

Annual Assessment Report

2020 – 2021

Prepared by: Karen A. Reiner, PhD, MT(ASCP)

ABSTRACT: An illustrated report of the assessment activities carried out by the faculty of the Department of Medical Laboratory Sciences for the 2020-2021 academic year. Every attempt has been made to report objective, accurate information. Any errors in reporting are not intentional, and the author welcomes correction when merited.

Medical Laboratory Science (MLS) Program 2020-2021 Assessment Report

I. INTRODUCTION

A. History and Location

Founded in 1874, Andrews University is currently located in Berrien Springs, Michigan and it is the sponsoring institution of the Program for Medical Laboratory Science (MLS). The first Clinical Year Program cohort began in the fall of 1988. The Program achieved its first accreditation by the National Accrediting Agency for Clinical Laboratory Science (NAACLS) in the spring of 1989, only a few months after the Program accepted the first group of students. The Program remains accredited by NAACLS and is offered through the Department of Medical Laboratory Sciences, housed in Halenz Hall.

The Program functions with one support staff and five MLS full time faculty members, one of which serves as Department Chair, Program Director, and Clinical Coordinator. The Program capacity increased from 24 to 32 in August 2014, after the completion of two brand new student laboratories.

B. Program Organization

The Andrews University Program for Medical Laboratory Science is a 3 + 1 program comprised of three years of undergraduate (pre-clinical) studies plus one clinical year (three semesters).

The first three years of undergraduate study include general education courses (Andrews Core Experience courses or ACE courses), cognate sciences, and pre-clinical courses. Students select elective courses in consultation with their faculty advisor and taking into consideration the student's career goals and interests.

MLS majors apply for admissions into the Clinical Year Program during the fall semester of their junior year. The deadline for submitting Clinical Year applications is January 31. The admissions committee typically meets late February or early March. Students admitted to the last year of the degree program (Clinical Year Program) take coursework that combines a rigorous competency-based science curriculum with community-sponsored clinical training. During the first two semesters of the clinical year, students complete course work in modern classrooms, which include a lecture room and two brand new and well-equipped student laboratories.

The three semesters of the clinical year are divided as follows: The Fall Semester and two months of the Spring Semester are composed of didactic educational experiences enhanced with hands-on student laboratories on the Berrien Springs campus. Upon successful completion of the on-campus coursework, students are assigned to one or more of the program affiliated laboratories to complete their clinical practicum. During the 16-week clinical training period, students spend 40 hours per week applying knowledge and skills to perform a wide variety of testing in an accredited medical laboratory and to develop further discipline-specific competency under supervision of clinical instructors. Currently, the MLS Department maintains affiliations with accredited laboratories in Colorado, Florida, Illinois, Indiana, Kentucky, Maryland, Michigan, Ohio, Tennessee, Texas, and Washington DC.

Program graduates are eligible to take the *American Society for Clinical Pathology (ASCP) Medical Laboratory Scientist (MLS)* national board certification examination and to pursue career opportunities in various laboratory settings including but not limited to hospital laboratories, clinics, forensic laboratories, veterinary clinics; medical, biotechnology, industrial research, and public health laboratories; cytogenetics, cytotechnology, and histology.

The Medical Laboratory Science Program is accredited by the *National Accrediting Agency for Clinical Laboratory Science (NAACLS)*, 5600 North River Road, Suite 720, Rosemont, Illinois 60018-5119.

II. PROGRAM OUTCOMES

- A. Enrollment Trends:** Applications to the Program continue an upward trend since 2018 (Figure 1). The number of admitted students reflects applicant qualifications as well as Program capacity, which it is not to exceed 32 (Figure 2).

