CORRELATES OF TRANSFER-STUDENT PERSISTENCE AND DEGREE COMPLETION IN THE COLLEGE OF HEALTH PROFESSIONS

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The Supervisory Committee certifies that this ***disquisition*** complies with North Dakota State University's regulations and meets the accepted standards for the degree of

MASTER OF SCIENCE

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ABSTRACT

Persistence and degree completion among transfer students are important concerns for colleges and universities. Transfer students may experience difficulties or barriers after transferring from one institution to another, preventing students from persisting and graduating. Additionally, health-profession programs often have selective admission requirements and competitive admission processes. Traditional transfer-student barriers and health-profession barriers can create a challenging atmosphere for undergraduate transfer students. The current study evaluates the relationships among transfer type, selective admission metrics, persistence, and degree completion. The results illustrate several bivariate relationships that indicate areas of concern. Directions for future research are discussed to further identify and resolve the root cause of these trends.

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DEDICATION

This thesis is dedicated to my wonderful family and friends who supported me throughout this entire process. To my husband, Rusten, who provided encouragement and distractions to keep me sane throughout this process. To my mother, Irene, who provided the push I needed to get started. To my wonderful friends and co-workers, who graciously listened to my frustrations and offered kind words of encouragement. Finally, to everyone who was not mentioned by name, but was instrumental to my success, thank you! Without your love and encouragement, this process would not have been possible.

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CHAPTER 1. INTRODUCTION

For many individuals, the pursuit of success can be a driving force with decisions made throughout the day. How an individual defines success is likely different from one person to the next. Depending on an individual's value system, success can relate to the accomplishment of goals, wealth, effectiveness, joy, performance, or a variety of other aspects. In the *Business Insider*, Baer (2014) noted how nine successful people describe success. In the article, Deepak Chopra (author and public speaker) defined success as an expansion of happiness and the progressive realization of worthy goals. Sir Winston Churchill (prime minister of the United Kingdom from 1940-1945) viewed success as going from failure to failure without losing enthusiasm. For Richard Branson (Virgin Group founder), success was about engagement; knowing that the more engaged you are, the more successful you will feel (Baer, 2014). In higher education, student success is often measured and defined by degree completion. College completion is a critical success outcome that is supported by every educational policymaker (Shapiro et al., 2012).

Degree completion remains a top priority for many government officials and educational policymakers. A quick search for "degree completion agenda" provides 76.1 million results and over 400,000 scholarly articles. The search results offer several guides, reviews, opinions, and plans, emphasizing the importance of degree completion. The search results also give varying definitions for successful outcomes. In this chapter, the researcher discusses the Evolution of the Transfer Student, the barriers that transfer students experience, the framework for this study, and the significance.

Evolution of the Transfer Student

Higher education in the United States has provided many routes for degree completion, most recently shifting from a traditional (or native) experience to a more non-traditional experience. The native experience previously embodied starting, continuing, and completing a degree at one institution (Clemetson, Furbeck, & Moore, 2015). Early research reports about student patterns indicated that the traditional college-student, or native student, entered four-year institutions as a first-time freshman and remain enrolled at the same institution of higher education until graduation (Porter, 1999). As a result, researchers consistently designed studies about college-student progress and performance based on 18-year old, high-school graduates (Borden, 2004). Furthermore, studies focused on student matriculation beginning in the fall semester with continuous full-time attendance at four-year institutions (Borden, 2004). Although the trends for student-attendance patterns indicated an increasing concentration of transfer students attending colleges and universities (Ishitani, 2008; McCormick, 2003; Schulte, 2015).

The National Student Clearinghouse Research Center found that "one-third of first-time college students attended multiple institutions before earning a degree or certificate" (Shapiro et al., 2012, p. 5). The evolution of transfer patterns is happening across the United States. Transfer patterns for students include options to attend public, private, non-profit, or for-profit institutions in two-year or four-year settings before attending the final destination, resulting in a plethora of transfer patterns. Transfer students move among a variety of institutions (private, public, two-year, or four-year) in a disorganized pattern (reverse, vertical, lateral, or swirling) and for multiple reasons (financial, academic, and personal). Some students will transfer laterally from one two-year institution to another two-year institution or from one four-year institution to another four-year institution (Bahr, 2012) while other students will reverse transfer from a four-

year institution to a two-year institution (Townsend & Dever, 1999). Finally, some students may experience a vertical transfer (or traditional transfer), referring to students who move from a two-year institution to a four-year institution (Townsend & Dever, 1999).

According to Shapiro, Dundar, Wakhungu, Yaun, and Harrell (2015), over 3.6 million students enrolled in college during the Fall 2008 semester. Of the students who enrolled, over one-third transferred to a different institution at least once during a 6-year period. Moreover, nearly half (45%) of the students who transferred did so multiple times. Therefore, nearly one in four students who began college in 2008, and completed their degree, did so at an institution other than where they started (Shapiro et al., 2015).

The surge with student mobility and transfer has transformed the student population in higher education to include both native and transfer students. The recent changes have greatly increased the number of transfer students attending colleges and universities. As described earlier, more than one-third of students likely attended another institution before enrolling at their final destination, significantly increasing the transfer student population. More notably, nearly 40% of students attending two-year institutions (public, private non-profit, and private for-profit) and 35% of students attending four-year institutions (public, private non-profit, and private for-profit) transferred to another institution from 2008-2014 (Hossler et al., 2012; Shapiro et al., 2015).

Transfer Patterns

The most commonly known transfer pattern, and often a typical gateway for students, occurs through vertical transfer. Students transfer vertically when they enroll at a four-year institution after attending a community college, often a public community college (Hartman, Bjerregaard, & Lord, 2009). Nearly 62% of public two-year students who transferred from 2008-

2014, transitioned to a four-year institution (Shapiro et al., 2015). This number has increased considerably since 2001 when approximately 22-25% of students attending community colleges transferred (Eggleston & Laanan, 2001). Because the vertical transition occurs frequently, much of the research that studies transfer patterns includes research designs that utilize community college students who are transitioning to four-year institutions.

While community colleges can be a stepping-stone to four-year institutions, Townsend and Dever (1999) found that community colleges could also be a point of entry for students leaving four-year institutions. A reverse-transfer student is someone who is transferring from a four-year institution to a two-year institution (Townsend & Dever, 1999). According to Hossler et al. (2012), 14.4% of native students attending four-year institutions transferred to a two-year institution during the period from Fall 2005 through Summer 2011. Of the 14.4% of native students who transferred from a four-year to a two-year institution, 16.6% returned to their original institution, and 28.3% returned to a four-year institution that was different from the original location. These trends illustrated that, while a student may reverse transfer, it does not necessarily indicate that the student will be a permeant student at the transfer institution (Hossler et al., 2012). Additionally, reverse transfer plays a significant role with student transfers; Shapiro et al. (2015) noted that 51.3% of the students enrolled at public, four-year institutions in 2008 who transferred did so to a public community college. Furthermore, students attending four-year, private, non-profit and four-year, private, for-profit transferred to public, two-year institutions (42.6 and 42.0%, respectively; Shapiro et al., 2015).

Students may horizontally, or laterally, transfer from one community college to another community college (Bahr, 2012). A lateral transfer also includes students who are moving from one four-year institution to another four-year institution. More recently, lateral transfers have

increased on campuses throughout the United States; more than 25% of community-college students will transfer to another two-year institution within a six-year period (Bahr, 2012). Shapiro et al. (2015) also noted that almost 37% of two-year college students and 36% of four-year college students laterally transferred between 2008 and 2014. Based on these data, the lateral transfer is a very common phenomenon, rivaling the prevalence of reverse and vertical transfers.

As a final point, it is common for transfer students to attend at least two institutions before enrolling at their final institution. In fact, nearly 45% of higher-education students are swirling transfers: those individuals who attend a minimum of three institutions (Shapiro et al., 2015). It is also common for students who swirl to attend various two-year institutions, four-year institutions, or a combination of both. Moreover, students who swirl from institution to institution (two-year, four-year, or a combination) follow unpredictable enrollment patterns (Clemetson et al., 2015). The enrollment patterns for swirling students could include reverse transfer, lateral transfer, or vertical transfer. The unpredictability of the swirling students places them at risk for not completing a degree due to a lack of structure in course selection and academic experiences (Clemetson et al., 2015).

Transfer Rates

Student mobility is an important postsecondary-education phenomenon to study because it plays a significant role in degree completion and is often considered an indicator of student success (Shapiro et al., 2015). Many policymakers believe that college success is defined by college completion, but they know little about the rates of completion for non-traditional students. Understanding actual college completion rates can be challenging because traditional graduation rates are based on students who start and finish at the same institutions of origin

(Shapiro et al., 2012). Many higher-education institutions do not track student mobility and transfer, making it difficult to research and gather data on the population. Additionally, previous studies about student movement have been limited. In fact, studies are often limited to one transfer pattern at a time and are often restricted to one institution, one state, or one time period (Glass & Harrington, 2002). However, the National Student Clearinghouse (NSCH) has been investigating and gathering recent data about transfer students, releasing annual reports on student mobility, attainment, and enrollment trends. With the availability of data, institutions and researchers can gather and analyze this subset of the transfer population by using multiple institutions, states, and time periods. Having access to the different types of student-enrollment patterns provides institutions with the opportunity to create mechanisms to determine the likelihood of student success and to further provide services to support transfer students.

The new reality is that students are transferring at a very high rate; and that student enrollment pathways are evolving. Approximately 2.4 million students transferred from one institution to another from 2008-2014 (Shapiro et al., 2015). In 2004, the NSCH began gathering data on student enrollment and mobility patterns, releasing its first report in 2012. Since the first report, the NSCH has released numerous signature reports and snapshot reports about transfer patterns, transfer mobility, and degree attainment.

According to NSCH's most recent signature report (Shapiro et al., 2015), during the Fall 2008 enrollment term, 3,629,429 students enrolled in post-secondary education in the United States. Nearly 38% of the students enrolled at a different institution at least once, with women transferring more than men (39.0 and 36.8 %, respectively). The findings also indicated that community colleges are a gateway for transfer to four-year institutions. Of the students who started at a community college between 2008 and 2014, nearly a quarter of them transferred to a

four-year institution within 6 years. The transferring students often transfer during their second year (36.6%) and third year (24.4%). It is important to recognize that students who transferred from a two-year institution did so at a rate of 39.5%. Additionally, students who transferred from four-year institutions did so at a rate of 36.5%. Furthermore, mixed-enrollment students were the most likely to transfer, with more than half of that group (53.7%) transferring to another institution at least once. During the time span of 2008 through 2014, full-time students were also expected to transfer, with one in five transferring at least once. Nearly 12% of part-time students also transferred to another institution (Shapiro et al., 2015).

Student transfer rates also varied for the starting and ending institutions for students enrolled from 2008 through 2014. According to Shapiro et al. (2015), students who started at four-year, public institutions were more likely to pick a two-year institution as a top destination (51.3%). Students who started at two-year institutions were mostly like to enroll at a four-year, public institution (42.2%) and other two-year, public institutions (36.5%). All students enrolled at two-year institutions (private, public, non-profit, or for-profit) were 24.4% likely to transfer to four-year institutions. Similarly, all two-year students were 15% likely to transfer to another two-year institution. Finally, for students who started at four-year institutions, 17.2% transferred to a two-year institution, and 17.9% transferred to another four-year institution (Shapiro et al., 2015).

The National Student Clearinghouse released information on reverse-transfer trends (Hossler et al., 2012). Reports indicated that, of the students who enrolled at public, four-year institutions for Fall 2005, over 14% reverse transferred to two-year institutions. An additional 5.4% reverse transferred during the summer but subsequently returned to their original four-year institution. Of the students who reverse transferred in the summer, 80.7% transferred back to their original four-year institution, whereas only 16.6% of students who transferred during a non-

summer semester transferred back to their original institution. Additionally, 28.3% of the students transferred back to the four-year sector but to a different institution (Hossler et al., 2012).

Understanding the patterns and mobility of student transfer should be considered essential for higher-education institutions because a large portion of students entering college today falls under the transfer category. There are many types of student-transfer patterns, and understanding each type and possible reasons why students transfer is necessary for supporting transfer students.

Transfer Policy and Barriers to Degree Completion

The increase in transfer patterns, as well as recent policy discussions and reforms, is driving the National Completion Agenda and shifting the focus to transparency and accountability (Shapiro et al., 2015). President Barak Obama is leading the charge for transparency and accountability, and he has set specific metrics for colleges and universities to meet before 2020. For institutions to increase the overall degree-completion among all students, the institutions will need to focus on transfer-student populations in addition to native students.

Policymakers and higher-education administrators in the United States have increasingly focused on transfer students' degree completion in response to the increased student mobility. Previously, U.S. colleges and government officials did not evaluate transfer-student completion when calculating students' degree completion for higher education institutions. As a result, student figures for degree completion have been slightly skewed and unrepresentative of the overall student completion in recent years. When students leave their original starting institution, the institution is left with a "student failure," what policymakers consider to be an unsuccessful student. Additionally, if students transfer to a different institution to finish their degree, they are

not considered a success because it was not their original starting point. While policymakers and administrators may view student success based on degree outcomes, there is another viewpoint to consider. Is academia only about the degree outcome, or is there also a learning component? College is a time for personal exploration, as well as knowledge and skill development, for students. Several elements contribute to the college-student experience, not just the end goal of degree completion.

Because student mobility has changed, policymakers and higher-education administrators shifted their focus and emphasized the importance of the degree completion and institutional accountability of all students, including transfers. The college-completion rates available for the United States indicated that 42% of individuals who started a college degree in 2006 completed their degree at their starting institution within 6 years of initial enrollment (Shapiro et al., 2012). When factoring transfer students into the completion equation, an additional 12.1% of students completed at a different institution (Shapiro et al., 2012). Similarly, 42.1% of students who started in 2008 completed their degree at their starting institution, and 13% completed their degree at a different institution (Shapiro, Dundar, Ziskin, Yaun, & Harrell, 2014). These statistics further characterized the importance of tracking transfer students.

The concern is building around the National Completion Agenda at many postsecondary institutions in the United States. Often, the transfer-student population experiences several barriers as students transfer to new institutions of higher education. Most notably, transfer students tend to experience transfer shock or a drop in their grade point average (GPA) after transferring (Glass & Harrington, 2002). Other barriers may include aptitude, environment changes, finances, or transferring credit. Each student has a different experience after transfer, so institutions need to be prepared to serve this population through multiple services. Navigating

these barriers can directly impact whether a student persists and graduates, or leaves the institution (Hatton, Homer, & Park, 2009).

Compounded with the barriers that transfer students face, students interested in health-related professions experience additional hurdles. Many colleges and universities have selective-admission requirements for professional programs (pharmacy, nursing, medical laboratory science, radiologic science, and respiratory care). For students to compete with selective admissions, they often need to meet admission criteria for GPAs, standardized test scores, or selective course requirements. These selective-admission requirements create additional barriers for degree completion. Transfer students may experience additional barriers based on their previous performance at other institutions, making it difficult for them to receive admittance to a health-related program.

