Indiana University School of Medicine
Health Professions Programs

2021 – 2022 Assessment Report

The Health Professions Programs (HPP) include the ***undergraduate*** programs that reside within the School of Medicine. Graduate and MD programs within the School of Medicine fall under the purview of different administrative offices. They are not included in this report. HPP includes:

Program	Degree Awarded
Cytotechnology	B.S.
Histotechnology	Cert., A.S.
Medical Laboratory Science	B.S.
Ophthalmic Technology	Cert. [New for 2023; No Students]
Paramedic Science	A.S.
Respiratory Therapy	B.S.
Radiologic Sciences	
Radiography	A.S.
Nuclear Medicine Technology	B.S.
Medical Imaging Technology	B.S.
Radiation Therapy	B.S.
* IUFW Medical Imaging and Radiologic Sciences	B.S.

Each of these undergraduate professional programs maintain separate accreditation through specialty accreditation organizations. The program directors and faculty of each of these programs is responsible for maintaining their accreditation. In addition to their program accreditors, the program directors and faculty are active in their professional practice organizations, national credentialing boards, and state licensure boards which may set standards or offer guidance on student learning outcomes and other aspects of the educational program's design. Each program is required to have periodic site visits whose frequency is determined by their respective accreditation organization. Please note that in addition to the yearly IUPUI PRAC report, each Health Professions Program is required to submit an annual report to their accrediting agency. Although each annual report can vary in format per specific program accreditation guidelines, most reports include an analysis and action plan for each of the following:

- Student learning outcomes
- Accreditation board exam results
- Employer surveys (cognitive, affective and psychomotor domains)
- Graduate surveys (cognitive, affective and psychomotor domains)
- Attrition/retention
- Job placement

Program Structure and Student Population

All of the IUSM HPP are cohort-style and all have selective admissions. Some programs are entirely online but these are typically taken by students who are full-time healthcare employees seeking additional certification and training. Each of the programs within HPP has evolved in unique ways in response to degree requirements, accreditation standards, availability of clinical placements, and the healthcare landscape in central Indiana. As an example, some programs (Medical Laboratory Science & Cytotechnology) are 3+1 which means that students spend their first three years in University College or other schools as they prepare for the competitive application process. Radiation Therapy, Respiratory Therapy, and several others have adopted a 2+2 format with two years of prerequisites in University College or other school. In the case of Radiography, students will spend two semesters in University College before entering their associate's degree program in a 1+2 format. The Medical Imaging and Radiologic Sciences program at IUFW is a 1+ 3 format. As illustrated by these examples, there is wide diversity in program structure, length, and geographic location.

The HPP draw secondary school students to the IUPUI campus from across the Midwest, but also draw a considerable number of transfer applicants from other post-secondary institutions. The first illustrative example is the Medical Laboratory Science program which has applications from every campus in the IU system and has an affiliation with Purdue whereby students take three years of prerequisite coursework in the Purdue system before completing their final year and earning a bachelors at IUPUI. HPP also have unique partnerships with area hospital systems and universities. The Respiratory Therapy program is a 2+2 program that was formed as part of a consortium between IUPUI, Ball State, University of Indianapolis, and IU Health. Each cohort in the Respiratory Therapy program is comprised of students from each member of the consortium. The Medical Laboratory Science program exists as a co-teaching partnership with IU Health wherein each cohort of 24 students is split equally between the two programs. In this partnership IU system and Purdue system students enter the IU MLS program while students from numerous non-IU academic institutions such as Purdue, Ball State, Franklin, Indiana State, University of Miami, University of Indianapolis enter the IU Health program. The Paramedic Science is another partnership program between IUSM and Indianapolis Emergency Medical Service. A final example of the diversity of the HPP is the Histotechnology Program. The Histotechnology program is offered entirely online and enrolls students from across the country. The program relies on locally recognized clinical coordinators, distance education technology, and students mailing technical artifacts to faculty for the teaching and assessment of these students. In some of the partnerships previously listed, the program directors and faculty may be traditional full-time IUSM faculty with tenure or non-tenure track appointments. In other programs, faculty and program directors may have adjunct status with IUSM and have their primary employment within healthcare institutions such as IU Health or Indianapolis EMS.