Figure 1. Clinical Year Applications (2012 – 2021)

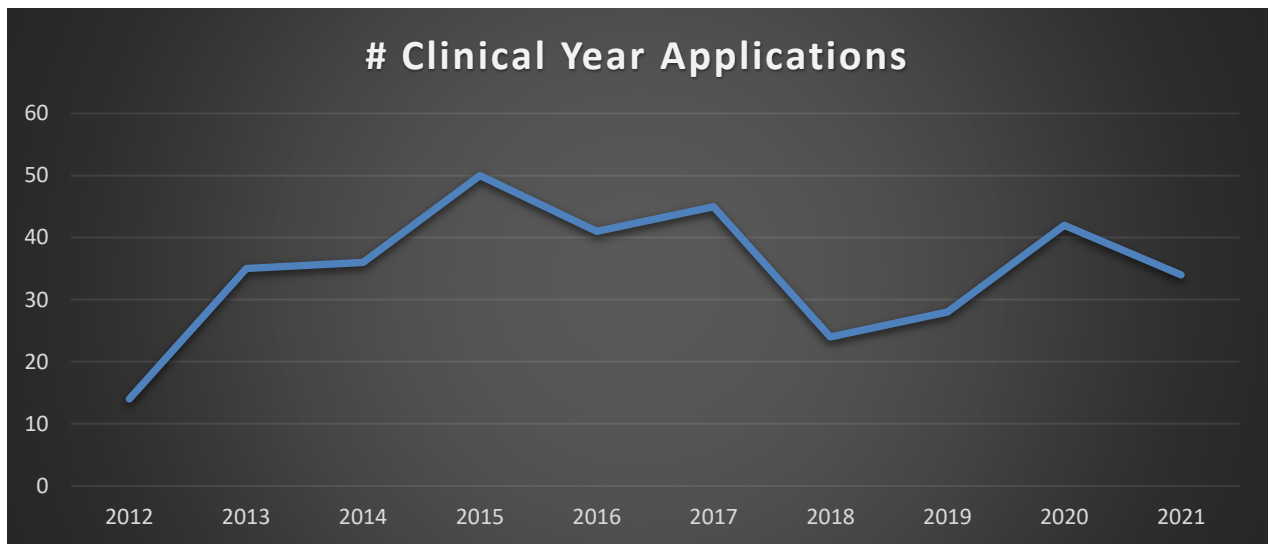
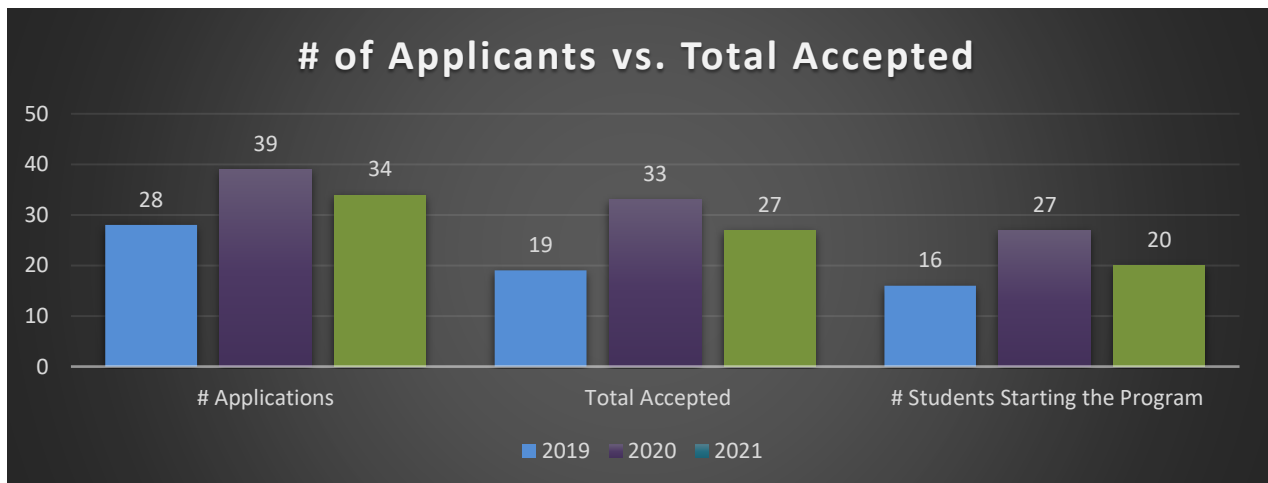
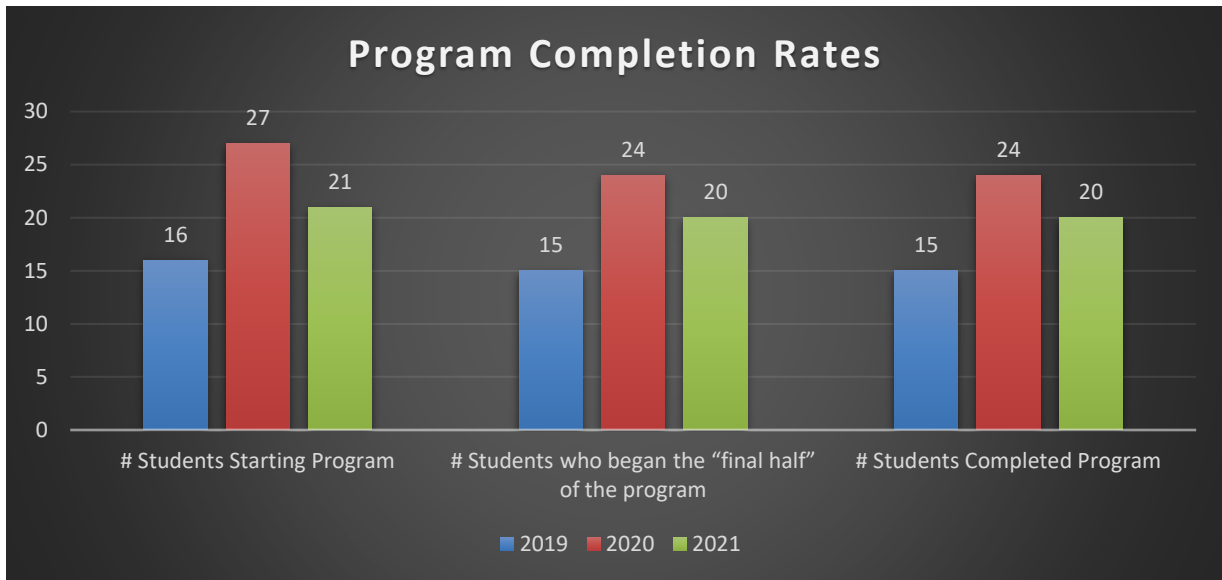