Students applying to health-related programs at North Dakota State University (NDSU) may experience barriers as a result of selective admissions. The College of Health Professions is one of eight colleges at NDSU. Within the College of Health Professions, there are four academic units, including six health-profession disciplines: (a) the School of Pharmacy (pharmacy practice and pharmaceutical sciences), (b) the School of Nursing, (c) the Department of Allied Sciences (medical laboratory science, radiologic sciences, and respiratory care), and (d) the Department of Public Health. Many of the College of Health Professions' programs are highly selective, creating barriers for students who want to pursue professions in health care. For this reason, the College of Health Professions often experiences poor retention rates due to students leaving the college to pursue other degrees at NDSU and students leaving the university to enroll at other institutions.

NDSU acknowledges the importance of student retention and graduation rates for undergraduate students. NDSU's strategic vision for 2015-2020 noticeably identifies improving student-retention and graduation rates of undergraduates as an institutional priority. Institutional research points to four underlying issues with student retention, one of which includes the "lack of a clear path for students who do not meet the selectivity requirements of certain programs" (*Strategic Vision 2015-2020*, 2015, p. 4). The selectivity of several campus programs limits the number of student admits each year. As a result, many students are left stranded and unsure about the future of their education. Because of the selective admission standards in the College of Health Professions, students may feel lost when they do not receive admittance to a program.

Statement of the Problem

Entering a professional program in NDSU's College of Health Professions can be a challenging feat for any students (native or transfer). The rigor of each pre-professional program creates many hurdles and challenges for students. Professional programs (pharmacy, nursing, medical laboratory science, radiologic sciences, and respiratory care) have high expectations for their students, proven through the rigorous admission process and the program standards that are required of all professional students.

NDSU's College of Health Professions utilizes quantitative factors (cumulative GPA, pre-requisite GPA, interviews, and standardized tests), as well as qualitative factors (admission essays and work experience) to determine which students will receive a spot in professional programs. Selective-admission and conduct standards exist to prepare students for license and certification boards as well as future careers in health professions. While selective-admission standards may create an additional barrier for students, this obstacle is often the gatekeeper for a program and prepares students for the professional program's rigor.

For students who want to pursue a professional degree in the College of Health Professions at NDSU, the greatest barrier to admittance is the level of competition among pre-professional students. On average, 100-150 nursing students apply to the professional nursing program each semester. Of those students, only 48 receive admittance to the professional nursing program at the Fargo location (K. Kotula, personal communication, October 16, 2015). The School of Pharmacy regularly receives approximately 130 applications; up to 85 students are admitted to the professional program annually (K. Haugen, personal communication, October 16, 2015). Factors such as GPA, repeated courses, and failing grades (D's or F's) create barriers for students interested in professional programs.

In addition to the barriers all students face with the College of Health Professions' admission process, transfer students may experience several other barriers (described on page 9). The purpose of this study was to examine, compare, and analyze the selectivity metrics (or barriers) that influence levels of persistence and completion for first-time and swirling transfer students enrolled in pre-professional health majors at NDSU. The researcher evaluated the relationship between transfer type (first-time transfer or swirling transfer) and persistence as well as transfer type and completion. Additionally, the researcher examined the relationship between transfer type and selectivity metrics (transfer GPA, English readiness, math readiness, course repeats, and course failures). The relationship between selectivity metrics and student persistence, as well as the relationship between selectivity metrics and completion for transfer students starting in pre-professional health majors, was also examined.

Research Questions

The following research questions guided this study:

1. What factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students starting in pre-professional health majors?
2. What are the relationships between selectivity metrics and persistence for transfer students starting in pre-professional health majors?
3. What are the relationships between selectivity metrics and degree-completion for transfer students starting in pre-professional health majors?

To answer the research questions, student data from NDSU's Office of Registration and Records and a correlational design were used.

Conceptual Framework

The researcher has held several positions in higher education; during this time, the researcher routinely worked with transfer students. Most recently, the researcher joined NDSU's College of Health Professions as a professional academic adviser. The researcher's primary role is to assist students in pre-professional programs with the development of education plans to complete the pre-professional program requirements. The researcher also helps students to identify and use university resources as well as to make informed choices regarding academic and career plans. As a higher-education professional, the researcher has an understanding of two perspectives regarding transfer students: (a) assisting students with transferring their previous coursework and gaining admission to colleges and universities as well as, (b) assisting students with advising and degree completion. The researcher understands the challenges of admitting students as well as the challenges associated with student retention. Moreover, the researcher is also a transfer student, both in undergraduate and graduate coursework. The researcher's

experience, both as a student and as a higher-education professional, is a motivating influence for her research about transfer students.

After countless hours researching transfer-student patterns and swirling-transfer students as well as many hours discussing topics with supervisory committee members, department supervisors, and department co-workers, this researcher narrowed her research to investigate the student persistence and completion for first-time transfer students and swirling transfer students in pre-professional health majors at NDSU. Moreover, the researcher evaluated several variables that are examined during the selective-admission process. Specifically, to examine the relationships between selective-admission variables and transfer-student persistence, as well as selective admission variables and degree-completion outcomes. Figure 1 offers a visual representation of the relationships examined.

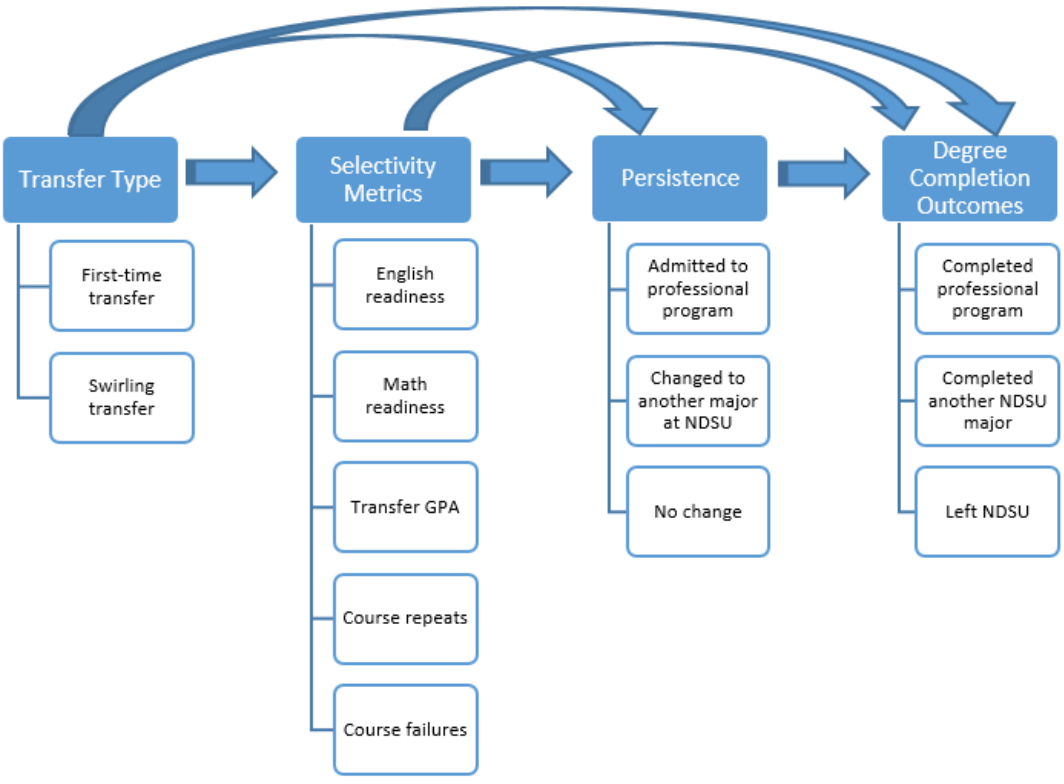

Figure 1. Proposed Diagram: Study Correlates.

Significance of the Study

This study provides an opportunity to gather insight about potential risk factors that influence the completion levels for transfer students in pre-professional health majors. The initial rationale originates from this researcher's experience with and observation of transfer students studying pre-professional programs in NDSU's College of Health Professions. The evolution of student transfers creates challenges for both tracking transfer patterns and providing successful advising. Tracking student mobility and the transfers for swirling students has been difficult because many institutions did not track student mobility and transfers. As the data became more accessible through studies completed by the National Student Clearinghouse, the National Information Center for Higher Education Policymaking and Analysis, and other organizations, researchers can analyze the transfer population. Additionally, understanding the factors that hinder or enhance the academic performance, persistence, and completion rates for transfer students can advance the currently available knowledge regarding transfer students' performance and success in pre-professional health majors. Potential known risk factors could help with future advising of pre-professional health majors in the College of Health Professions at NDSU.

Definition of Terms

The following definitions are provided to ensure uniformity and understanding throughout the study.

Dual-enrollment: students concurrently enrolled at two academic programs or educational institutions, typically referring to high-school students who are receiving high school and post-secondary credit (Manz, 2015).

First-time transfer: a student who has only transferred institutions one time since his/her initial enrollment (attended two institutions total).

Lateral transfer: students moving between two-year or four-year institutions of higher education at the same degree-track level (Bahr, 2012).

Mixed enrollment: students who experience varying forms enrollment: from full time to part time, or vice versa, from term to term (Shapiro et al., 2012).

Native student: someone who remains enrolled at the same higher-education institution from start to finish.

Persistence: a student's continuous enrollment in post-secondary education that leads to graduation.

Retention: a common percentage measurement indicating how many students who attended the previous year re-enrolled at an institution (Arnold, 1999).

Reverse transfer: students who are transferring from a four-year institution to a two-year institution (Townsend & Dever, 1999).

Swirling transfer: a student who has transferred institutions two or more times (has attended a minimum of three institutions of higher education).

Transfer student: all various types of transfer students (lateral, reverse, and vertical transfer; McCormick, 2003).

Transfer shock: the decrease in grade point average (GPA) during the first semester of transfer for community-college students transitioning to a four-year institution (Glass & Harrington, 2002). For this study, the term will encompass all students (both two-year and four-year) transferring to a four-year institution.

Vertical transfer: students who are making the transition from a two-year institution to a four-year university (Townsend & Dever, 1999).

CHAPTER 2. LITERATURE REVIEW

For the purpose of this study, the researcher conducted a search of the EBSCO Education Source, ERIC database, SAGE journals, and JSTOR journals. Major descriptors include; transfer student, swirling student, higher education, academic persistence, completion rates, transfer shock, and student readiness. The Literature Review is divided into three sections, beginning with an overview of Transfer-Student Transitions which includes Transfer Shock and barriers students face after transfer. Section two reviews selective admissions and program expectations, specifically for students enrolled in NDSU's pre-professional health majors. The researcher also investigates student readiness and the previous college performance of transfer students as it applies to pre-professional program admissions and expectations. The final section covers degree attainment and the national push for college completion.

Transfer-Student Transitions

Virtually all students who move from one institution to another experience barriers that create challenging transitions at the new institution. Often, these barriers make persistence and degree completion difficult for students. Barriers may include transfer shock, aptitude, environmental changes (campus climate), finances, and transfer of credit (Carlan & Byxbe, 2000; Flaga, 2006). Navigating these barriers can directly impact whether a student encounters success or failure after transferring. Understanding the barriers can help institutions develop, retain, and graduate transfer students (Manz, 2015).

Transfer Shock

Researchers have documented significant changes among students who transfer to a new institution. Often, transfer students experience a drop in their GPA after the first semester (Cejda, 1997; Cejda & Kaylor, 1997; Laanan, 2001). Followed by the GPA decline, some students may

experience grade improvement in relation to their length of schooling (Hills, 1965). In 1965 when the term "transfer shock" was coined, Hills utilized it to describe a phenomenon seen quite frequently in higher education. The term stuck, and since that time, many researchers have argued the validity of transfer shock (both supporting and opposing the phenomenon).

During the 1990s, studies supporting transfer shock were rather extensive in higher-education research. Boswell's study found that community-college transfers experienced transfer shock more than private, junior-college transfers did. Jones found that students who transfer with GPAs of 2.5 or less experience transfer shock. In Jones' study, nearly 77% of the transfer students experienced transfer shock, and 50% of transfers experienced a drop in GPA of 0.5 grade points. Additionally, Karpis reported that the mean GPAs of transfer students fell to 2.82 from an unmentioned higher GPA. Glass and Harrington's study also found evidence of transfer shock, with an average transfer-student GPA decrease of .44 from the spring semester to the fall semester (Glass & Harrington, 2002).

In addition to the research supporting transfer shock, studies indicated that, while some students experience transfer shock, many people do not or can recover from the decreased GPA. Glass and Harrington (2002) proved that, while transfer students may experience transfer shock during their first semester, the students typically recover during the next semester. Furthermore, transfer students may perform as well as, or better than, native students (Glass & Harrington, 2002). Carlan and Byxbe (2000) also found that, while the students' experience during the first semester declined compared to their community-college grades, future semesters did not experience a decline. Transfer students received grades similar to those of native students taking similar upper-level coursework. Models showed that "upper-division GPA increased two-thirds of a letter grade for every one-point increase in GPA transferred from community colleges"

(Carlan & Byxbe, 2000, p. 34). Also, Carlan and Byxbe (2000) noted that students who transferred for majors in education or psychology outperformed transfer students in other colleges. Specifically, students in business and science fared the worst, whereas students in liberal arts and health sciences reduced the gap somewhat. Diaz's (1992) in-depth meta-analysis of transfer shock completed revealed 62 studies that reported GPA change among transfer students. According to Laanan (2001), the studies showed that, while community-college students suffered transfer shock (79%), the magnitude of GPA change was minimal (one-half a grade point or less). Of the community-college transfer students who experienced transfer shock, 67% usually recovered within the first year after transfer. Additionally, 34% recovered completely; 34% nearly recovered; and 32% exhibited partial recovery (Laanan, 2001).

Aptitude

Studies suggested that student aptitude varies individually depending upon the student and previous educational experiences (Carlan & Byxbe, 2000; Glass & Harrington, 2002). As noted earlier, transfer students have varying educational backgrounds and knowledge, depending on the institutions previously attended, with vertical transfer as the most common experience. Often, students utilize public, two-year institutions as a starting point when they are unable to attend four-year institutions because of the admission requirements. Student aptitude, success, and performance are questioned after students transition from institution to institution. Vaughan and Templin (1987) argued that community-college transfers are not as academically prepared when compared to their native, four-year institution counterparts. Additionally, some research indicated that community college does not prepare students for the rigor of certain four-year institutions, which may explain the decreased academic performance (Laanan, 2001). Hartman et al. (2009) noted that community-college grades are inflated estimates of student achievement.

Some four-year colleges perceived community-college grades to be inflated by two letter grades or more (Carlan & Byxbe, 2000). Further, the lack of transfer success was due to the lack of community-college preparation (Hartman et al., 2009).

Early studies note that community-college students who are transferring to four-year institutions are less successful than native students because of academic preparedness. The lack of preparation is believed to be a result of lower academic standards at community colleges compared to four-year institutions, often indicating that four-year institutions have faster-paced courses and more emphasis on writing (Flaga, 2006). Researchers argue that the lack of preparedness results in a lower GPA, a decreased academic performance, and a decreased baccalaureate attainment. When compared to native students starting at a four-year institution, community-college students are 15% less likely to attain a bachelor's degree (Townsend & Wilson, 2006). Furthermore, according to Cejda, Kaylor, and Rewey (1998), studies on dismissal or failure rates have indicated that 18-22% of students transferring from community colleges to four-year institutions are unsuccessful at the end of the first semester. Moreover, transfer students moving to four-year institutions are more likely to experience academic probation after their first semester (Cejda et al., 1998; Laanan, 2001).