As professional healthcare programs, all HPP require extensive clinical experiences. These clinical experiences are not only required for program accreditation leading to national certification and state licensure, but they are also critical opportunities for teaching and assessment. The goals and objectives that are taught and assessed during the clinical experiences are intertwined with and complementary to the learning objectives for lecture and student laboratory courses. The clinical experiences require students to apply classroom knowledge, demonstrate technical skills in real-world situations, and practice skills within the affective domain.

In summary, each of the HPP within IUSM are shaped by their accreditors, their academic departments, their clinical affiliations, and numerous other stakeholders. The students are a diverse group that may hail from all IU campuses as well as other academic institutions. Once students matriculate into a program, their educational experiences are carefully crafted to empower them to meet learning goals and objectives across all domains of learning. To cater to all of the intricacies and diversity among the HPP programs, starting with the 2020-2021 cycle we are adopting a three-year rotating schedule of reporting to PRAC. Below is a cycle of reporting.

Year 1	Year 2	Year 3
MLS	Histotechnology	Nuclear Medicine
Cytotechnology	Medical Imaging Technology	Radiography
Radiation Therapy	IUFW Medical Imaging Radiologic Sciences	Paramedic Science
		Respiratory Therapy

Advising, Student Population, Career Advisement, Learning Resource Centers.

Students are not directly admitted into IUSM HPP cohorts. Prior to admission into IUSM, most advising for students is accomplished through academic advisors and career advisors in University College, Health and Life Sciences Advising Center, and to a lesser degree in other schools. HPP has one academic advisor who advises students through the application process and assists programs in coordinating admissions. Once students are admitted to a program, their program director assumes most of the roles and responsibilities of an advisor and career advisor with the assistance from the HPP academic advisor and HPP director. HPP does not operate any tutoring or success centers because our cohort sizes are too small to be effective.

Profiles of Learning for Undergraduate Success

The structure of the HPP eliminates the possibility of longitudinally developing students from freshman to seniors in all areas of the Profiles. HPP faculty rely on University College and other schools to start student development in the Profiles and then we teach the professional curriculum once students are admitted to a HPP program. Since admission is competitive and is open to many different educational institutions, we have no clear way of identifying and tracking students before they enter our cohorts. Thankfully, the flexibility of the Profiles allows us to still teach and scaffold students in each of the attribute areas within our programs. However, we must acknowledge that for 3+1 and 2+2 programs there is less time to develop students in each of these attributes than other academic programs across campus. Additionally, since students are arriving from multiple campuses and institutions, there is a spectrum of familiarity and expertise in the Profiles amongst our student population.

Special Emphasis 1: Process to date on implementing the Profiles into teaching, learning, and assessment, and of any assessment findings related to student achievement of the Profiles

All of the responding programs have mapped their program's learning goals and objectives to the Profiles. Most of the programs have managed to create tables that merge program specific

accreditation standards, the Profiles, and the program's learning goals and/or objectives to ensure they are meeting the demands of all stakeholders.

Special Emphasis 2: An account of progress in identifying, developing, redesigning, and implementing experiences included in the Record and of any assessment findings.

All of the HPP have experiences that could be acknowledged in the Record. Our clinical experiences, as well as capstone/research experiences, would all be candidates for the Record. In the Fall of 2022 we invited Jerry Daday and Tom Hahn to introduce the Record with our faculty. Faculty and Program Directors are working on their submissions. Most are focusing on transferring their RISE designated courses to the Record. In some cases, faculty are redesigning assessments or implementing new reflective prompts to enable this transition. As a group, we see a value in the Record. It is a great way for IUPUI graduates to provide a record of their experiential learning and accomplishments to employers. However, within our School there hasn't been a demand by students or employers to document experiential learning in this way. Certification (and licensure) of our graduates and accreditation of our programs are the only matters that concern our employers and students. The vast majority of employers are also our clinical affiliates so they are participating first hand in the experiential learning of our students.