Figure 2. # of Applicants vs. Total Accepted (Class of 2019 – 2021)



B. Program Completion Rates: Program completion rates continue to exceed the target of at least 80% (Figure 3). Program completion rates for the last three years are as follow: **15/15** completed the program in 2019; **24/24** completed the program in 2020; **20/20** completed the program in 2021. Note: Program completion rates are calculated using the NAACLS standard of comparing the number of students that began the “final half” of the program and subsequently completed the program versus those that left the program (voluntarily or involuntarily). The “final half” of the program is defined as the clinical practicum portion of the program.

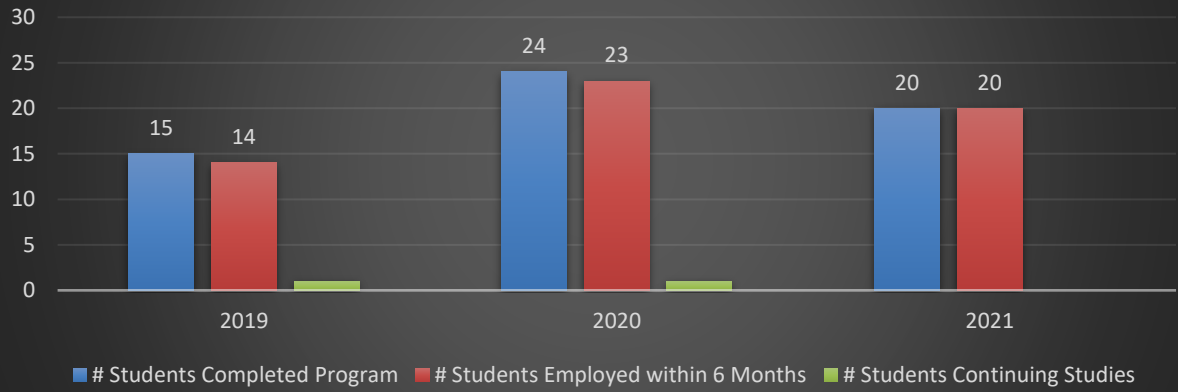
Figure 3. Program Completion Rates (2019 – 2021)