One key to student success after transferring exists in the preparation that students receive before transferring (Pope, 2004). Preparation to transfer not only falls on the sending institution, but also on the receiving institution. Furthermore, Tinto (1987) believes that the scope of a student's transition is largely dependent upon the student's willingness to transition to the college before formal entry. When both the sending and receiving institutions are willing to work together, students can be more successful after the transition. Of the students surveyed, a large percentage do not receive assistance from community-college staff members for the

transition to four-year institutions (Townsend & Wilson, 2006). The lack of assistance from academic advisers, transfer orientation programs, and the faculty at community colleges is a common occurrence in higher education; however, many institutions are trying to change (Pope, 2004).

While some investigators noted a slight disconnect between the performance of community-college transfers and native students, several researchers found different results. Glass and Harrington (2002) discovered that community-college transfer students entering the College of Arts and Sciences are just as prepared as native students attending four-year institutions, having equal or better performance. Glass and Harrington further cited no significant difference for the cumulative GPAs of transfer students or native students. Some results even indicated that transfer students obtained higher GPAs than native students (Glass & Harrington, 2002). According to Cejda et al. (1998), a relationship existed between the number of credits a student completes at a community college and his/her academic performance at a four-year institution. Several studies indicated that students with upper-division status experienced a lesser degree of transfer shock than students with lower-division status. Students with upper-division status often performed at the level of native, four-year college students. More importantly, students with upper-division transfer work were more likely to graduate than lower-division students (Cejda et al., 1998). Carlan and Byxbe (2000) further verified Cejda et al. (1998) when examining the GPAs of transfer students and native students. In that study, very few differences existed between transfer students and native students for upper-level coursework following a bumpy first semester. The GPA comparison between native and transfer students completing upper-level coursework was nonexistent (Carlan & Byxbe, 2000).

Environmental Characteristics

Laanan (2001) emphasized the relationship between transfer students' academic performance and their personal, demographic, or environmental characteristics. Students transferring from small community colleges to larger, four-year universities tended to have difficulties with the shift in campus size, student-faculty ratios, and the increased student population (Laanan, 2001; Tinto, 1987). While students may have been successful at their previous institution, they may not be as successful at their new institution because of environmental changes. Students who are transferring from community colleges tended to have experienced smaller class sizes and campuses. Qualitative studies suggested that some students do not know how to adjust to the changing environment (Townsend & Wilson, 2006). Students who repeatedly transfer often entered a new institution feeling isolated. Many transferring students needed to readjust to the new environment, faculty, and student body. These changes often made students feel isolated by their surroundings, and they were unable to connect with their new environment (Townsend & Wilson, 2006). Additionally, some students did not feel connected to the faculty or staff at the new institution. Students noted feeling less supported in the classroom and receiving less interaction from faculty, hindering their success (Thurmond, 2007).

Financial

For many individuals, the cost of education is one of the largest barriers to student persistence. Education is expensive and, often, a financial burden for many students. Goldrick-Rab and Pfeffer (2009) noted that, when students make a decision to attend college, they will question whether to go, where to attend, and whether to finish a degree. Socioeconomic inequalities among students often prevented individuals from entering college, attending

institutions, and earning bachelor's degrees. If students make it through accessing an institution, they are often left with the challenge of deciding whether they can persist and graduate or whether to opt to work instead (Goldrick-Rab & Pfeffer, 2009). If students manage to enter an institution they cannot afford, they are more prone to transfer. Additionally, many students may not be able to enroll at the school of their choice because of financial constraints.

The Advisory Committee on Student Financial Assistance's (2010) report, *The Rising Price of Inequality*, identified a decrease of high-school graduates enrolling at four-year institutions because of family financial concerns. Financial instability was concerning because data have shown that where students begin college (two-year versus four-year institutions) can have an effect on the likelihood of persistence and degree completion. Students from low-income families who started at four-year institutions earned a bachelor's degree at a much higher rate than students who started at a two-year institution (62% vs. 20%). Even students from moderate-income families earned a bachelor's degree twice as often (67% vs. 34%). Financial constraints can also impact the likelihood of any student successfully completing a bachelor's program. Findings from the Advisory Committee on Student Financial Assistance's report also indicated a loss of more than 3 million bachelor's degrees awarded from 2000 to 2009 due to financial constraints. These statistics, while concerning, represented a subset of the population and may not hold true in all areas of the United States (Advisory Committee on Student Financial Assistance, 2010).

Transferring Credit

Many students who transfer and swirl among institutions have trouble transferring credits. Students usually experience a credit loss because the coursework does not apply to the program of study or does not meet the course requirements at the new school. Institutions have

tried to overcome the hurdle by creating articulation agreements and other methods of transfer planning to assist students with credit transfer. However, many students still experience credit loss when transferring institutions. For some students, the loss increases their overall time on campus and may decrease their likelihood of completion. Studies show that the longer it takes students to complete their degree, the less likely they are to graduate (Adelman, 2006).

One perspective suggests that capturing student credits and applying them to students' program of study provides students with the ability to graduate earlier. The University of Wisconsin (UW) System has been trying to help transfer students receive their degrees in a timely and affordable fashion with the adoption of the UW System Transfer Information System. When students transfer to a University of Wisconsin institution or a Wisconsin Technical College (WTC), they can visit a website that helps them to identify how a credit transfers so that they can take the next steps to achieve their college-education goals. According to the UW System (n.d.), students select one of five academic statuses based on where they are currently attending school: (a) two-year UW College campus, (b) Wisconsin Technical College, (c) four-year UW College campus, (d) Out-of-State School or In-State Private College, and (e) High School. Based upon their selection, students receive resources to guide them through the transfer process. Students are also able to gather information about how their courses will transfer from one institution to the next. Students have a better chance of knowing how their credits will transfer before they leave the institution they are attending. The UW System creates a streamlined process that enables students to know which course to register for and how long they will need to attend (UW System, 2015). Student transfer has become customary at many higher-education institutions; as a result, other institutions have followed suit by creating transfer resources similar to the UW System. Over 5,100 colleges utilize the Transfer Evaluation System

(TES), creating a database of over 74,500,000 course equivalencies (College Source, 2015). This database is an exceptional tool that provides colleges and universities with catalog resources to create course equivalencies as students transfer new courses to other institutions.

Summary

Transfer shock, student aptitude, environmental adjustments, financial constraints, and transferring college credit are potential risk factors for student success. The difficulty with each discussed barrier is the limitations for how or why the barriers will affect some students and not others. It is challenging to determine how each barrier may impact a student's road to degree completion. Some students may be affected by one or several barriers while other students will not experience barriers after transferring.

Selectivity Metrics

In addition to the barriers that students face after transferring, students who are interested in health-related professions (nursing, pharmacy, medical laboratory sciences, radiologic science, and respiratory care) may experience additional hurdles with the selective-admission requirements at many four-year institutions. A quick search for the admission requirements of nursing and pharmacy programs throughout the country indicates that acceptance into health-related professional programs is competitive. According to the National League for Nursing (2013), only 41% of qualified applicants applying to baccalaureate nursing programs were accepted in Fall 2012. The ratio of applicants to admitted students remains high for students who are interested in pharmacy programs. For the Fall 2014 term, the number of applicants applying for program slots was roughly 5.5:1 (American Association of College of Pharmacy [AACP], 2015). According to *Compare top pharmacy schools* (2015), the average GPA for acceptance into a Pharm.D. program is anywhere from 3.00-4.00. Rankings, however, for the top 10 schools

in the United States expect that the student's GPA is between 3.40 and 4.00 (*Compare top pharmacy schools,* 2015). In 2013, the AACP noted that a minimum GPA of 2.7 and a Pharmacy College Admission Test (PCAT) composite score percentile of 52 were needed (Schauner, Hardinger, Graham, & Grarvalia, 2013). With few open spots and thousands of students applying each year, it is critical for universities and colleges to have stringent admission policies and procedures.

Overview for the NDSU College of Health Professions

The College of Health Professions at NDSU offers a variety of academic degrees for students to pursue. The School of Pharmacy offers a Doctor of Pharmacy, Bachelor of Science, Master of Science, and Doctor of Philosophy in Pharmaceutical Sciences. The School of Nursing offers a Bachelor of Science in Nursing and Doctor of Nursing Practice. The Department of Allied Sciences offers a Bachelor of Science with majors in respiratory care, medical laboratory science, and radiologic sciences, and the Department of Public Health offers a Master of Public Health. The College of Health Professions is a small subset of NDSU's student population. According to the *NDSU College of Health Professions (CHP) Profile* (n.d.), more than 2,000 students are enrolled in pre-professional, professional, and graduate programs (about 14% of the total university student population). The School of Pharmacy is comprised of 700 students; the School of Nursing has 865 students; the Department of Allied Sciences has 317 students, and the remaining student population consists of approximately 113 graduate students (*NDSU College of Health Professions (CHP) Profile*, n.d.).

NDSU's School of Pharmacy, School of Nursing, and Department of Allied Sciences offer pre-professional programs for students who are interested in applying to professional programs. Each pre-professional curriculum is open to all high-school graduates and college-

transfer students who have not completed the requirements to enter the professional programs. To enter the pre-professional pharmacy, nursing, or allied science programs, students must qualify for and obtain admission to NDSU. Once a student has completed all necessary courses for admission to his/her program of interest, he/she can apply to the program. Each pre-professional major has different admission requirements and is limited to a select number of students.

The academic standards for the College of Health Professions are slightly different from the university's general requirements. The College of Health Professions has different expectations for semester GPAs and minimum grade-point requirements. As stated in the *Pharmacy handbook 2015-2016* (2015), the *Department of Allied Sciences handbook 2015-2016* (2014) and the *Undergraduate nursing handbook 2015-2016* (2015), any student who fails to meet or exceed a semester GPA of 2.0 may be placed on college warning or probation. Students who have been placed on academic warning or probation for two consecutive or three non-consecutive semesters shall be suspended from enrollment in the college. After two suspensions, students will be terminated from the college. The college standards require a 2.00 GPA; each program may have stricter admission requirements. The pre-professional pharmacy program requires a minimum 3.00 GPA, and pre-professional nursing requires a 2.75 GPA; the pre-professional allied science programs require a minimum 2.0 GPA. In addition to GPA requirements, students must also meet minimum grade requirements. As stated in the *Pharmacy handbook 2015-2016* (2015), the *Department of Allied Sciences handbook 2015-2016* (2014), and the *Undergraduate nursing handbook 2015-2016* (2015), to be in good academic standing within the college, students enrolled in the professional programs must complete all required courses within the college with a grade of C or higher.

The NDSU standards mentioned previously are similar to the standards found at many U.S. institutions. It is worth noting that, in a survey of 451 allied-health programs, Dietrich and Crowley (1982) found little consistency regarding admission criteria and program-selection procedures. The predictor variable that is typically used for admission to professional programs is the overall undergraduate GPA. It is clear that pre-admission GPA and academic grades predict subsequent in-course academic performance for professional disciplines (Foti & DeYoung, 1991; Hansen & Pozehl, 1995; Holt & Dunlevy, 1992; Scott & Markert, 1994; Tompkins & Harkins, 1990). Holt and Dunlevy (1992) report a coefficient of 0.76 between pre-admission GPA and program GPA. Similarly, the pre-admission science GPA is also a good predictor of academic performance (Holt & Dunlevy, 1992).

Pre-professional students also need to note the course repeat policies for each department. Course repeat standards for the pre-professional pharmacy and pre-professional nursing programs limit the total number of core courses that may be repeated by students to three. A core course is one that is included in the GPA for admission purposes. The grade received during a student's final attempt will be used for evaluation, a withdrawal is not an attempt.

The School of Pharmacy's Selective Admissions

The level of competitiveness among the professional programs is fairly high on NDSU's campus, especially for the School of Pharmacy. The number of students admitted to the pharmacy program and the required GPA have remained steady during the past 10 years. Annually, the College of Health Professions admits up to 85 students to the pharmacy professional program (K. Haugen, personal communication, October 16, 2015). Students who apply to the School of Pharmacy must maintain a GPA of 3.00 or higher in addition to a grade of at least a C for all pre-professional pharmacy coursework. Appendix B provides an overview for

the pre-professional pharmacy courses that are required before starting the professional program. Students who do not attain a letter grade of C are required to repeat the course. The program only allows three core-course repeats. Figure 2 outlines the programs core courses. These classes must be completed by the end of the fall semester before the December 31 deadline in order to apply to the pharmacy program. The remaining pre-professional pharmacy courses must be completed by the end of the spring term after applying. The course requirements have also remained similar over the past 10 years. One major curriculum adjustment was made in Fall 2011 when Biochemistry I and II moved from the professional program to the pre-professional program. In addition to coursework, students must take the PCAT (*Pharmacy handbook 2015-2016*, 2015). The pharmacy (Pharm.D.) class entering the program for Fall 2015 maintained a core GPA above 3.40 and had a PCAT score of 61% (K. Haugen, personal communication, October 16, 2015).

Core Pre-Pharmacy Coures

Subject	Course #	Course Title	Credits
BIOC	460	Biochemistry I	3
BIOL	150	General Biology I	3
BIOL	150L	General Biology I Lab	1
BIOL	220	Human Ant. & Phys I	3
BIOL	220L	Human Ant. & Phys I Lab	1
COMM	110	Fundamentals of Public Speaking	3
COMM	216	Intercultural Communication	3
CHEM	121	General Chemistry I	3
CHEM	122	General Chemistry II	3
CHEM	341	Organic Chemistry I	3
CHEM	342	Organic Chemistry II	3
ECON	201	Microeconomics	3
ENGL	120	Composition II	3
MATH	146	Applied Calculus I	4
MICR	202	Introductory Microbiology	2
MICR	202L	Introductory Microbiology Lab	1
STAT	330	Introduction to Statistics	3

Figure 2. Core Pre-Professional Pharmacy Courses.

The School of Nursing's Selective Admissions

Similar to the pharmacy program, the NDSU nursing program is also very competitive. The nursing program currently admits students twice a year (fall and spring semesters), annually admitting 176 students (96 in Fargo, ND, and 80 in Bismarck, ND; K. Kotula, personal communication, October 16, 2015). Before Fall 2014, the nursing program in Fargo, ND admitted students (64 total) during the fall term.

The NDSU nursing program requires a minimum cumulative GPA of 2.75 for all students who apply. According to previous NDSU bulletins, the minimum cumulative GPA requirement has changed during the last year. During the period from 2010-2014, the minimum GPA requirement was 3.00. According to one source, the change to the cumulative GPA minimum occurred after NDSU acquired a group of nursing students from the Sanford School of Nursing in Bismarck, ND (K. Kotula, personal communication, October 16, 2015). In addition, to the cumulative GPA change, there is no longer a minimum selective GPA. Previously (from 2010-2014), the minimum selective GPA was 3.00. According to one source, while the minimum cumulative GPA is 2.75, the average cumulative GPA is around 3.50 to 4.00. Even though the college no longer requires a minimum selective GPA, the selective GPA can range between 3.80 and 4.00 (K. Kotula, personal communication, October 16, 2015).

