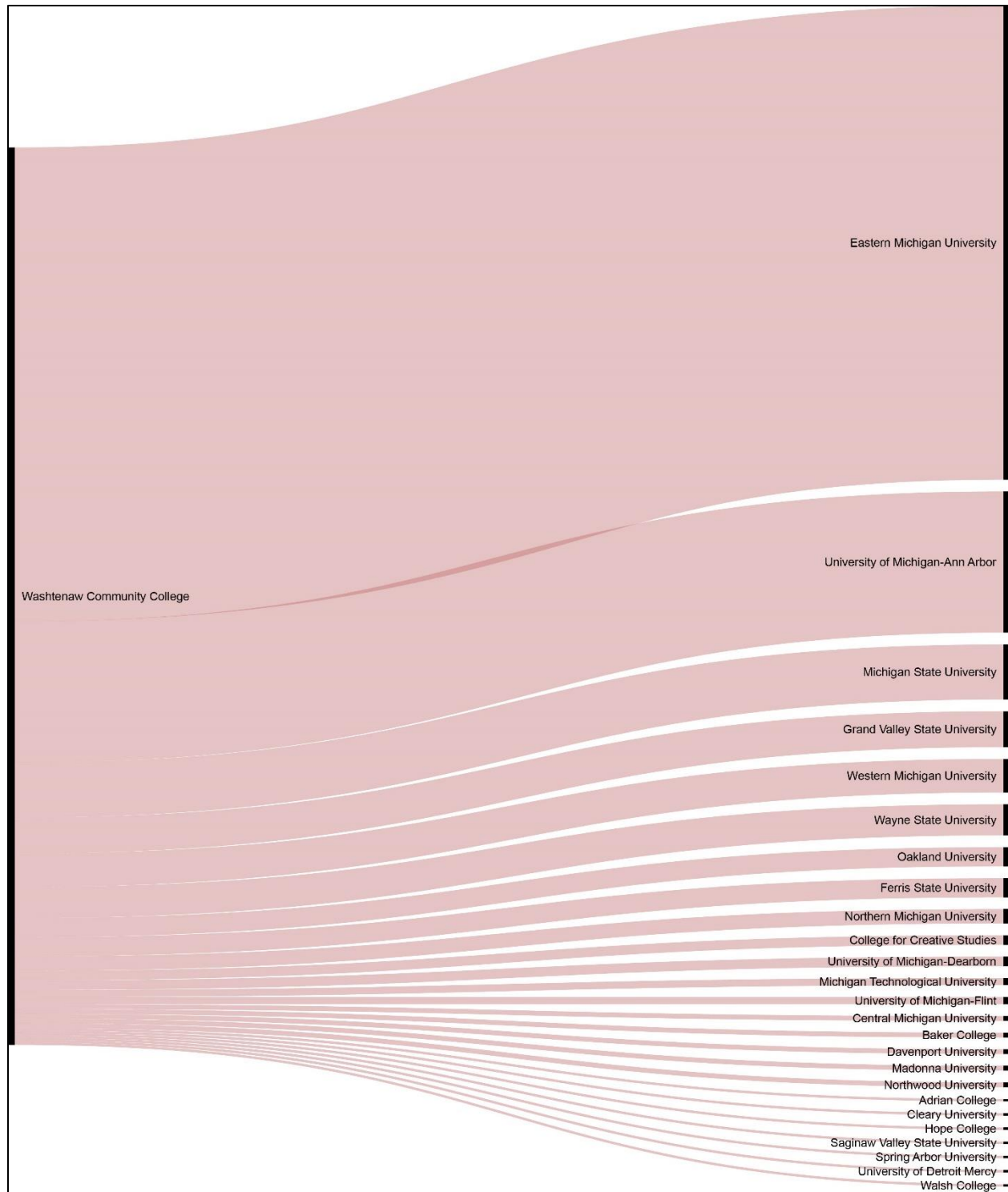


Figure B27. Wayne County Community College (n=216 graduates)