Special Emphasis 3: Lingering or Ongoing Impact of COVID-19

Each of the three programs have addressed this item in their own sections. In general, COVID has taught HPP faculty to leverage technology when it is best suited for both teaching and assessment. COVID has also taught our programs to be more innovative in the expansion of our programs thereby increasing the impact we have in Indiana and broader afield.

I.   Program Description

To meet health care manpower needs in both urban and rural settings nationwide, the educational program in histotechnology is offered through the Indiana University School of Medicine and functions as a cooperative effort between IUSM and qualifying histology laboratories around the United States. The Histotechnology Program offers a certificate and an associate degree. Prerequisite courses required of students prior to entry into the program are Certificate Track: applicants must hold a minimum of an associate degree with a minimum 12 credit hours in chemistry & biology combined. Associate Degree Track: 30 credits of specific General Education Courses taken at any regionally accredited college or university or IU Online then transferred to IU. Both tracks must have access to a full-service histology lab with a certified HT (ASCP) or HTL (ASCP) employed at the facility and an affiliation agreement between the facility and University must be executed before students are admitted into the program. Affiliate clinical sites are established in laboratories that meet specific requirements for broad experiences and directed training by a certified histologist (HT or HTL).

The HT program prepares its graduates to pass the American Society for Clinical Pathology's (ASCP) Board of Certification HT or HTL exam. This exam is a national credentialing exam for professionals working in histology laboratories. Our program is highly sought after locally and nationally for histotechnology training.

Traditionally, only students who have training access to, or are employed by, laboratories that qualify as affiliate clinical sites were accepted into the program. In 2012 the histotechnology program responded to several requests from individuals and laboratories interested in histotechnology training, but not yet employing the student in the lab. A limited number of students were admitted on a trial basis. This has become standard practice. Regardless of employment status, affiliate agreements are signed and on file before students are admitted to class. Student enrollment has continued with high numbers, averaging 53 per year.

The program was supported initially by a three-year federal grant. The granting agency's funding expired in September 1997; the School of Medicine has incorporated an annual budget for the Histotechnology Program in its operational budget. The program budget was subsequently included in the overall Medical Laboratory cluster of budgets that include Clinical Laboratory Sciences, Cytotechnology, and Histotechnology. Student enrollment has continued with high numbers, averaging 53 per year.

The program administers a curriculum of university-based theory presented weekly via recorded lectures and bi-weekly interactive Zoom web conference. Practical experience is gained in selected histopathology laboratories at the student's home location under the direct supervision of a Clinical Liaison. Lectures are offered as four sequential three credit-hour courses; practical experiences are also packaged in four sequential three credit-hour courses, for a total of 24 semester hours for Track #1. An additional 6 credit hour course is required for Track #2 students. Courses must be taken sequentially, and practicum courses must be undertaken concurrently with lecture courses, as designated. Upon successful completion of the program's courses Track #1 graduates are awarded a certificate for the university and Track #2 graduates are awarded a degree from the university.

Affiliate clinical sites are established in laboratories that meet specific requirements for broad experiences and directed training by a certified histologist (HT or HTL). Practicum "modules" of study are outlined in the curriculum, and can be accomplished by the trainee, under the

instruction of on-site personnel. The minimum requirements are ASCP's recommended "entry-level" competencies. When indicated by module topics, students are assigned to send to the Program Director certain technical products such as paraffin-embedded tissue blocks or cut and stained slides. The products are evaluated by the Program Director, Education Coordinator and PRN Technical Grader with grades and constructive comments returned to the student and clinical site instructor.

Lectures are recorded and available to students through Canvas, Indiana University's Learning Management System. Each lecture topic is accompanied by related study materials such as reading, audio-visuals, and assignments. Assignments and exams are submitted to the Program for evaluation, with grades returned to the student and feedback to the clinical site instructor. Live class discussions are delivered to clinical site students and clinical liaisons via ZOOM interactive web-conferencing sessions.