As stated in the *Undergraduate nursing handbook 2015-2016* (2015), prerequisite coursework must be completed before applying for program admission. Figure 3 indicates the prerequisite courses used during the admission process (as of 2015). The required courses include English Communication II (ENLG 120), Fundamentals of Public Speaking (COMM 110), Introduction to Psychology (PSYC 111), and Introduction to Sociology (SOC 110) or Introduction to Anthropology (ANTH 111). The required courses also include a minimum of

eight science credits. The science credits must be from the science coursework required by the program (refer to Figure 3). Before 2015, students who enrolled at the Fargo location were required to have 11 credits; now, preference is given to individuals who have 11. The highest grades obtained for the science courses will factor into the admission decision. A grade of at least a C must be earned for each course. Similar to the School of Pharmacy, students who do not receive letter grades of C or above for core coursework must retake classes. Additionally, students are only allowed three core-course repeats (*Undergraduate nursing handbook 2015-2016*, 2015).

Pre-requisite Nursing Coures

Subject	Course #	Course Title	Credits
BIOL	220	Human Ant. & Phys I	3
BIOL	220L	Human Ant. & Phys I Lab	1
BIOL	221	Human Ant. & Phys II	3
BIOL	221L	Human Ant. & Phys II Lab	1
COMM	110	Fundamentals of Public Speaking	3
CHEM	117	Chemical Concepts	3
CHEM	117L	Chemical Concepts Lab	1
CHEM	260	Elements of Biochemistry	4
ENGL	120	Composition II	3
MICR	202	Introductory Microbiology	2
MICR	202L	Introductory Microbiology Lab	1
SOC	110	Introductory to Sociology (OR)	3
ANTH	111	Introduction to Anthropology	

Figure 3. Pre-Requisite Nursing Courses.

The Department of Allied Sciences' Selective Admissions

The admission process for each professional program in the Department of Allied Science varies depending upon the major. Each pre-professional program works with a hospital internship affiliate, limiting the number of students that may be accepted. The hospital internship affiliate establishes specific admission criteria, typically including academic performance, an essay, references, interviews, related experience, and background checks.

Similar to the pre-professional nursing and pre-professional pharmacy programs, students in medical laboratory science also need to compete for a seat in the program. According to the department director, the medical laboratory science (MLS) program works with seven hospital internship affiliates in four states (North Dakota, Iowa, Colorado, and Nebraska). Each hospital internship affiliate has specific application criteria; the majority of them expect a GPA above 2.50 to 2.80, grades of C or higher in major courses, and courses in chemistry and biology. Figure 4 provides a sample program plan and lists the courses required before the internship. Students should possess lab-related work experience; good interview skills and references; and steady coursework progression without concerning patterns of final letter grades: D's, F's, or withdraws. The coursework required for the program has remained relatively similar over the past 10 years. The 2014-2015 internship admission rate for MLS was 14 of 25 applicants (56%). On average, 59% of students receive acceptance to affiliate programs. The average cumulative GPA is 3.46, and the average science GPA is 3.45 (P. Olson, personal communication, September 3, 2015).

Medical Laboratory Science Sample Curriculum

First Year	Fall	Spring
ENGL 110, 120- College Composition I, II	3	3
CHEM 121, 121L- Gen. Chemistry I, Lab	4	
BIOL 150,150L- General Biology I, Lab	4	
MATH 103- College Algebra	3	
UNIV 189- Skills of Academic Success	4	
CSCI 114- Microcomputer Packages		3
CHEM 122, 122L- Gen. Chemistry II, Lab		4
COMM 110- Found. of Public Speaking		3
Wellness Elective		2
Totals	**15**	**15**

Second Year		
CHEM 341, 341L- Organic Chem. I, Lab	4	
MICR 350, 350L- Gen. Micro., Lab	5	
BIOL 220, 220L- Human Anat. & Phys I, Lab	4	
MLS 111- Intro to Medical Lab Sciences	1	
General Education Electives	6	
CHEM 342- Organic Chem. II		3
BIOL 221, 221L- Human Anat. & Phys II, Lab		4
MICR 460, 460L- Pathogenic Mircro, Lab		5
MICR 470 Immunology		3
Totals	**16**	**15**

Third Year	Fall	Spring	Summer
BIOL 315, 315L- Genetics, Lab	4		
BIOC 460, 460L- Fnd Biochem/Molc Bio I, Lab	4		
MICR 471- Immunology Lab	2		
STAT 330- Introductory Statistics	3		
General Education Elective	3		
MICR 463- Clinical Parasitology		2	
MLS 435- Hematology		2	
General Education Electives		6	
ENGL 315- Writing in Health Prof.		3	
Totals	**16**	**13**	

Fourth Year			
MLS 496- Field Experience/Internshi	12	12	6
Totals	**12**	**12**	**6**

Notes:
This is a sample curriculum, other variations are possible.

All courses must be completed prior to the start of an internship.

Figure 4. Medical Laboratory Science Sample Curriculum.

Additional selective-admission challenges exist for the respiratory care (RC) program. According to its director, the program collaborates with one hospital internship-affiliate location, offering 12 seats annually. The minimum GPA is 2.50, and the core course minimum GPA is also 2.50, remaining consistent over the past 10 years. Students must complete all pre-requisite courses with a C or higher. Figure 5 provides a sample program plan with a listing of courses required before the internship. The coursework required for the program has remained relatively similar over the past 10 years. Students complete a majority of pre-requisite courses before applying, and individuals must possess good interview skills, references, and evidence of career motivation. In 2014-2015, the internship admission rate for RC was 10 of 11 (91%); however, on average, the program admits 84% of the students who apply. The average cumulative GPA for admittance is 3.17 with the core-science GPAs at 2.96 (P. Olson, personal communication, September 3, 2015).

Respiratory Care Sample Curriculum

First Year	Fall	Spring
ENGL 110, 120- College Composition I, II	3	3
MATH 103- College Algebra	3	
PSYC 111- Intro to Psychology	3	
UNIV 189- Skills of Academic Success	1	
CSCI 114- Microcomputer Packages	3	
CHEM 121, 121L- Gen. Chemistry I, Lab	4	
CHEM 122, 122L- Gen. Chemistry II, Lab		4
MICR 202, MICR 202L- Intro Micro, Lab		3
General Education Electives		6
Wellness Elective		2
Totals	17	18

Second Year		
CHEM 240- Survey of Organic Chem	3	
RC 111- Intro Respiratory Care	1	
COMM 110- Found. of Public Speaking	3	
STAT 330- Introductory Statistics	3	
General Education Electives	3	
BIOL 220, 220L- Human Anat. & Phys I, Lab	4	
BIOL 221, 221L- Human Anat. & Phys II, Lab		4
CHEM 260- Elements of Biochemistry		4
PHYS 120- Fund. Of Physics		3
HNES 210- First Aid & CPR		2
Special Elective (Dept. Approved)		3
PHRM 125- Medical Terminology		1
Totals	17	17

Third Year	Fall	Spring	Summer
RC 496- Internship	15	15	13
Totals	**15**	**15**	13

Fourth Year		
RC 496- Intership	8	
ENGL 325- Writing for Health Prof.	3	
Special Elective (Dept. Approved)	3	
RC 494- Individual Study	4	
General Education Electives		
Totals	**18**	**0**

Notes:

This is a sample curriculum, other variations are possible.

The internship is 15 months, including one summer session.

Figure 5. Respiratory Care Sample Curriculum.

Finally, similar to other professional programs at NDSU, the radiologic science (RS) program has admission challenges as well. According to the department director, the program has hospital internship affiliates with 10 locations in 4 states (North Dakota, South Dakota, Minnesota, and Iowa). Each hospital internship affiliate has specific application criteria; the majority expect a GPA between 2.50 and 3.00. Students should possess patient-care related experience, have completed the pre-requisites, possess good interview skills, have previous job-shadowing experience, and have good references. Figure 6 provides a sample program plan with a listing of the courses required before the internship. The coursework required for the program has remained relatively similar over the past 10 years. In 2014-2015, the internship admission rate for RS was 25 of 34 applicants (74%); however, the average acceptance rate is 76%. The average cumulative GPA is 3.43, and the average core-science GPA is 3.23 (P. Olson, personal communication, September 3, 2015).

Radiologic Sciences Sample Curriculum

First Year	Fall	Spring
ENGL 110, 120- College Composition I, II	3	3
PSYC 111- Intro to Psychology	3	
CHEM 117, 117L- Chem Concepts, Lab	4	
UNIV 189- Skills of Academic Success	1	
CSCI 114- Microcomputer Packages	3	
Wellness Elective	2	
MATH 105- Trigonometry		3
MICR 202, 202L- Intro Micro, Lab		3
General Education Electives		3
CHEM 260- Elements of Biochemistry		4
Totals	16	16

Second Year		
RS 111- Intro Radiologic Sciences	1	
COMM 110- Found. of Public Speaking	3	
BIOL 220, 220L- Human Anat. & Phys I, Lab	4	
PHYS 211, 211L- College Physics I, Lab	4	
Special Elective (Dept. Approved)	3	
General Education Electives	3	3
BIOL 221, 221L- Human Anat. & Phys II, Lab		4
PHYS 212, 212L- College Physics II, Lab		4
STAT 330- Introductory Statistics		3
PHRM 170- Common Medicines & Diseases		2
PHRM 125- Medical Terminology		1
Totals	18	17

Third Year	Fall	Spring	Summer
Special Elective (Dept. Approved)		3	
RS 496- Intership	12	12	6
ENGL 325- Writing for Health Prof.			3
Totals	12	15	9

Fourth Year			
RC 496- Internship	12	12	6
Totals	12	12	6

Notes:
This is a sample curriculum, other variations are possible.

Figure 6. Radiology Sciences Sample Curriculum.

English and Math Readiness

English composition and college mathematics are two subjects that are taught at most colleges and universities. Both English composition and college mathematics are also often required for many programs (majors) offered at four-year institutions of higher education. Students are often placed in English and math courses based on previous entrance exams or experience. Each institution has distinct measurements; however, ACT and SAT scores are the most often-used admissions criteria. Additionally, many colleges and universities use ACT/SAT scores to determine admittance to the institution. For some institutions, the ACT sub-test scores are used to place students into the appropriate math and English courses. At NDSU, ACT/SAT scores are used both for admittance and for English and math placement. It is important to note that the submission of ACT/SAT scores is required for all incoming first-time freshmen but is not required for all students. In accordance with the North Dakota University System (NDUS) policy, the following students are exempt from submitting ACT/SAT scores: (a) students age 25 or older on the first day of class, (b) students from foreign countries other than Canada, (c) students transferring 24 or more semester credits. Campuses may require additional placement qualifications of these subgroups (*402.1.2 Student placement into college courses*, 2015).

Under Policy *402.1.2 Student placement into college courses* (2015), the following placement scores are required for admission to College Composition I (ENGL 110). Students with ACT English sub-test scores of 14-17, or approved equivalents, may take ENGL 110 if co-enrolled in a developmental English course when a co-enrollment option is made available by the student's home campus or after they have passed a developmental writing course with a grade equivalent of C or higher. Students with an English sub-test score less than 14 must complete a developmental course before taking ENGL 110. NDSU places students with an ACT sub-test

score of 18 or higher (or a SAT of 430 or higher) into College Composition II (ENGL 120). Upon completion of ENGL 120 with a C grade or higher, students will be awarded placement credit for ENGL 110. Furthermore, under Policy 402.1.2, an ACT math sub-test score of 21 (or higher) is required for a student to enroll in College Algebra (MATH 103). Students without qualifying assessment scores must successfully complete (letter grade of C of higher) a developmental math course before enrolling in a non-developmental math course (*401.1.2 Student*, 2015).

While ACT and SAT scores are used for college admission, they are not directly used in the admission selection for pre-professional programs in College of Health Professions. The sub-scores are used for English and math placement. Knowledge of basic math is essential for students who are interested in professional health majors in NDSU's College of Health Professions. Often, math courses (as well as preparatory science courses) provide foundational knowledge for pharmacy, nursing, and allied-science professional courses. Students interested in the College of Health Professions' programs need foundational knowledge about college algebra for the rigorous curriculum. College Algebra is a pre-requisite, or co-requisite, course for NDSU's CHEM 117 (Chemical Concepts and Application) and CHEM 121 (General Chemistry I) courses. College Algebra is also a pre-requisite for MATH 105 (Trigonometry), MATH 146 (Applied Calculus), and STAT 330 (Introduction to Statistics). It is important to note that MATH 105 is a pre-requisite for PHYS 211 (College Physics I), which is required for some pre-professional programs. Without college-algebra knowledge, students interested in the pre-professional programs would lack the foundational skills to be successful. Basic mathematic proficiencies are often the gatekeeper for pre-professional programs, requiring students to have

knowledge in MATH 103 to get through the program (D. Friesner, personal communication, October 20, 2015).

A sample pre-professional pharmacy curriculum (Appendix B) offers an overview of the courses required for admission to the professional pharmacy program. In the first semester, students are expected to take MATH 146 and CHEM 121. In order to take these courses, students need to have previously completed/have one of the following: (a) MATH 98 or higher, (b) a high enough ACT/SAT score, or (c) a combination of a high ACT/SAT score and a high COMPASS/math-placement score. Radiologic sciences (RS) is another example where MATH 103 is required during the first semester. A sample curriculum for the RS program (Figure 6) indicates that MATH 105 and CHEM 117 should be taken during the first year of the pre-professional program. Nursing also requires CHEM 117 for admission to the professional program (Figure 3), and this class is often completed during the first semester of coursework. All of these curricula are samples, and it is important to note that, when students do not follow the sample curriculum, they may take longer to gain admission to the professional program and graduate.

ACT/SAT scores can place students into remedial math and English courses. Often, remedial coursework is viewed negatively in higher education. Students who require developmental coursework are significantly less likely to finish college than the students who do not require such assistance (Abraham, Slate, Saxon, & Barnes, 2014). According to the College of Health Professions Associate Dean for Student Affairs and Faculty Development, if students do not meet the requirements to enroll in ENGL 120 or MATH 103 during their first semester, it will take longer to complete the core coursework that is required for admission to the professional program. Not having the knowledge of previous coursework often increases the

length of time in the pre-professional program and the length of time on campus. MATH 103 is a pre- or co-requisite for introductory chemistry courses, and subsequent math courses may be required for pre-professional programs, creating a delay in program completion for students. Individuals who need to take Intermediate Algebra (MATH 98), remedial math at NDSU, are least a semester behind students starting with the knowledge of MATH 98. ENGL 120 is required for all pre-professional programs, and students who place into English Composition I and Writing Lab (ENGL 100/110) further extend their stay at the university and in the pre-professional program. Students requiring College Writing Prep (ASC 87) are an additional semester behind students in ENGL 100/110. By extending their time in the program, the likelihood of students' completion is diminished (D. Friesner, personal communication, October 20, 2015).

Previous College Experience

In addition to math and English readiness, early research studies have identified transfer student GPAs as a factor in the pre-transfer characteristics that influence academic success (persistence and degree completion) and provide an indication of future success (Cejda et al., 1998). According to Graham and Hughes (1994), Underwood (1998), and Glass and Harrington (2002), community-college students' GPAs have predictive value for the future first, second, and fourth semester GPAs at four-year institutions. In fact, later research studies on transfer patterns in the 1990s verify that community-college GPAs are good predictors of the transfer students' future GPAs at four-year institutions (Glass & Harrington, 2002). Community-college GPA is also the strongest predictor for transfer students completing their bachelor's degree (Roorda, 2006). Furthermore, early studies have proven that academic performance is the strongest predictor of degree attainment (Wang, 2009). Students who are transferring with a GPA of 3.00,

as compared to students transferring with a 2.00 GPA, are less likely to depart from the institution (Ishitani, 2008). Hartman et al. (2009) point out that Ishitani (2008) supported Dickerson's early research that reports that transfer GPAs, among other factors, are predictors of transfer students' likelihood to obtain a degree. Noting the GPA influence on bachelor's degree completion is important because community colleges are typical gateways for students transferring to a four-year institution (Hartman et al., 2009).