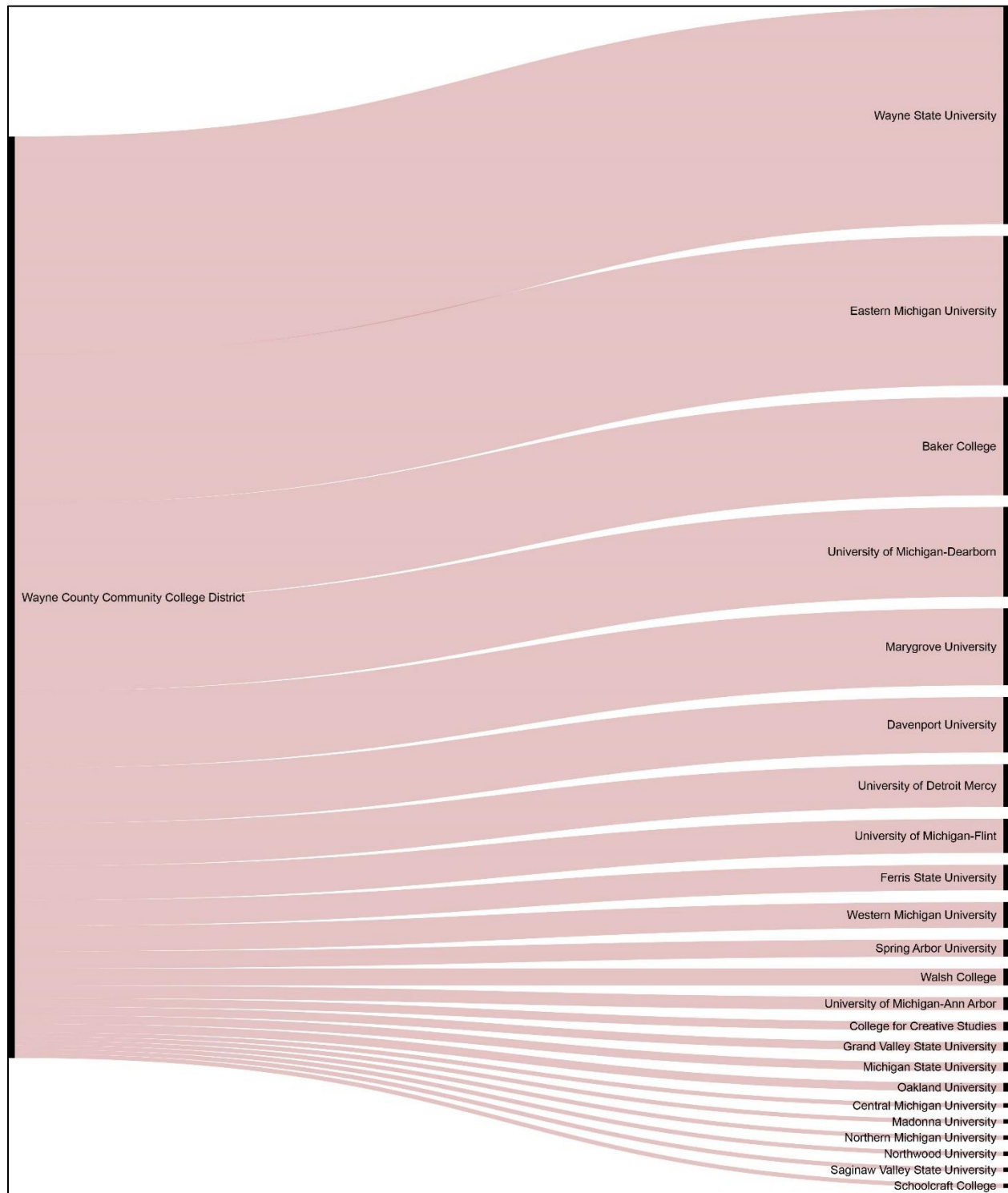


Figure B28. West Shore Community College (n=40 graduates)



Appendix C: Top Four Sending and Receiving Institutions, by Beginning Community College

Beginning Institution	Bachelor's Degree-Granting Institution	N	Percent
Alpena Community College	Saginaw Valley State University	6	11%
Alpena Community College	Lake Superior State University	7	13%
Alpena Community College	Ferris State University	8	15%
Alpena Community College	Grand Valley State University	8	15%
Bay de Noc Community College	Ferris State University	4	5%
Bay de Noc Community College	Michigan Technological University	9	12%
Bay de Noc Community College	Lake Superior State University	17	23%
Bay de Noc Community College	Northern Michigan University	38	51%
Delta College	Michigan State University	26	8%
Delta College	Ferris State University	48	15%
Delta College	Northwood University	64	19%
Delta College	Saginaw Valley State University	88	27%
Glen Oaks Community College	Rochester College	1	5%
Glen Oaks Community College	Wayne State University	1	5%
Glen Oaks Community College	Grand Valley State University	4	21%
Glen Oaks Community College	Western Michigan University	11	58%
Gogebic Community College	Ferris State University	2	6%
Gogebic Community College	Finlandia University	4	12%
Gogebic Community College	Michigan Technological University	13	39%
Gogebic Community College	Northern Michigan University	13	39%
Grand Rapids Community College	Davenport University	39	8%
Grand Rapids Community College	Western Michigan University	49	9%
Grand Rapids Community College	Ferris State University	105	20%
Grand Rapids Community College	Grand Valley State University	225	44%
Henry Ford College	Western Michigan University	18	6%
Henry Ford College	Eastern Michigan University	56	18%
Henry Ford College	Wayne State University	64	21%
Henry Ford College	University of Michigan-Dearborn	101	33%
Jackson College	Spring Arbor University	16	11%
Jackson College	Michigan State University	23	15%
Jackson College	Western Michigan University	30	20%
Jackson College	Eastern Michigan University	31	20%
Kalamazoo Valley Community College	University of Michigan-Ann Arbor	7	2%
Kalamazoo Valley Community College	Davenport University	12	4%
Kalamazoo Valley Community College	Grand Valley State University	20	7%
Kalamazoo Valley Community College	Western Michigan University	211	72%
Kellogg Community College	The Robert B Miller College	6	5%
Kellogg Community College	Spring Arbor University	9	7%
Kellogg Community College	Grand Valley State University	19	15%
Kellogg Community College	Western Michigan University	53	41%
Kirtland Community College	Northern Michigan University	3	10%
Kirtland Community College	Northwood University	3	10%