C. Employment/Placement Rates: Program employment/placement rates continue to exceed the program target of at least 80% (Figure 4). All 20 students that completed the clinical year program in 2021 found employment within six months of graduation or went on to continue their education. The yearly average employment/placement rate for the last three years (2019-2021) are as follows: 100% (n=15) for the class of 2019; 100% (n=24) for the class of 2020; 100% (n=20) for the class of 2021.

Figure 4. Placement Rate (2019 – 2021)

Placement Rate

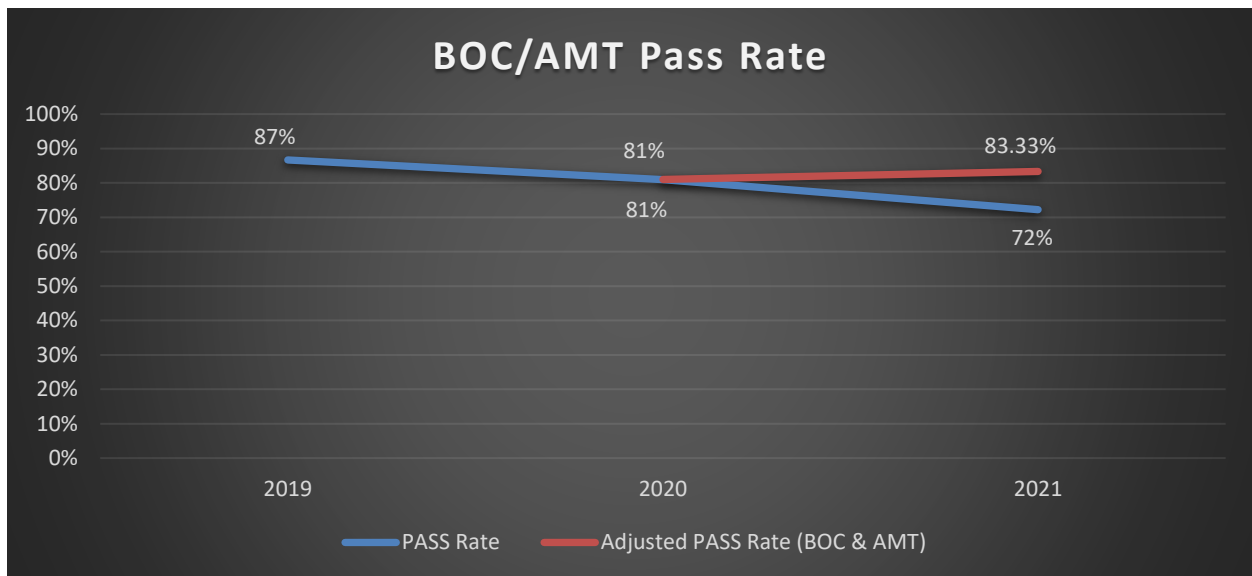


D. Pass Rates on National Board Exam: Typically, the pass rate reported reflect the number of students that take the Board of Certification (BOC) as offered by the American Society of Clinical Pathologist (ASCP). However, for the class of 2021, the pass rates also reflect the number of students that choose to take the American Medical Technologists (AMT)* exam to gain certification. The BOC pass rate the class of 2021 was 72% and the combined BOC and AMT past rates was 83% (Figure 6). The drop in BOC passing rates for the class of 2021 appears to be somewhat explained by the aftermath of the COVID-19 pandemic. Students seemed to struggle to “get back to normal.” We observed mental fatigue due to a variety of issues such as Long COVID and emotional distress due to loss of loved ones.