For transfer students seeking admission to a pre-professional program, previous course completion can be an admission barrier for some students. As noted earlier, the College of Health Professions' programs have repeat policies, grade requirements, and selective GPA standards. Students wishing to transfer need to be aware of these policies, requirements, and standards; depending on previous experience, students may delay acceptance into their program of choice.

Through personal communication with Dr. Daniel Friesner (October 20, 2015), this researcher was able to gather information about why the College of Health Professions uses these standards when working with students who are interested in NDSU's professional programs. The repeat policy exists for two reasons; one, students often try to use repeats to their advantage, and two, it prevents a delay in graduation. Students often try and transfer to other colleges to get through courses with a better grade by repeating courses multiple times. However, studies have indicated that, when students try to repeat classes more than once, they are less likely to improve their overall course grade. Additionally, when students repeat a course multiple times, they are extending admittance to the program and delaying graduation. Statistically speaking, the odds are not in the students' favor if they continue to repeat courses multiple times. Utilizing a GPA of 3.00 for pre-professional pharmacy students prepares them to maintain the GPA once admitted to

the professional program. The professional program teaches graduate-level courses to students, thus requiring a 3.00 minimum cumulative GPA. Nursing utilizes a 2.75 GPA based on similar standards that are seen locally and nationally. Requiring courses with grades of C or higher relates to philosophical principles that A's are considered well above average, B's are above average, C's are average, D's are below average, and F's are failing grades. To pass state examination boards, students should be at an average level of ability (C grades or higher).

Each pre-professional program in the College of Health Professions requires high standards from each student academically, personally, and professionally. The rigor of academic standards, conduct standards, technical standards, and general policies have prevented many students from not only entering, but also completing their desired program within NDSU's College of Health Professionals. Because of the pre-professional and professional program requirements, evaluating college readiness and previous course experience can, perhaps, determine the statistical likelihood of transfer-student outcomes for professional programs in the College of Health Professions.

Persistence and Degree Completion Outcomes

As students continue to transfer to new schools in order to find the right fit, higher-education institutions are trying to figure out how to help transfer students complete their educational goals. Government officials, students, parents, and taxpayers are looking for results (degree completion), and they want to know how higher-education institutions are spending money. The federal government and President Barak Obama have been issuing new policies for states and institutions as a means to encourage states to increase overall degree completion. Harbour and Smith (2015) summarize the Completion Agenda, noting three parts. The first part informs the public that the American Dream is drifting from reach and that the median family

income and social mobility are stalled. In 1931, James Truslow Adams stated that the American Dream is "that dream of a land in which life should be better and richer and fuller for everyone, with opportunity for each according to ability or achievement." (Adams, 1931, p. 214). Part two identifies that U.S. economic growth is not keeping pace with the rest of the world. The third part asserts that an educated workforce is the answer to economic recovery and the preservation of American democracy (Harbour & Smith, 2015). To meet the workforce demands, individual states and higher-education institutions need to develop diverse activities to increase the number of individuals with postsecondary degrees (U.S. Department of Education, 2011). Government predictions claim that more than half of all new jobs will require a postsecondary education. In response, institutions are investing time, money, energy, and resources to increase the number of degrees awarded and spending less on learning outcomes (Rassen, Chaplot, Jenkins, & Johnstone, 2013).

The College Completion Agenda creates a new level of pressure for higher-education institutions. Some U.S. institutions have very low degree-completion rates and are concerned about performing at appropriate levels set by the government. According to Shapiro et al. (2014), the average completion rate for students attending public, four-year institutions is 63% (including transfers). Nevada, Utah, and Idaho struggle the most with 6-year degree-attainment rates for students who started at four-year public institutions (28.3%, 39.2%, and 41.2%, respectively), whereas Iowa, Virginia, and New Hampshire have some of the highest 4-year completion rates (79.8%, 77.8%, and 77.7%, respectively; Shapiro et al., 2014). Furthermore, degree-completion rates at public, two-year institutions are significantly lower than completion rates for four-year institutions. According to Shapiro et al. (2014), the completion rate for students attending two-year institutions in the United States is approximately 40% (including

transfers). States with lower completion rates include Indiana, California, and Connecticut (20%, 30%, and 32%, respectively), and states performing at the high end of the spectrum include North Dakota, Minnesota, and Florida (62%, 53%, and 52.8%, respectively; Shapiro et al., 2014).

According to the U.S. Department of Education (2011), there are seven strategies available for states to utilize when achieving the national metrics: (a) setting completion goals, developing an action plan, (b) embracing performance-based funding, (c) aligning high-school standards with college-entrance and placement standards, (d) making it easier for students to transfer, (e) using data to drive decision making, (f) accelerating students' learning and reducing costs, and (g) targeting adults. Emphasizing the strategy to make it easier for students to transfer provides more institutional assistance to transfer students. The government understands that many post-secondary students attend more than two institutions before obtaining a bachelor's degree. Student transition is often complicated, especially with transfer credits. If schools have smooth transition processes for students, it increases the likelihood of students completing their degree. Suggestions to provide smoother transitions include articulation agreements, higher education common core curriculums, and easy-to-understand transfer policies (U.S. Department of Education, 2011).

In addition to the national College Completion Agenda, some states developed degree-completion plans. Completion by Design (sponsored by the Bill & Melinda Gates Foundation) focused on community-college (CC) students in Florida, North Carolina, and Ohio by increasing degree completions, transferring to four-year institutions, and raising the value of CC degrees in the labor market (Rassen et al., 2013). Approximately 72% of students with a 2-year credential graduated with a baccalaureate degree in 6 years, and 56% without a 2-year credential received a

baccalaureate degree (Shapiro et al., 2013). Furthermore, Wang (2009) discovered that nearly 63% of students transferring from community colleges attain a bachelor's degree within 8 years of enrolling. "The odds of attaining a bachelor's degree is also significantly predicted by students' high school curriculum track and baccalaureate aspirations" (p. 579). Additionally, factors such as remediation in math, college involvement, and community-college GPA were significant predictors of baccalaureate attainment. High transfer GPAs were also associated with increased chances of earning a bachelor's degree. A one-point increase in GPA related to higher odds of earning a bachelor's degree by a factor of 3.029 (Wang, 2009). In contrast, about 60% of the students who start at a four-year institution will complete in 6 years (Shapiro et al., 2012).

While government officials and policymakers contend that the only measurement of student success is degree completion, academic officials want the public to consider learning outcomes. Educators should want to empower and prepare students for richer lives, not just to satisfy the national economic outcomes (Harbour & Smith, 2015). More emphasis should be on promoting strategies to improve student learning. According to Harbour and Smith (2015), critics question whether Completion Agenda strategies will increase graduation rates. Furthermore, critics argue that a focus on student completion, as opposed to student learning, is short-sighted (Harbour & Smith, 2015).

Both government and academic officials recognize the need for degree completion. The record number of students who fail to finish a degree is astounding. The need for degree completion is just as important as the need for learning outcomes. Unfortunately, it is much easier to measure degree completion than it is to measure student-learning outcomes. The focus on degree completion will continue as long the number of students completing college degrees remains the same. The statistics covered about student transfers display the magnitude of transfer

completion as well as indicating the importance of making transfer-student success a central focus at four-year institutions.

Summary

In conclusion, transfer students are a highly researched group and represent a large portion of the students attending four-year institutions of higher education. As emphasized by multiple articles on transfer and student mobility, thousands of students are transferring from institution to institution in the United States. Notably, over 1.6 million students transferred from 2008-2014, with over 800,000 of those students transferring more than once (Shapiro et al., 2015).

It is likely that the number of students transferring will continue to rise. As students transfer from one institution to another, there are many risk factors, or barriers, that may prevent transfer students from successfully graduating from four-year institutions. Often, barriers such as aptitude, environmental changes, or financial constraints limit students from completing their degree. Furthermore, once students are admitted to four-year institutions, some face additional outside forces, such as selective-admission standards, that potentially prevent degree completion. These barriers can make it more difficult for students to persist and to complete their degree.

Rising concern from government leaders, academic officials, and the general public about the need for degree completion has intensified the examination of students' degree completion as well as transfers' degree completion. However, there is an opportunity to understand how variables such as selective admission and student persistence may relate to one another in order to develop clear and logical theories about processes that influence degree completion among students who are interested in professional health majors. By breaking apart other factors that

could be affecting the degree-completion outcome, higher-education institutions may be able to define the potential indirect and direct variables of concern.

CHAPTER 3. RESEARCH METHODOLOGY

The purpose of this study was to examine, compare, and analyze factors that influence the levels of persistence and completion for first-time transfer and swirling transfer students enrolled in pre-professional health majors at NDSU. The study originated from the researcher's experience and observations of transfer students in numerous capacities, most recently as an academic adviser for NDSU's College of Health Professions. Throughout the following chapter, the Research Design is explained; the population and sample are described; and the plan for Data Collection and Analysis is provided.

Research Design

The research design for the study sought to answer the following research questions:

1. What factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students starting in pre-professional health majors?
2. What are the relationships between selectivity metrics and persistence for transfer students starting in pre-professional health majors?
3. What are the relationships between selectivity metrics and degree-completion for transfer students starting in pre-professional health majors?

The study involved a quantitative research method using a non-experimental correlational design. For this study, a convenience sample of undergraduate transfer students was selected from the NDSU student records system. Students were selected based on their program of interest at the time of enrollment between the Fall 2006 and Fall 2014 semesters. The sample consisted of 887 students who declared pre-professional pharmacy, pre-professional nursing, pre-professional radiologic science, pre-professional medical laboratory science, and pre-professional respiratory care as their major. The following correlates were examined: (a) transfer

type and selectivity metrics, (b) transfer type and persistence, (c) transfer type and degree completion outcomes, (d) selectivity metrics and persistence, (e) selectivity metrics and degree-completion outcome, and (f) persistence and degree-completion outcome.

The following selectivity metrics (variables examined during the admission process) were examined: (a) English readiness, (b) math readiness, (c) transfer GPA, (d) number of course repeats, and (e) number of course failures. English and math readiness required students from the sample to have the ability to enroll ENGL 120 (English Composition II) and MATH 103 (College Algebra). The researcher determined English and math readiness using recorded transfer coursework and ACT scores. All other selective metrics were examined using recorded data collected from the Office of Registration and Records

In addition to selectivity metrics, the researcher evaluated student persistence using the following outcomes: (a) the student was admitted to his/her program of choice, (b) the student enrolled in another program on campus, or (c) the student experienced no change. The researcher also determined the following degree-completion outcomes: (a) the student graduated from the professional program of choice, (b) the student graduated from another program at NDSU, or (c) the student left the institution.

Population and Sampling

All collected data were obtained from NDSU's Office of Registration and Records. The student population included all undergraduate transfer students admitted from the Fall 2006 through Fall 2014 semesters at NDSU (n = 887). All transfer students, regardless of age, gender, and ethnicity, were included for the study. Students who were not considered a transfer student by the institution were excluded from the study.

A convenience sample was utilized to select participant data. With convenience sampling, the researcher selected participants based on the availability (Creswell, 2007). The sample population included all transfer students who previously attended at least one institution (first-time transfers; $n = 349$) as well as students who attended two or more institutions (swirling transfer; $n = 538$), post high school, before attending NDSU. The sample population included all transfer-student admits from Fall 2006 through Summer 2014, regardless of age, gender, and ethnicity. The researcher only selected students who declared majors of pre-professional pharmacy, pre-professional nursing, pre-professional medical lab sciences, pre-professional radiologic sciences, and pre-professional respiratory sciences at any point in their NDSU studies.

Data Collection and Analysis

Before conducting the study, a request to review NDSU student data was approved by the Institutional Review Board (IRB; Appendix A). All examined and collected data were obtained from the student information system in NDSU's Office of Registration and Records; students were not actively involved with this study. All student identification information was re-coded and remained anonymous to the researcher at all times.

For this study, the exploratory data analysis used several statistical methods. A point-biserial correlation was used to show the correlation between dichotomous and numerical variables, and a Chi-squared test was used to measure the existence of a relationship between two nominal variables. Additionally, the researcher utilized Cramer's V to show the correlation between two nominal-level variables. Finally, conditional means were examined for the relationship between a categorical variable and a numerical variable. For each statistical method, the following relationships were examined: (a) transfer type and selectivity metrics, (b) transfer

type and persistence, (c) selectivity metrics and persistence, (d) selectivity metrics and degree-completion outcome, and (e) persistence and degree-completion outcome.

CHAPTER 4. FINDINGS

In this chapter, the researcher reports the findings from the data analysis described in Chapter 3. The chapter reviews Demographics, provides Quantitative Results for each relationship examined, answers the research questions in numerical order, and discusses the limitations. The results are discussed in Chapter 5.

Demographics

In total, data about 887 undergraduate transfer students from NDSU's College of Health Professions were used for this study. The final sample consisted of 349 (39.3%) first-time transfer and 538 (60.7%) swirling transfer students. The initial program of study indicated that 357 (40.2%) students declared pre-professional nursing, 226 (25.5%) students declared pre-professional pharmacy, 110 (12.4%) students declared non-College of Health Professions programs, 97 (10.9%) students declared pre-professional radiologic sciences, 58 (6.5%) students declared pre-professional medical laboratory sciences, and 39 (4.4%) students declared pre-professional respiratory care. On average, 35 transfer students in these academic programs enrolled at NDSU each semester from Fall 2006 through 2014. The average number of transfer-student admits indicated larger enrollment numbers during the fall semesters: fall n = 59, spring n = 33, and summer n = 11.

Quantitative Results

Relationship Between Transfer Type and Selectivity Metrics

The relationship between the transfer type (first-time or swirling) and the selectivity metrics (transfer GPA, math readiness, English readiness, number of course repeats from previous institutions, and number of course failures from previous institutions) indicated that four of the five selectivity metrics had a significant bivariate relationship with transfer type. The

point-biserial correlation was not significant for the relationship between transfer type and transfer GPA, $r_{pb} = .0632$ ($p = .0601$). Furthermore, the conditional means of the relationship between transfer type and transfer GPA were not significant, $t\ (885) = 1.8826$ ($p = .0601$). Although the point-biserial correlation was deemed insignificant, it is worth recognizing the *p* value is slightly above .05. This could indicate that given a slight change in values, the relationship could be significant. Table 1 illustrates the mean transfer GPAs for each transfer type.

Table 1

Mean transfer GPA for each transfer type

Transfer Type	Mean Transfer GPA
First-time transfer	2.992
Swirling transfer	3.088
Overall	3.050

English readiness (ability to enroll in ENGL 120 College Composition II) for the transfer types indicated that the Chi-squared test was significant, $\chi^2\ (1) = 25.6240$ ($p < .001$), Cramer's $V = .1700$. Table 2 shows the contingency table for English readiness and each transfer type.

Table 2

English readiness for each transfer type

Transfer Type	English Readiness		
	Unable to Enroll in ENGL 120	Able to Enroll in ENGL 120	Total
First-time transfer	50	299	349
	(14.3%)	(85.7%)	(100.0%)
Swirling transfer	25	513	538
	(4.6%)	(95.4%)	(100.0%)
Total	75	812	887
	(8.5%)	(91.5%)	(100.0%)

Math readiness (ability to enroll in MATH 103 College Algebra) for each transfer type showed that the Chi-squared test was significant, χ^2 (1) = 26.1715 ($p < .001$), Cramer's V = .1718. Table 3 illustrates the contingency table for math readiness and each transfer type.