Kirtland Community College	Saginaw Valley State University	4	13%
Kirtland Community College	Ferris State University	6	19%
Lake Michigan College	Michigan State University	13	9%
Lake Michigan College	Andrews University	14	10%
Lake Michigan College	Grand Valley State University	25	18%
Lake Michigan College	Western Michigan University	51	37%
Lansing Community College	Western Michigan University	28	7%
Lansing Community College	Northwood University	31	8%
Lansing Community College	Ferris State University	36	10%
Lansing Community College	Michigan State University	140	37%
Macomb Community College	Western Michigan University	32	5%
Macomb Community College	Walsh College	50	8%
Macomb Community College	Wayne State University	171	26%
Macomb Community College	Oakland University	220	34%
Mid Michigan College	Central Michigan University	6	11%
Mid Michigan College	Northwood University	6	11%
Mid Michigan College	Ferris State University	7	13%
Mid Michigan College	Saginaw Valley State University	7	13%
Monroe County Community College	Wayne State University	4	5%
Monroe County Community College	University of Michigan-Dearborn	6	7%
Monroe County Community College	Western Michigan University	6	7%
Monroe County Community College	Eastern Michigan University	38	46%
Montcalm Community College	Davenport University	5	11%
Montcalm Community College	Western Michigan University	5	11%
Montcalm Community College	Grand Valley State University	6	13%
Montcalm Community College	Ferris State University	18	40%
Mott Community College	Oakland University	14	5%
Mott Community College	Ferris State University	17	6%
Mott Community College	Northwood University	18	6%
Mott Community College	University of Michigan-Flint	153	51%
Muskegon Community College	Michigan State University	16	9%
Muskegon Community College	Western Michigan University	20	11%
Muskegon Community College	Ferris State University	25	14%
Muskegon Community College	Grand Valley State University	84	46%
North Central Michigan College	Grand Valley State University	7	9%
North Central Michigan College	Northern Michigan University	7	9%
North Central Michigan College	Spring Arbor University	10	14%
North Central Michigan College	Lake Superior State University	20	27%
Northwestern Michigan College	Michigan Technological University	10	6%
Northwestern Michigan College	Michigan State University	13	7%
Northwestern Michigan College	Grand Valley State University	34	19%
Northwestern Michigan College	Ferris State University	62	35%
Oakland Community College	Eastern Michigan University	49	8%
Oakland Community College	Michigan State University	50	8%
Oakland Community College	Wayne State University	79	12%
Oakland Community College	Oakland University	230	36%

Schoolcraft College	Michigan State University	34	8%
Schoolcraft College	Wayne State University	49	12%
Schoolcraft College	University of Michigan-Dearborn	51	13%
Schoolcraft College	Eastern Michigan University	106	26%
Southwestern Michigan College	Andrews University	3	6%
Southwestern Michigan College	Grand Valley State University	6	12%
Southwestern Michigan College	Ferris State University	15	30%
Southwestern Michigan College	Western Michigan University	21	42%
St Clair County Community College	Saginaw Valley State University	13	10%
St Clair County Community College	Wayne State University	14	11%
St Clair County Community College	Ferris State University	15	12%
St Clair County Community College	Grand Valley State University	20	16%
Washtenaw Community College	Western Michigan University	14	4%
Washtenaw Community College	Grand Valley State University	15	4%
Washtenaw Community College	University of Michigan-Ann Arbor	56	16%
Washtenaw Community College	Eastern Michigan University	195	54%
Wayne County Community College District	University of Michigan-Dearborn	21	10%
Wayne County Community College District	Baker College	22	11%
Wayne County Community College District	Eastern Michigan University	32	15%
Wayne County Community College District	Wayne State University	49	24%
West Shore Community College	Central Michigan University	3	8%
West Shore Community College	Western Michigan University	3	8%
West Shore Community College	Grand Valley State University	10	26%
West Shore Community College	Ferris State University	14	36%