Both the BOC and AMT exams includes the following seven subtest areas: 1) Transfusion Medicine and Blood Banking (BBNK); 2) Chemistry (CHEM); 3) Hematology and Hemostasis (HEMA); 4) Immunology (IMMU); 5) Laboratory Operations (LO); 6) Microbiology (MICR); and 7) Urinalysis (UA).

**Two (2) of the students from the class of 2021 that did not pass the BOC on their first attempt, did not retake the BOC. Instead, they took the AMT within one year of graduation and passed. This contributed to the lower final passing rate for the BOC.*

Figure 5. BOC Pass Rate (2019 – 2021)



III. PROGRAM MISSION/PURPOSE, GOALS, AND STUDENT LEARNING OUTCOMES

- A. *The MLS program faculty* discussed assessment activities for the 2020-2021 year. The program purpose, objectives, and student learning outcomes were reviewed and affirmed as the following:

Faculty & Staff Commitment

We, the faculty and staff of the Andrews University Program for Medical Laboratory Sciences, as professionals and educators, are committed to providing our students with experiences that prepare them to practice as scholastically accomplished and competent Medical Laboratory Scientists. To that end, we acknowledge our responsibility and pledge our commitment to:

- Demonstrate professionalism through our words and actions
- Provide knowledge-building, skill-developing experiences for all our students
- Create equal opportunity learning environments within which all our students are educated in an atmosphere of fairness and impartiality
- Foster students' commitment to lifelong learning
- Endorse student participation in professional organizations
- Promote student scholarship and professional achievement
- Contribute to the ongoing development and growth of medical laboratory science pedagogy through faculty participation in scholarship, service, and outreach

Program Mission/Purpose

The mission of the Department of Medical Laboratory Sciences (MLS), in harmony with Andrews University and the Seventh-day Adventist Church, is to prepare students for Christian service as Medical Laboratory Scientists. The MLS department encourages faculty in professional, educational, and spiritual growth. The MLS faculty educates students to develop excellence in the professional skills necessary for a life work of service in quality health care and dedication to improving the human condition. MLS graduates will minister to the needs of others by practicing and promoting standards of excellence as medical laboratory science professionals.

Program Goals and General Student Learning Objectives (SLO):

Goal 1: Christian service as MLS professionals.

To prepare students for Christian service as medical laboratory science professionals

Goal 2: MLS Entry-Level Professional Competence

Provide MLS profession-related comprehensive instruction sufficient to meet entry-level MLS employment competencies—including attention to professional growth, personal student-professor interactions, excellent advising, and an emphasis on the spiritual dimensions of the health care field.

SLO 1: MLS Comprehensive Didactic Competency

- Achieve Medical Laboratory Scientist entry-level didactic competency in the following scientific content and as defined by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS):
 - Clinical Chemistry
 - Hematology & Hemostasis
 - Immunology

- Immunohematology & Transfusion Medicine
 - Microbiology
 - Molecular Diagnostics
 - Renal, Urinalysis & Body Fluids
 - Laboratory Operations
- Achieve a passing score in the Board of Certification by the ASCP or in the American Medical Technologists (AMT) exam within the first year after graduation.

SLO 2: Application of MLS Professional Skills

- Achieve Medical Laboratory Scientist entry-level psychomotor, clinical, and professional skills for service to humanity.
- Demonstrate competency to perform a full range of test protocols in the contemporary medical laboratory setting encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including body fluids, chemistry, hematology, immunohematology, immunology, microbiology, molecular diagnostics, urinalysis, and phlebotomy.
- Exhibit proficiency to evaluate clinical data and interpret results, problem solve, troubleshoot, and use statistical approaches when evaluating data.
- Exhibit administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, financial resource management, and appropriate composure under stressful conditions.
- Application of safety and governmental regulations and standards as applied to medical laboratory practice.