Table 3

Math readiness for each transfer type

Transfer Type	Math Readiness		
	Unable to Enroll in MATH 103	Able to Enroll in MATH 103	Total
First-time transfer	108 (30.9%)	241 (69.1%)	349 (100.0%)
Swirling transfer	88 (16.4%)	450 (83.6%)	538 (100.0%)
Total	196 (22.1%)	691 (77.9%)	887 (100.0%)

The relationship between the number of course repeats (completed before transferring to NDSU) and each transfer type indicated that the Chi-squared test was not significant, χ^2 (8) = 14.4615 (p = .071), Cramer's V = .1277. The point-biserial correlation was, however, significant, r_{pb} = .1046 (p = .0018). Table 4 shows the contingency table for the number of course repeats and each transfer type. As mentioned earlier, the College of Health Professions' repeat policy (p. 28) would potentially eliminate students with more than three course repeats, depending on the students' program.

Table 4

Number of course repeats for each transfer type

Transfer Type	Number of Course Repeats									
	0	1	2	3	4	5	6	7	8	Total
First-time transfer	319 (91.4%)	16 (4.6%)	9 (2.6%)	2 (.06%)	2 (0.6%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	349 (100.0%)
Swirling transfer	447 (83.1%)	51 (9.5%)	22 (4.1%)	5 (0.9%)	4 (0.7%)	3 (0.6%)	3 (0.6%)	1 (0.2%)	2 (0.4%)	538 (100.0%)
Total	766 (84.4%)	67 (7.6%)	31 (3.5%)	7 (0.8%)	6 (0.7%)	4 (0.5%)	3 (0.3%)	1 (0.1%)	2 (0.2%)	887 (100.0%)

Finally, the number of course failures (completed at previous institutions, before transferring to NDSU) for each transfer type indicated that the Chi-squared test was not significant, χ^2 (7) = 12.1865 (p = .095), Cramer's V = .1172. Similar to the number of course repeats, the point-biserial correlation was significant, r_{pb} = .0703 (p = .0362). Table 5 illustrates the contingency table for the number of course failures and each transfer type.

Table 5

Number of course failures for each transfer type

Transfer Type	Number of Course Failures								
	0	1	2	3	4	5	6	7	Total
First-time transfer	309 (88.5%)	18 (5.2%)	11 (3.2%)	4 (1.1%)	5 (1.4%)	2 (0.6%)	0 (0.0%)	0 (0.0%)	349 (100.0%)
Swirling transfer	434 (80.7%)	54 (10.0%)	31 (5.8%)	7 (1.3%)	7 (1.3%)	3 (0.6%)	1 (0.2%)	1 (0.2%)	538 (100.0%)
Total	743 (83.8%)	72 (8.1%)	42 (4.7%)	11 (1.2%)	12 (1.4%)	5 (0.6%)	1 (0.1%)	1 (0.1%)	887 (100.0%)

Relationship between Transfer Type and Persistence

The relationship test between transfer type (first-time or swirling transfer) and persistence (admitted to College of Health Professions [CHP] major, declared non-CHP NDSU major, or major stayed the same) was done using all programs of study in the College of Health

Professions and did not represent individual programmatic results. The Chi-squared test was not significant for the relationship between transfer type and persistence, χ^2 (2) = 2.2372 (p = .327), Cramer's V = .0502. Table 6 illustrates the contingency table for transfer type and persistence.

Table 6

Level of persistence for each transfer type

Transfer Type	Persistence			
	Admitted to CHP major	Declared Non-CHP NDSU major	Major stayed the same	Total
First-time transfer	109 (31.2%)	104 (29.8%)	136 (39.0%)	349 (100.0%)
Swirling transfer	193 (35.9%)	156 (29.0%)	189 (35.1%)	538 (100.0%)
Total	302 (34.1%)	260 (29.3%)	325 (36.6%)	887 (100.0%)

Relationship Between Transfer Type and Degree-Completion Outcome

The Chi-squared test was not significant for the relationship between transfer type (first-time or swirling transfer) and degree-completion outcome (graduated from CHP major, graduated from another NDSU major, still enrolled at NDSU, left NDSU), χ^2 (3) = 1.8621 (p = .602), Cramer's V = .0458. Table 7 shows the contingency table for transfer type and degree-completion outcome.

Table 7

Degree completion outcome for each transfer type

Transfer Type	Degree-Completion Outcome				
	Graduated from CHP major	Graduated from another NDSU major	Still Enrolled at NDSU	Left NDSU	Total
First-time transfer	69 (19.8%)	33 (9.5%)	81 (23.2%)	166 (47.6%)	349 (100.0%)
Swirling transfer	121 (22.5%)	59 (11.0%)	122 (22.7%)	236 (43.9%)	538 (100.0%)
Total	190 (21.4%)	92 (10.4%)	203 (22.9%)	402 (45.3%)	887 (100.0%)

Relationship Between Selectivity Metrics and Persistence

Testing the variables of selectivity metrics (transfer GPA, math readiness, English readiness, the number of course repeats from previous institutions, and the number of course failures from previous institutions) and persistence (admitted to CHP major, declared non-CHP NDSU major, or major stayed the same) indicated that 2 of the 5 correlates had a significant bivariate relationship. The Chi-squared test was significant for the relationship between transfer-GPA group and persistence, χ^2 (8) = 45.0030 ($p < .001$), Cramer's $V = .1593$. Table 8 illustrates the contingency table for persistence and transfer GPA. Additionally, the conditional means also proved to be significant, F (2, 884) = 12.11 ($p < .001$). Table 9 shows the mean transfer GPA for each persistence level.

Table 8

Level of persistence for each transfer GPA group

Transfer GPA (groups)	Persistence			
	Admitted to CHP major	Declared Non-CHP NDSU major	No change	Total
$0.000 \leq GPA \geq 1.000$	12 (44.4%)	8 (29.6%)	7 (25.9%)	27 (100.0%)
$1.000 \leq GPA \geq 2.000$	2 (9.5%)	7 (33.3%)	12 (57.1%)	21 (100.0%)
$2.000 \leq GPA \geq 3.000$	60 (21.5%)	90 (32.3%)	129 (46.2%)	279 (100.0%)
$3.000 \leq GPA \geq 4.000$	212 (39.9%)	146 (27.5%)	173 (32.6%)	531 (100.0%)
GPA = 4.00	16 (55.2%)	9 (31.0%)	4 (13.8%)	29 (100.0%)
Total	302 (34.0%)	260 (29.3%)	325 (36.6%)	887 (100.0%)

Table 9

Mean transfer GPA for each level of persistence

Persistence Type	Mean Transfer GPA
Admitted to CHP major	3.219
Declared Non-CHP NDSU major	2.972
Major stayed the same	2.955
Overall	3.050

English readiness for each persistence type indicated that the Chi-squared test was not significant, χ^2 (2) = 1.2904 (p = .525), Cramer's V = .0381. Table 10 illustrates the contingency table for English readiness and each persistence type.

Table 10

English readiness for each persistence type

Persistence Type	English Readiness		
	Unable to Enroll in ENGL 120	Enroll in ENGL 120	Total
Admitted to CHP major	26 (34.7%)	276 (34.0%)	302 (34.0%)
Declared Non-CHP NDSU major	18 (24.0%)	242 (29.8%)	260 (29.3%)
Major stayed the same	31 (41.3%)	294 (29.3%)	325 (36.6%)
Overall	75 (100.0%)	812 (100.0%)	887 (100.0%)

Math readiness for each persistence type indicated that the Chi-squared test was not significant, χ^2 (2) = 2.0796 (p = .354), Cramer's V = .0484. Table 11 shows the contingency table for math readiness and each persistence type.

Table 11

Math readiness for each persistence type

Persistence Type	Math Readiness		
	Unable to Enroll in MATH 103	Enroll in MATH 103	Total
Admitted to CHP major	59 (30.1%)	243 (35.2%)	302 (34.0%)
Declared Non-CHP NDSU major	58 (29.6%)	202 (29.2%)	260 (29.3%)
Major stayed the same	79 (40.3%)	246 (35.6%)	325 (36.6%)
Overall	196 (100.0%)	691 (100.0%)	887 (100.0%)

The number of course repeats for each persistence type indicated that the Chi-squared test was not significant, χ^2 (16) = 18.0177 (p = .323), Cramer's V = .1008. Table 12 illustrates the contingency table for the number of course repeats and each persistence type.

Table 12

Number of course repeats for each persistence type

Number of Course Repeats	Persistence Type			
	Admitted to CHP major	Declared Non-CHP NDSU major	Major stayed the same	Overall
0	273 (35.6%)	225 (29.4%)	268 (35.0%)	766 (100.0%)
1	14 (20.9%)	23 (34.3%)	30 (44.8%)	67 (100.0%)
2	9 (29.0%)	5 (16.1%)	17 (54.8%)	31 (100.0%)
3	3 (42.9%)	2 (28.6%)	2 (28.6%)	7 (100.0%)
4	2 (33.3%)	2 (33.3%)	2 (33.3%)	6 (100.0%)
5	0 (0.0%)	2 (50.0%)	2 (50.0%)	4 (100.0%)
6	0 (0.0%)	1 (33.3%)	2 (66.7%)	3 (100.0%)
7	0 (0.0%)	0 (0.0%)	1 (100.0%)	1 (100.0%)
8	1 (50.0%)	0 (0.0%)	1 (50%)	2 (100.0%)
Total	302 (34.0%)	260 (29.3%)	325 (36.6%)	887 (100.0%)

Finally, the number of course failures for each persistence type indicated that the Chi-squared test was significant, χ^2 (14) = 38.7371 (p < .001), Cramer's V = .1478. Table 13 shows the contingency table for the number of course failures and each persistence type.

Table 13

Number of course failures for each persistence type

Number of Course Failures	Persistence Type			
	Admitted to CHP major	Declared Non-CHP NDSU major	Major stayed the same	Overall
0	282 (38.0%)	209 (28.1%)	252 (33.9%)	743 (100.0%)
1	10 (13.9%)	26 (36.1%)	36 (50.0%)	72 (100.0%)
2	7 (16.7%)	13 (31.0%)	22 (52.4%)	42 (100.0%)
3	2 (18.2%)	3 (27.3%)	6 (54.5%)	11 (100.0%)
4	1 (8.3%)	7 (58.3%)	4 (33.3%)	12 (100.0%)
5	0 (0.0%)	2 (40.0%)	3 (60.0%)	5 (100.0%)
6	0 (0.0%)	0 (0.0%)	1 (100.0%)	1 (100.0%)
7	0 (0.0%)	0 (0.0%)	1 (100.0%)	1 (100.0%)
Total	302 (34.0%)	260 (29.3%)	325 (36.6%)	887 (100.0%)

Relationship Between Selectivity Metrics and Degree-Completion Outcomes

Testing the variables for selectivity metrics (transfer GPA, math readiness, English readiness, the number of course repeats from previous institutions, and the number of course failures from previous institutions) and degree-completion outcomes (graduated from CHP major, graduated from another NDSU major, still enrolled at NDSU, left NDSU) indicated that 3 of the 5 correlates had a significant bivariate relationship. The Chi-squared test was significant for the relationship between transfer-GPA group and degree completion, χ^2 (12) = 37.4361 ($p <$ .001), Cramer's V = .1186. Table 14 shows the contingency table for degree completion and transfer-GPA groups. Additionally, conditional means also proved to be significant, F (3, 883) = 4.49 (p = .004). Table 15 illustrates the mean transfer GPA for each level of degree completion.

Table 14

Level of degree completion for each transfer GPA group

Transfer GPA (groups)	Degree Completion Outcome				
	Graduated from CHP major	Graduated from another NDSU major	Still Enrolled at NDSU	Left NDSU	Total
$0.000 \leq GPA \geq 1.000$	10 (37.0%)	2 (7.4%)	6 (22.2%)	9 (33.3%)	27 (100.0%)
$1.000 \leq GPA \geq 2.000$	1 (4.8%)	1 (4.8%)	4 (19.0%)	15 (71.4%)	21 (100.0%)
$2.000 \leq GPA \geq 3.000$	39 (14.0%)	27 (9.7%)	59 (21.1%)	154 (55.2%)	279 (100.0%)
$3.000 \leq GPA \geq 4.000$	130 (24.5%)	61 (11.5%)	124 (23.3%)	216 (40.7%)	531 (100.0%)
GPA = 4.00	10 (34.5%)	1 (3.4%)	10 (34.5%)	8 (27.6%)	29 (100.0%)
Total	190 (21.4%)	92 (10.4%)	203 (22.9%)	402 (45.3%)	887 (100.0%)

Table 15

Mean transfer GPA for each level of degree completion

Degree Completion Type	Mean Transfer GPA
Graduated from CHP major	3.161
Graduated from another NDSU major	3.108
Still enrolled at NDSU	3.115
Left NDSU	2.952
Overall	3.050

English readiness for each level of degree completion indicated that the Chi-squared test was significant, χ^2 (3) = 11.6966 (p = .008), Cramer's V = .1148. Table 16 shows the contingency table for English readiness and each level of degree completion.

Table 16

English readiness for each level of degree completion

Degree Completion Type	English Readiness		
	Unable to Enroll in ENGL 120	Able to Enroll in ENGL 120	Total
Graduated from CHP major	8 (10.7%)	182 (22.4%)	190 (21.4%)
Graduated from another NDSU major	5 (6.7%)	87 (10.7%)	92 (10.4%)
Still enrolled at NDSU	27 (36.0%)	176 (21.7%)	203 (22.9%)
Left NDSU	35 (46.7%)	367 (45.2%)	402 (45.3%)
Overall	75 (100.0%)	812 (100.0%)	887 (100.0%)

Math readiness for each level of degree completion indicated that the Chi-squared test was not significant, χ^2 (3) = 3.8320 (p = .280), Cramer's V = .0657. Table 17 illustrates the contingency table for math readiness and each level of degree completion.

Table 17

Math readiness for each level of degree completion

Degree Completion Type	Math Readiness		
	Unable to Enroll in MATH 103	Able to Enroll in MATH 103	Total
Graduated from CHP major	33 (16.8%)	157 (22.7%)	190 (21.4%)
Graduated from another NDSU major	19 (9.7%)	73 (10.6%)	92 (10.4%)
Still enrolled at NDSU	46 (23.5%)	157 (22.7%)	203 (22.9%)
Left NDSU	98 (50.0%)	304 (44.0%)	402 (45.3%)
Overall	196 (100.0%)	691 (100.0%)	887 (100.0%)

The number of course repeats for each level of degree completion indicated that the Chi-squared test was not significant χ^2 (24) = 22.1154 (p = .572), Cramer's V = .0912. Table 18 shows the contingency table for the number of course repeats and each level of degree completion.

Table 18

Number of course repeats for each persistence type

Number of Course Repeats	Degree Completion Type				
	Graduated from CHP major	Graduated from another NDSU major	Still enrolled at NDSU	Left NDSU	Overall
0	174 (22.7%)	80 (10.4%)	179 (23.4%)	333 (43.5%)	776 (100.0%)
1	9 (13.4%)	8 (11.9%)	12 (17.9%)	38 (56.7%)	67 (100.0%)
2	3 (9.7%)	1 (3.2%)	9 (29.0%)	18 (58.1%)	31 (100.0%)
3	2 (28.6%)	1 (14.3%)	1 (14.3%)	3 (42.9%)	7 (100.0%)
4	1 (16.7%)	1 (16.7%)	2 (33.3%)	2 (33.3%)	6 (100.0%)
5	0 (0.0%)	1 (25.0%)	0 (0.0%)	3 (75.0%)	4 (100.0%)
6	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (100.0%)	3 (100.0%)
7	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	1 (100.0%)
8	1 (50.0%)	0 (0.0%)	0 (0.0%)	1 (50.0%)	2 (100.0%)
Total	190 (21.4%)	92 (10.4%)	203 (22.9%)	402 (45.3%)	887 (100.0%)

Finally, the number of course failures for each level of degree completion indicated that the Chi-squared test was significant, χ^2 (21) = 37.1074 (p = .016), Cramer's V = .1181. Table 19 illustrates the contingency table for the number of course failures and each level of degree completion.

Table 19

Number of course failures for each persistence type

Number of Course Failures	Degree Completion Type				
	Graduated from CHP major	Graduated from another NDSU major	Still enrolled at NDSU	Left NDSU	Overall
0	179	80	174	310	743
	(24.1%)	(10.8%)	(23.4%)	(41.7%)	(100.0%)
1	5	7	15	45	72
	(6.9%)	(9.7%)	(20.8%)	(62.5%)	(100.0%)
2	4	1	10	27	42
	(9.5%)	(2.4%)	(23.8%)	(64.3%)	(100.0%)
3	2	1	1	7	11
	(18.2%)	(9.1%)	(9.1%)	(63.6%)	(100.0%)
4	0	2	3	7	12
	(0.0%)	(16.7%)	(25.0%)	(58.3%)	(100.0%)
5	0	1	0	4	5
	(0.0%)	(20.0%)	(0.0%)	(80.0%)	(100.0%)
6	0	0	0	1	1
	(0.0%)	(0.0%)	(0.0%)	(100.0%)	(100.0%)
7	0	0	0	1	1
	(0.0%)	(0.0%)	(0.0%)	(100.0%)	(100.0%)
Total	190	92	203	402	887
	(21.4%)	(10.4%)	(22.9%)	(45.3%)	(100.0%)

Relationship Between Persistence and Degree-Completion Outcomes

The Chi-squared test was significant for the relationship between persistence (admitted to CHP major, declared non-CHP NDSU major, or major stayed the same) and the degree-completion outcome (graduated from CHP major, graduated from another NDSU major, still enrolled at NDSU, left NDSU), χ^2 (6) = 822.2425 ($p < .001$), Cramer's $V = .6808$. Table 20 illustrates the contingency table for persistence and the degree-completion outcome.

Table 20

Level of degree completion for each persistence type

Persistence Type	Degree-Completion Outcome				
	Graduated from CHP major	Graduated from another NDSU major	Still enrolled at NDSU	Left NDSU	Total
Admitted to CHP major	190 (62.9%)	0 (0.0%)	96 (31.8%)	16 (5.3%)	302 (100.0%)
Declared Non-CHP NDSU major	0 (0.0%)	90 (34.6%)	62 (23.8%)	108 (41.5%)	260 (100.0%)
No Change	0 (0.0%)	2 (0.6%)	45 (13.8%)	278 (85.5%)	325 (100.0%)
Overall	190 (21.4%)	92 (10.4%)	203 (22.9%)	402 (45.3%)	887 (100.0%)

Research Questions Examined

The data analysis shows several significant bivariate relationships. Figure 7 illustrates the variables that were found to have significant bivariate relationships. The variables connected with lines were found to have relationships representing the hypothetical direction of influence. The results indicated that transfer type has a significant bivariate relationship with four of the seven variables (English readiness, math readiness, number of courses repeated, and number of course failures).

Research question 1 sought to address what factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students who start in pre-professional health majors. As illustrated in Table 6, Chi-squared test was not significant for the relationship between transfer type and persistence, χ^2 (2) = 2.2372 (p = .327), Cramer's V = .0502, or for the relationship between transfer type and degree completion, χ^2 (3) = 1.8621 (p = .602), Cramer's V = .0458.

Although transfer type did not have a significant bivariate relationship with persistence or degree-completion outcome, indirect relationships were present. Transfer type had an indirect

relationship with persistence through the transfer GPA and the number of failed courses. Furthermore, transfer type had an indirect relationship with degree-completion outcomes through transfer GPA, English readiness, and the number of course failures.

Research question 2 sought to address the relationship between selectivity metrics and the persistence of transfer students who start pre-professional health majors. The findings indicated a hypothetical direction of influence on persistence based upon a student's transfer GPA and the number of previously failed courses. The Chi-squared test was significant for the relationship between transfer-GPA group and persistence, χ^2 (8) = 45.0030 ($p < .001$), Cramer's $V = .1593$. Additionally, the number of course failures for each persistence type indicated that the Chi-squared test was significant, χ^2 (14) = 38.7371 ($p < .001$), Cramer's $V = .1478$. Figure 7 provides a visual representation.

Research question 3 sought to address the relationship between selectivity metrics and the degree-completion outcomes for transfer students who started pre-professional health majors. Similar to research question 2, the findings indicated a hypothetical direction of influence on degree completion based upon a student's transfer GPA and the number of previously failed courses. The Chi-squared test was significant for the relationship between transfer-GPA group and degree completion, χ^2 (12) = 37.4361 ($p < .001$), Cramer's $V = .1186$. Additionally, the number of course failures for each level of degree completion indicated that the Chi-squared test was significant, χ^2 (21) = 37.1074 ($p = .016$), Cramer's $V = .1181$. Moreover, English readiness was found to have a hypothetical influence on degree completion. Results for the Chi-squared test indicated a significant bivariate relationship, χ^2 (3) = 11.6966 ($p = .008$), Cramer's $V = .1148$. Figure 7 provides a visual representation.

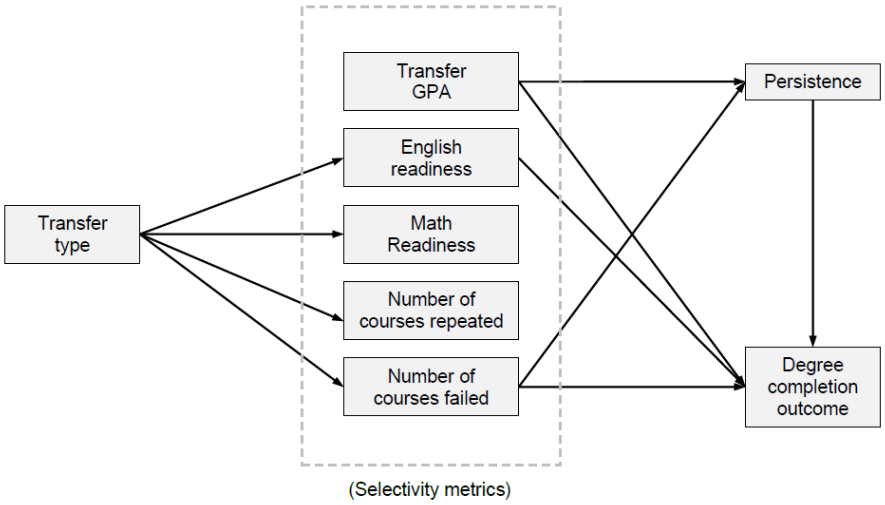

Figure 7. Results Diagram.

Chapter Summary

The purpose of this study was to examine, compare, and analyze the factors that influence levels of persistence and completion for first-time transfer and swirling transfer students enrolled in NDSU's pre-professional health majors. For this study, the exploratory data analysis utilized several statistical methods. A point-biserial correlation was used to show the relationship between dichotomous and numerical variables, and a Chi-squared test was used to examine the existence of a relationship between two nominal variables. Additionally, the researcher used Cramer's *V* to show the correlation between two nominal-level variables. Finally, conditional means were examined for the relationship between a categorical variable and a numerical variable.

The following research questions guided this study:

1. What factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students starting in pre-professional health majors?
2. What are the relationships between selectivity metrics and persistence for transfer students starting in pre-professional health majors?

3. What are the relationships between selectivity metrics and degree-completion for transfer students starting in pre-professional health majors?

The findings illustrated a significant bivariate relationship between transfer type and English readiness, transfer type and math readiness, transfer type and number of course repeats, and transfer type and number of course failures. Significant bivariate relationships were also present with the following relationships: transfer GPA and persistence, transfer GPA and degree completion, English readiness and degree completion, and number of course failures and persistence, number of course failures and degree completion. Finally, the relationship between persistence and degree-completion outcome had a significant bivariate relationship.

CHAPTER 5. DISCUSSION AND CONCLUSION

This chapter provides a summary of the research study based on the findings described in Chapter 4. A brief overview of the study is provided, followed by Major Study Findings and Recommendations, Limitations, and Recommendations for Further Studies.

Restatement of the Problem

The purpose of this study was to examine, compare, and analyze the factors that influence the levels of persistence and completion for first-time and swirling transfer students who enrolled in NDSU's pre-professional health majors. The study originated from the researcher's experience and observations of transfer students in numerous capacities, most recently as an academic adviser for NDSU's College of Health Professions. Figure 8 provides visual representation of the correlates examined: (a) transfer type and selectivity metrics, (b) transfer type and persistence, (c) transfer type and degree completion outcomes, (d) selectivity metrics and persistence, (e) selectivity metrics and degree-completion outcome, and (f) persistence and degree-completion outcome.

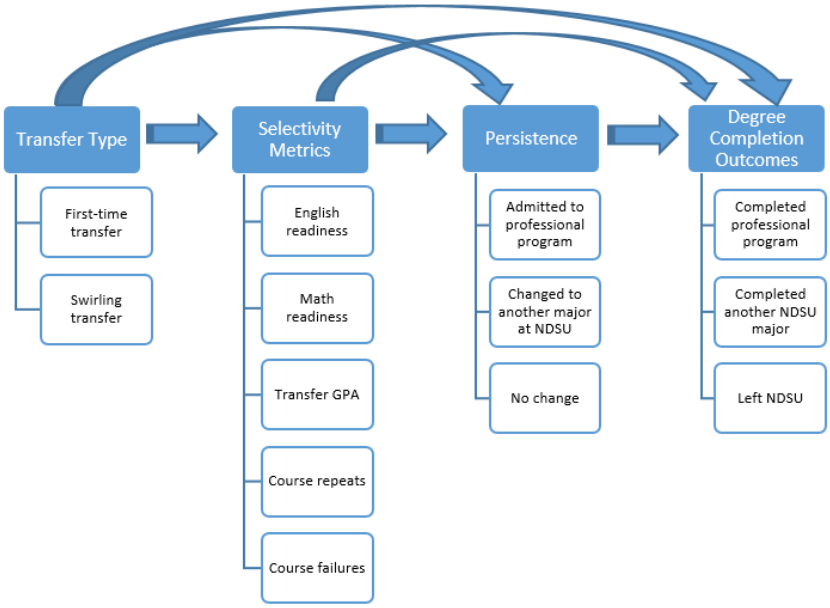

Figure 8. Final Diagram: Study Correlates.

To address the research questions, undergraduate transfer-student data from students admitted Fall 2006 through Fall 2014 were collected from NDSU's Office of Registration and Records; the data were subsequently analyzed. The study involved a quantitative research method that utilized a non-experimental correlational design. A sample of 887 NDSU undergraduate transfer students was selected from the student-records system. The study's research design sought to answer three research questions that addressed issues relating to transfer students' persistence and degree completion in NDSU's College of Health Professions. The following research questions guided this study:

1. What factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students starting in pre-professional health majors?
2. What are the relationships between selectivity metrics and persistence for transfer students starting in pre-professional health majors?
3. What are the relationships between selectivity metrics and degree-completion for transfer students starting in pre-professional health majors?

Major Study Findings and Recommendations

The study's major findings are summarized in relation to the research questions. The findings for the questions come from utilizing several statistical methods. A bivariate correlation was used to show the relationship between dichotomous and numerical variables, and a Chi-squared test was used to examine the existence of a relationship between two nominal variables. Additionally, the researcher used Cramer's *V* to show the correlation between two nominal-level variables. Finally, conditional means were examined for the relationship between a numerical variable and a categorical variable.

Research Question 1

What factors influence transfer students' levels of persistence and the degree-completion outcomes for transfer students starting in pre-professional health majors? The literature indicated that transfer students experience difficulties, or barriers, after moving from one institution to another. Often, barriers such as aptitude, environmental changes, or financial constraints limit students from completing their degree. Furthermore, once students gain admittance to four-year institutions, some individuals face additional barriers, such as selective-admission standards, that potentially prevent degree completion. These obstacles can make it more difficult for students to persist and to complete their degree.

For the purpose of this study, the relationship between transfer type (first-time or swirling transfer) and persistence (admitted to College of Health Professions major, declared non-College of Health Professions NDSU major, or major stayed the same), as well as transfer type and degree completion (graduated from College of Health Professions major, graduated from a non-College of Health Professions NDSU major, still enrolled at NDSU, left NDSU), was tested. Results of the Chi-squared test indicated no significant relationship between transfer type and persistence, χ^2 (2) = 2.2372 (p = .327), Cramer's V = .0502. Similarly, results from the Chi-squared test assessing the relationship between transfer type and the degree-completion outcome was not significant, χ^2 (3) = 1.8621 (p = .602), Cramer's V = .0458.

Although there was no indication that transfer type had an influence on overall persistence, an indirect relationship was present between transfer type and persistence through the number of courses failed. Additionally, an indirect influence was also present between transfer type and college completion outcomes through English readiness (ability to enroll in ENGL 120 College Composition II) and the number of courses failed (prior to transferring).

When criticizing the likelihood of persistence and degree completion for transfer students in the College of Health Professions, it may be sensible to keep in mind that, while skills and previous success matter, barriers can be surmounted. When a student transfers to a new college or university, the institution should examine his/her learning and ability gaps and address those issues at the point of transfer. NDSU's pre-professional students in the College of Health Professions typically meet with a professional academic adviser before starting the pre-professional coursework. Meetings with professional academic advisers facilitate consistent messaging and program information about requirements, deadlines, services, and resources. Furthermore, advising meetings are offered to all students throughout their pre-professional career, including individuals who are at-risk of not persisting or completing a degree.

Pre-professional student advising meetings with assigned professional academic advisers in the College of Health Professions provide an opportunity to examine student abilities and prepare students for program success. Based on the findings, professional academic advisers can utilize the indirect relationship between transfer GPA and persistence to provide students with possible educational outcomes. For example, if a student enters NDSU with a GPA below 2.00, they are less likely to gain admittance to a College of Health Professions major (4.6%) than a student who enters with a GPA above 2.00 (95%). Additionally, the fewer course failures the student has transferred, the more probable the student is to gain admittance to a College of Health Professions major.