SLO 3: Practice Ethics and Professionalism

- Demonstrate ethical and professional behaviors in both didactic and practicum portions of the Program.
- Model the professional traits of an entry-level healthcare practitioner.
- Display professional conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and avoiding personal concerns and biases to interfere with the welfare of patients.
- Demonstrate effective communication skills, including competent written, oral, and visual communication, to ensure accurate and appropriate transfer of information.
- Embrace interprofessional collaborative practice that strengthen the health care team and enhances patient outcomes.

Goal 3: Program Accreditation
Maintain Program accreditation.

Program Learning Outcomes

Upon graduation of the Program for Medical Laboratory Science and initial employment, the Medical Laboratory Science Andrews University graduate should be inclined to engage in Christian service as MLS Professionals and be able to demonstrate entry-level competencies in the following areas of professional practice:

1. Reflect ethical and moral attitudes and principles essential for gaining and maintaining the trust of professional associates, the support of the community, and the confidence of the patient and family;

2. Maintain an attitude of respect for the patient and confidentiality of patients' records and/or diagnoses;
3. Develop and establish procedures for collecting, processing, and analyzing biological specimens and other substances;
4. Perform analytical tests on body fluids, cells, and other clinical substances;
5. Integrate and relate data generated by the various clinical laboratory departments while making decisions regarding possible discrepancies;
6. Confirm abnormal results, verify quality control procedures, and develop solutions to problems concerning the generation of laboratory data;
7. Make decisions concerning the results of quality control and quality assurance measures, and institute proper procedures to maintain accuracy and precision;
8. Establish and perform preventive and corrective maintenance of equipment and instruments as well as identify appropriate sources for repairs;
9. Develop, evaluate, and select new techniques, instruments and methods in terms of their usefulness and practicality within the context of a given laboratory's personnel, equipment, space, and budgetary resources;
10. Demonstrate professional conduct and interpersonal skills with patients, laboratory personnel, other health care professionals, and the public;
11. Establish and maintain continuing education as a function of growth and maintenance of professional competence;
12. Provide leadership in educating other health personnel and the community;
13. Exercise principles of management, safety, and supervision;
14. Apply principles of educational methodology, and
15. Apply principles of current information systems.

IV. PROGRAM ASSESSMENT

- A. The MLS faculty has agreed on the following assessment plan as shown on Table 1 (p. 9).

Table 1. Assessment Plan



Assessment Plan of Medical Laboratory Science Program by Year

NAACLS Benchmarks	Program Student Learning Outcomes (SLO)	Measure	Target	Assessment of SLO by Year		
				2020-2021	2019-2020	2018-2019
Graduation Rates (70%)	SLO 1: MLS Comprehensive Didactic Competency	Direct <i>-Clinical Year Didactic Competencies</i>	1. Clinical-year students will achieve a grade no lower than "C-" in all (clinical year) MLSC-400 level courses. AND 2. Clinical-year students will maintain a minimum GPA of 2.50 during the clinical year.	Target Met	Target Met	Target Met
Certification Rates (75%)	SLO 2: Application of MLS Professional Skills	Direct <i>-BOC Scores</i> <i>-Clinical Evaluation of Student Performance</i>	The percentage of graduates that pass the Medical Laboratory Sciences Board of Certification (BOC) by the American Society for Clinical Pathology (ASCP) within one year of graduation will be 80% or greater.	Target Met The BOC & AMT pass rate: 83% (n=18)	Target Met The BOC pass rate: 81% (n=21)	Target Met The BOC pass rate: 87% (n=15)
Placement Rates (70%)	SLO 3: Practice Ethics and Professionalism	Indirect <i>-Student feedback on placement</i> <i>-Employment feedback</i>	The percentage of graduates that obtained employment or continue their education within the first six months after graduation will be 80% or greater.	Target Met 100% of those seeking employment in the Medical Laboratory Sciences field were employed within six months after graduation.	Target Met 100% of those seeking employment in the Medical Laboratory Sciences field were employed within six months after graduation.	Target Met 100% of those seeking employment in the Medical Laboratory Sciences field were employed within six months after graduation.

V. SUMMARY OF ASSESSMENT ACTIVITIES

A. DIRECT MEASURE: NAACLS Benchmark for accredited programs - Three-years consecutive results of graduate certification rates demonstrate an average of at least 75% pass rate on the ASCP-BOC examinations for those who take the exam within the first year of graduation as calculated by the most recent three-year period. Three-year averages should be and are calculated using raw student numbers. Records for assessment activities are kept in the Office of the MLS Department Chair and may be found in individual student records maintained in the MLS program office.

- Program action: Program faculty assessed professional program graduates using results from the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Scientist (MLS) exam.
- Strengths and Weakness in Student Learning Outcomes: The most recent three-years average pass rate on the ASCP BOC MLS exam (Table 2) is above the NAACLS benchmark of at least 75% (program average pass rate for the last 3 years is 79.62% for those who take the exam within the first year of graduation. Student first time pass rates for this cycle was 72%. The average mean scaled score for the 2021 examination cycle was 443. This represents a decrease as compared to the Program mean scaled scores for the previous examination cycle (2019 = 451). The Program’s mean scaled scores for this testing cycle are also lower than the Universities (471) and National (476). It should be noted that the mean scaled scores for Universities and National are also lower as compared to the 2020 cycle.
- Recommendations for Improvements: The faculty is completing another comprehensive review of the didactic material in consultation with the ASCLS Body of Knowledge (BOK) and updated BOC exam outline. Additional assessment resources will include: a BOC review textbook required for the review course, five discipline-specific review exams, and a mock BOC exam in which students will have to achieve a minimum of 80%. The faculty will continue to monitor program outcomes and will make curriculum adjustments as needed.

Table 2. Three-year BOC Pass Rates

	Class of 2019	Class of 2020	Class of 2021
Total number of graduates	15	24	20
Number of graduates that sat for exam within one year of graduation	15	21	18
Number of examinees that passed the exam within first year of graduation	13	17	13
Yearly BOC Pass Rate (%)	87%	81%	72%*
3-year average: 79.62%			

*Does not include the AMT exam pass rates. Combine BOC & AMT pass rate is 83% (n=18).

Table 3. Three-year ASCP-BOC Certification Rates

Andrews University Program for Medical Laboratory Science			
CYCLE: 2019*	Program	Universities	National
Number of Examinees	17***	3108	4252
Mean Scale Score	451	502	505
Number Passing (%)	15 (88.24%)	2555 (82%)	3495 (82.16%)
Number Failing (%)	2 (11.76%)	853 (23%)	1219 (23.92%)
CYCLE: 2020*	Program	Universities	National
Number of Examinees	21	3263	4489
Mean Scale Score	462	483	486
Number Passing (%)	16 (76.19%)	2533 (78%)	3477 (77.46%)
Number Failing (%)	5 (23.81%)	730 (22%)	1012 (22.54%)
CYCLE: 2021*	Program	Universities	National
Number of Examinees**	19	2371	3273
Mean Scale Score	443	471	476
Number Passing (%)	13 (68.42%)	2371 (75%)	3273 (76.06%)
Number Failing (%)	6 (31.58%)	773 (25%)	1030 (23.94%)

NOTE: *ASCP calculates and reports data for first-time examinees while NAACLS's benchmark report includes all examinee attempts within the first year after graduation. Data in this table is for first time examinees. **Includes one first-time examinee from class of 2020.

B. INDIRECT MEASURES:

1. Graduation rates - NAACLS benchmark for graduation rates - Three years consecutive results of graduation rates demonstrating an average of at least 70% of students who have begun the final half of the program go on to successfully graduate from the program as calculated by the most recent three-year period. Records for assessment activities are kept in the Office of the MLS Department Chair and may be found in individual student records maintained in the MLS program office.

NOTE: Our program consists of three (3) consecutive semester-terms, divided into two parts: the didactic portion and the clinical practicum portion. Students begin the program in the fall and complete the program at the end of the following summer term. Accordingly, the program determines the final half of the program to be when students have completed the didactic portion of the program and begin the second and last portion of the program, third semester or summer semester-term, which consists of the clinical practicum.