Professional academic advisers can also discuss challenges and obstacles that students could face based on transfer information and ACT/SAT scores during advising sessions. Students who transfer to NDSU may transfer courses from other institutions or have lower ACT/SAT scores. If a student transfers with multiple failed courses or multiple repeats, it can be

more difficult for the student to gain admittance. Additionally, lower ACT/SAT scores might place students into remedial math and English courses. If students place into remedial courses they may experience more barriers while working towards admittance to a College of Health Professions major. However, if students are determined to excel, they can persist and graduate from a College of Health Professions major. Some students will not be able to improve upon their previous performance, and it might be advisable for them to consider a different major or school before committing to NDSU and the College of Health Professions major. During the initial advising meeting, professional academic advisers have an opportunity to discuss possible backup plans with students. Backup plans may consist of changing their major to another NDSU major or applying to other institutions with similar programs. There are many routes to degree completion. Professional academic advisers have an opportunity to help students find success while attending college, even if it is not in the original plan of study.

Research Question 2

What are the relationships between selectivity metrics and persistence for transfer students starting in pre-professional health majors? Based on the researcher's prior expectations, admissions selectivity for health-related programs may prevent students from successfully gaining admission to programs in NDSU's College of Health Professions (CHP). Students who transfer can experience barriers to admission based on their transfer GPA, math aptitude, English aptitude, how many courses they previously failed before transferring, or how many courses they previous repeated at other institutions. Using the selectivity metrics (transfer GPA, math readiness, English readiness, the number of course repeats from previous institutions, and the number of course failures from previous institutions), the researcher wanted to see if any hypothesized directions of influence on transfer-student persistence were present.

The results indicated that 2 of the 5 selectivity metrics had a significant bivariate relationship with persistence: transfer GPA and the number of course failures. Results from the Chi-squared test identified as statistically significant for the relationship between transfer-GPA group and persistence, χ^2 (8) = 45.0030 ($p < .001$), Cramer's $V = .1593$. The majority of students ($n = 288$) admitted to the College of Health Professions transferred with a GPA greater than 2.00. Only 14 students received admittance with transfer GPAs lower than 2.00. The number of course failures for each persistence type indicated that the Chi-squared test was significant, χ^2 (14) = 38.7371 ($p < .001$), Cramer's $V = .1478$. The maximum number of core course repeats for most of the pre-professional programs in College of Health Professions is limited to three. If a student failed more than three courses before transferring to NDSU, they would likely not receive admittance to a professional program. As a result, students admitted to the College of Health Professions had fewer course failures than students who declared a different NDSU major or experienced no change.

Professional academic advisers can use the relationship significance between transfer GPA and persistence as well as the relationship significance between persistence and the number of courses failed when advising students. Knowing that students who have a transferring GPA above a 2.00 are more likely to gain admittance (n = 288) can provide the direction of conversation. While the significance does not indicate a causal effect, highlighting the GPA and data results can provide motivation for a student or potentially change their plan of study before they get started. Knowing the likelihood of success can help facilitate the discussion of a potential backup plan students may consider with their advisor.

As discussed in Chapter 4, results did not indicate a significant bivariate relationship between math readiness and persistence or between English readiness and persistence. Although

math readiness can be viewed as a gate keeper to professional programs (D. Friesner, personal communication, October 20, 2015), in this study it does not provide a significant relationship with persistence. Furthermore, while professional academic advisers view English readiness as a barrier for students entering the College of Health Professions (K. Kotula, personal communication, October 16, 2015; K. Haugen, personal communication, October 16, 2015), the results do not indicate a significant bivariate relationship. Using the results of the study, a professional academic adviser can look at incoming transfer coursework and ACT/SAT English and math sub-scores to inform students of potential educational outcomes. For example, if a student has lower ACT/SAT English and math sub-scores (placing them into remedial English or remedial math courses) professional academic advisers can discuss challenges a student may face. Challenges could include difficulty understanding course material, potential delays in program progression, or difficulties with subsequent courses in the program. The findings do not indicate that they will not be able to gain admittance to a College of Health Professions major.

Based on the findings, the relationship between the number of course repeats and persistence were also not considered significant. Indicating that while professional academic advisers may view course repeats as a potential barrier, the data does not support the preconceived notions. Noting that if a student had course repeats on their transcript, it might not prevent them from admittance to a CHP major.

Research Question 3

What are the relationships between selectivity metrics and degree-completion outcomes for transfer students starting in pre-professional health majors? Personal communications with staff members in NDSU's College of Health Professions suggested that students who do not meet the selectivity metrics (transfer GPA, math readiness, English

readiness, the number of course repeats from previous institutions, and the number of course failures from previous institutions) are less likely to gain admittance and graduate. Using the selectivity metrics, the researcher wanted to see if any hypothetical directions of influence on transfer-student degree-completion were present.

The results indicated that 3 of the 5 selectivity measurements have a hypothetical direction of influence on degree completion: (a) transfer GPA, (b) English readiness, and (c) number of course failures. The Chi-squared test was significant for the relationship between transfer-GPA group and degree completion, χ^2 (12) = 37.4361 ($p < .001$), Cramer's $V = .1186$. English readiness for each level of degree completion indicated that the Chi-squared test was significant, χ^2 (3) = 11.6966 ($p = .008$), Cramer's $V = .1148$. Finally, the number of course failures for each level of degree completion indicated that the Chi-squared test was significant, χ^2 (21) = 37.1074 ($p = .016$), Cramer's $V = .1181$. The relationships between math readiness and degree-completion as well as the relationship between the number of course repeats and degree-completion were not significant.

Based on the College of Health Professions requirements, it is expected that students will have a cumulative GPA above a 2.00. For students transferring to NDSU, it will be important that they have a transfer GPA above a 2.00 when they arrive, or they will need to improve their GPA during their first semester. Some CHP programs have higher GPA requirements, thus requiring students to further improve their GPA before applying to their program of study. In most cases, it is recommended that all applications applying to NDSU have at least a 2.00 GPA in all college course work at the time of transfer to be considered for admission. When reviewing the data, 839 of the 887 students (94.6%) enrolled in the College of Health Professions (pre-professional) had transfer GPAs ranging from 2.00-4.00. Indicating that some students who

transferred to NDSU to the College of Health Professions entered on probation and were required to raise their GPA in the first semester.

Results from the study also indicated that 179 of the 190 students (94%) who graduated from the College of Health Professions had a transfer GPA above 2.00. Give the requirements of the College of Health Professions this is to be expected. One of the surprising results was 40.7% of students who have a GPA between 3.00 and 4.00 left NDSU. The percentage of students leaving indicates that some of the transfer students with a GPAs that meet the minimum requirements for a pre-professional program may still leave NDSU. The GPA results provide an interesting discussion point for professional academic advisers to have with students and share insight into why advisers encourage students to have backup plans to meet educational goals. It does not matter if a student has a 1.50 or a 4.00 GPA, and each student must determine their appropriate educational path, and it may not always be the initial plan of study. For example, a student with a higher GPA may decide that a career as a physician is more profitable and has similar educational requirements as a pharmacist. A student may also recognize that while a health care degree is a stable career choice, it may not fit into their personal strengths. Students need to persist towards the major that is right for them.

Given the findings, professional academic advisers can utilize the results from this study to meet with students and discuss possible outcomes during advising appointments. As mentioned throughout this chapter, the results provide several talking points for advisers to share with students. Professional academic advisers can discuss potential outcomes based on previous transcripts and ACT/SAT scores during the initial student meeting. Students then have information to consider before progressing in the College of Health Professions.

Limitations

This study had a few limitations based on changes that occurred with NDSU's student information system. First, before Fall 2010, Campus Connection did not calculate transfer GPA. Transfer GPAs were manually calculated and entered into the system. As of Fall 2010, a special GPA process is performed at the end of each term. Second, NDSU is an institutional GPA school, so the GPA a student earns at NDSU is calculated as his/her cumulative GPA. Furthermore, not all transfer courses were entered in the transfer-credit module during the software's initial use. As a result, some transfer GPAs may be skewed based on the courses entered into the system (R. Kitch, personal communication, September 16, 2015).

Recommendations for Further Studies

The diversity of the sample population was intended to analyze only transfer students in the College of Health Professions. Further research using the entire campus population may provide additional insight on the transfer population at NDSU. Also some of selective metrics utilized in this study could be tested using all students (transfer and non-transfer) entering the College of Health Professions for comparison purposes. Quality data and insight could be gained by studying all transfer students at NDSU, as well as the entire undergraduate student body.

The significant bivariate relationships presented in Chapter 4 also indicated a need for additional research and exploration about the relationships between transfer GPA and persistence, transfer GPA and degree completion, English readiness and degree completion, course failures and persistence, course failures and degree completion, and persistence and degree completion. The results indicate significant bivariate relationships with all of the relationships listed above. Furthermore, the data suggested further study on the decreased likelihood of persistence and degree completion among transfer students who have repeated

courses or failed courses before enrolling at NDSU. Of the 121 transfer students who repeated courses, only 29 students persisted (23.97%) in a College of Health Professions program. Furthermore, only 16 students (13.22%) graduated from a program in the College of Health Professions. Based on the data, 144 students who entered the College of Health Professions failed courses before attending NDSU. Of those 144 students, 20 students persisted (13.89%), and 11 graduated (7.64%). Additionally, 80 students both failed and repeated courses before attending NDSU, with 13 persisting (16.25%) and 8 graduating (10.00%). A potential research study utilizing a path analysis to test the fit between the various relationships could be beneficial in determining which relationship conforms best to the data at hand.

Conclusions

The purpose of this study was to examine, compare, and analyze the factors that influence the levels of persistence and completion for first-time transfer and swirling transfer students who are enrolled in NDSU's pre-professional health majors. The researcher was interested in the relationships among transfer students, selectivity metrics, persistence, and degree completion. Many variables may affect the likelihood of transfer students' persistence and degree completion. This study looked at the hypothetical direction of influence, not causal effects. The findings indicated several bivariate relationships but did not imply anything about the potential outcomes.

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APPENDIX A. IRB LETTER OF APPROVAL

NDSU NORTH DAKOTA STATE UNIVERSITY

November 5, 2015

Dr. Thomas Hall and Ms. Amanda Groom
School of Education/College of Health Professions

Re: Your submission to the IRB: "Investigating transfer student persistence and completion in the College of Health Professions"

Thank you for your inquiry regarding your project. At this time, the IRB office has determined that the above-referenced protocol does not require Institutional Review Board approval or certification of exempt status because it does not fit the regulatory definition of 'research involving human subjects'.

Dept. of Health & Human Services regulations governing human subjects research (45CFR46, Protection of Human Subjects), defines 'research' as "…a systematic investigation, research development, testing and evaluation, designed to contribute to generalizable knowledge." These regulations also define a 'human subject' as "…a living individual about whom an investigator conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information."

It was determined that your project does not require IRB approval (or certification of exempt status) because the project will not obtain identifiable private information. The board makes this determination based on the 11/4/2015 protocol submission that the research involves only secondary analysis of a non-identifiable dataset.

We appreciate your intention to abide by NDSU IRB policies and procedures, and thank you for your patience as the IRB Office has reviewed your study. Best wishes for a successful project!

Sincerely,
Kristy Shirley
Digitally signed by Kristy Shirley
DN: cn=Kristy Shirley, o=NDSU, ou=Institutional Review Board, email=kristy.shirley@ndsu.edu, c=US
Date: 2015.11.05 08:13:52 -06'00'
Kristy Shirley, CIP; Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult www.ndsu.edu/irb. This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

INSTITUTIONAL REVIEW BOARD
NDSU Dept 4000 | PO Box 6050 | Fargo ND 58108-6050 | 701.231.8995 | Fax 701.231.8098 | ndsu.edu/irb
Shipping address: Research 1, 1735 NDSU Research Park Drive, Fargo ND 58102

APPENDIX B. PRE-PROFESSIONAL PHARMACY CURRICULUM (TWO TRACKS)

Pre-Pharmacy Curriculum (Two-Tracks)

Track One

Two Year Track with summer session (4 Semesters + 1 Summer Session, 76 credits, includes credit for Engl 110)

FIRST YEAR

Fall	Credits	Spring	Credits
Chem 121 General Chemistry 1*	3	Chem 122, General Chemistry II*	3
Chem 121L General Chemistry 1 Lab	1	Chem 122L, General Chemistry II Lab	1
English 120, Composition II[1]*	3	Comm 110, Fundamentals of Public Speaking*	3
Math 146, Applied Calculus I*	4	Econ 201, Microeconomics*	3
Biol 150/150Lab, General Biology I*	3/1	Stats 330, Introductory Statistics*	3
University 189, Study Skills	1	Elective-Humanities & Fine Arts	3
Total Credits	**16**	**Total Credits**	**16**

SUMMER: Chem 341*/341L, Organic Chemistry I and Lab, 3 + 1 cr. and Chem 342*, Organic Chemistry II, 3 cr.

SECOND YEAR

Fall	Credits	Spring	Credits
Bioc 460, Biochemistry I*	3	Bioc 461, Biochemistry II	3
Biol 220/220Lab, Human Anatomy & Physio I*	3/1	Biol 221/221Lab, Human Anatomy & Physio II	3/1
Comm 216, Intercultural Comm*	3	Engl 324 or Engl 325, Upper division English [1]	3
Micr 202/202Lab* or 350/350Lab*	2/1	Micr 460, Pathogenic Microbiology	3
Elective—Humanities & Fine Arts	3	Phys 211, College Physics I	3
		Wellness	2
Total Credits	**16**	**Total Credits**	**18**

[1]English 324 or English 325 requires the completion of 60 credit hours to enroll in the course. Students should consult with their advisor to ensure that they meet this requirement.

This track represents a suggested course sequence. Students should meet with their advisor to adapt this suggested course sequence based on their specific academic and professional backgrounds.

More information can be found on this program on our website:
www.ndsu.edu/pharmacy/pharmd/

Other programs within the College of Health Professions:
www.ndsu.edu/healthprofessions/degrees_programs/

Track Two

Three year track. Allows room for a minor of study. (6 Semesters, 94 credits, includes credit for Engl 110)

FIRST YEAR

Fall	Credits	Spring	Credits
Biology 150/150Lab, General Biology I*	3/1	Chem 122, General Chemistry II*	3
Chem 121, General Chemistry I*	3	Chem 122L, General Chem II Lab	1
Chem 121L, General Chemistry I Lab	1	Comm 110, Fundamentals/Public Speaking*	3
Math 146, Applied Calculus I*	4	Elective—Humanities & Fine Arts	3
Elective—Humanities & Fine Arts	3	English 120, Composition II[1]*	3
Pharm189, Skills for Academic Success	1	Wellness	2
Total Credits	**16**	**Total Credits**	**15**

SECOND YEAR

Fall	Credits	Spring	Credits
Chem 341, Organic Chemistry I*	3	Chem 342, Organic Chemistry II*	3
Chem 341L, Organic Chemistry I Lab	1	Biol 221/221Lab, Human Anatomy & Physio II	3/1
Biol 220/220L, Human Anatomy & Physio I*	3/1	Phys 211, College Physics I	3
Comm 216, Intercultural Comm*	3	Credits towards minor	6
Econ 201, Microeconomics*	3		
Credits towards minor	3		
Total Credits	**17**	**Total Credits**	**16**

THIRD YEAR

Fall	Credits	Spring	Credits
Bioc 460, Biochemistry I*	3	Bioc 461, Biochemistry II	3
Stat 330, Introductory Statistics*	3	Engl 324 or Engl 325, Upper division English	3
Micr 202/202Lab or 350/350Lab*	2/1	Micr 460, Pathogenic Microbiology	3
Credits towards Minor	6	Credits towards Minor	6
Total Credits	**15**	**Total Credits**	**15**

This track represents a suggested course sequence. Students should meet with their advisor to adapt this suggested course sequence based on their specific academic and professional backgrounds.