- Program action: Program faculty reviewed program graduation rates.
- Strengths and Weakness in Program Outcomes: The most recent three-years average for graduation rates (Table 4) are well above the NAACLS benchmark of at least 70% of students who have begun the final half of the program go on to successfully graduate from the program.
- Recommendations for Improvements: The faculty recommends continuing the current practices that have contributed to the current program graduation rates.

Table 4. Three-year Graduation Rates

	Class of 2019	Class of 2020	Class of 2021
Number of students beginning final half of program	15	24	20
Number of graduates	15	24	20
Graduation Rate (%)	100%	100%	100%
Graduation 3-year average: 100%			

2. Placement rates (NAACLS benchmark for graduate placement rates) - Graduate placement rates demonstrate that an average of at least 70% of respondent graduates either find employment in the field or a closely related field (for those who seek employment) or continue their education within one year of graduation as calculated by the most recent three-year period. Records for assessment activities are kept in the Office of the MLS Department Chair and may be found in individual student records maintained in the MLS program office.
- Program action: Program faculty reviewed graduates placement rates.
 - Strengths and Weakness in Program Outcomes: The most recent three-years average for placement rates (Table 8) are well above the NAACLS benchmark of at least 70% of respondent graduates either find employment in the field or a closely related field (for those who seek employment) or continue their education within one year of graduation.
 - Recommendations for Improvements: The faculty made no recommendations for improvements.

Table 5. Three-year Placement Rates

	Class of 2019	Class of 2020	Class of 2021
Number of graduates	15	24	20
Number of graduates that gain employment in the field or continued their education within one year of graduation	15	24	20
Graduation Rate (%)	100%	100%	100%
Graduation 3-year average: 100%			

*Lost to follow-up are counted as placed.

3. Attrition rates for the last three consecutive years (table 6) reflects all students that *began the "final half" of the program and subsequently completed the program versus those that left the program (voluntarily or involuntarily). The "final half" of the program has been defined for as the clinical practicum portion of the program.* Program attrition is typically due to either academic dishonesty and/or inability to meet the progression criteria, which includes maintaining a minimum 2.5 GPA in all portions of the program.

Table 6. Three-year Attrition Rates

	Class of 2019	Class of 2020	Class of 2021
Number of students that began the "final half" of the program	15	24	20
Number of students that did not complete the program	0	0	0
Attrition Rate (%)	0%	0%	0%
Attrition 3-year average: 0%			

VI. MEDICAL LABORATORY SCIENCE CLINICAL YEAR CURRICULUM SEQUENCE

FALL SEMESTER		
Course Number	Course Title	Credits
MLSC401	Clinical Year Seminar & Research Methodology	1
MLSC411	Hematology & Lab	3
MLSC421	Clinical Immunology, Virology & Molecular Diagnostics & Lab	2
MLSC431	Clinical Bacteriology & Lab	4
MLSC441	Immunohematology & Lab	3
MLSC451	Clinical Chemistry I & Lab	3
Total Credits		16
SPRING SEMESTER		
MLSC405	Clinical Year Seminar & Research Project	1
MLSC414	Body Fluids & Hemostasis	3
MLSC432	Clinical Mycology & Parasitology & Lab	2
MLSC442	Transfusion Medicine & Lab	3
MLSC452	Clinical Chemistry II & Lab	3
MLSC470	Laboratory Operations & Best Practices	3
MLSC483	Comprehensive Review & Written Examination	1
Total Credits		16
SUMMER SEMESTER		
MLSC415	Clinical Hematology, Hemostasis & Body Fluids Practicum	3
MLSC423	Clinical Immunology, Virology & Molecular Diagnostics Practicum	1
MLSC433	Clinical Microbiology Practicum	4
MLSC443	Clinical Immunohematology Practicum	4
MLSC453	Clinical Chemistry Practicum	3
Total Credits		15