Curriculum development follows the ASCP's HT Exam Content Outline. The goal of the program is to provide a course of study by which the histology student can gain knowledge of theory and practical skills sufficient to meet the entry-level task assessment and to successfully accomplish the certification exam, thereby becoming a more effective practicing histology technician.

The program is only offered in a full-time, cohort style format. The HT program prepares its graduates to pass the American Society for Clinical Pathology's HT or HTL (ASCP) Board of Certification exam. This exam is a national credentialing exam for professionals working in anatomic pathology laboratories. Our program is highly sought after locally and nationally. Graduates enjoy a direct path from their education to their future professions as Histotechnicians and Histotechnologists.

II.   Learning Outcomes

The IUSM HT program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Our programmatic learning outcomes are informed by NAACLS standards, American Society for Clinical Pathology (ASCP) HT/HTL content guidelines, National Society for Histotechnology, and the IUPUI's Profiles of Learning for Undergraduate Success.

Here is a link to an Excel sheet that maps the IUPUI Profiles, NAACLS Entry Level Competencies, NAACLS Standards, and HT Program Learning outcomes

Below is a list of our programmatic Student Learning Outcomes:

1: Knowledge: Demonstrate an understanding of histologic procedures including theory, technical, procedural, quality control, problem-solving, and analyze biological specimens regarding tissue identification, quality control and troubleshooting procedures on patient specimens received in the histology, cytology veterinary, industry, autopsy, electron microscopy laboratories. The histotechnician will have diverse functions in areas of pre-analytic, analytic, and post-analytic processes.

2: Technical Skills: Perform proficiently the full range of histologic laboratory tests in areas involving receiving and documenting specimens, fixation, decalcification, tissue processing, frozen sectioning, embedding; microtomy, nuclear and cytoplasmic staining, special staining methodology for: connective tissue, carbohydrates, amyloid, lipids, pigments, minerals, nerve, special cells, microorganisms, enzyme and immunohistochemical staining; molecular techniques on patient specimens.

3: Communication: Communicate effectively, orally and in writing, at a level sufficient to serve the needs of patients, the public, and members of the healthcare team. Work with healthcare team to assure accurate testing on patient samples. Demonstrate scientific literacy by locating and interpreting scientific literature to inform decision making for the benefit of the profession and the patient community.

4: Educational Methodologies and Training Responsibilities: Effectively apply educational methodologies and terminology at a level to orient new employees of the histology laboratory.

5: Supervision, management, administration: Apply safety and governmental regulations and standards in the histology laboratory. Collaborate with healthcare teams to ensure safety and quality healthcare delivery to the community.

6: Professional and ethical conduct and Continuing Professional Development: Apply the principles and practices of professional and ethical conduct to ensure the safe and ethical treatment of all patients. Recognize the significance of continuing professional development and development of a professional community.

7. Critical Thinking: Engage in the scientific process by understanding the principles and practices to solve a technical error.

Curriculum and Learning Environment

Prerequisite courses are required to be completed before the student can begin the professional course work. Certificate track students must hold an associate degree or above and a minimum of 12 credits in general biology, anatomy, and chemistry. Associate degree track students must complete 30 credits of general education courses that include general biology, anatomy, and chemistry.

The program's curriculum is designed to provide both entry-level theoretical knowledge and technical skill learning opportunities to the students using both didactic and practicum courses. Although separate courses, the information provided in each is coordinated with its concurrent "partner" course (i.e., didactic course H211 presents the theory of the practicum course H281, offered concurrently). Didactic courses are taught from the program office via Canvas and ZOOM web conferencing.

Practicum courses are taught in the affiliated clinical facility.

Program Completion Requirements Satisfactory completion of 24 credit hours of professional courses for the certificate track during the fall and spring terms and 30 credits of professional courses during the fall, spring, and summer terms for the associate degree. All course work must be completed in compliance with the program and school's academic and professional policies.

The Program's curriculum includes all aspects of the entry level histology practitioner requirements. Histotechnology courses H211-H284 carry a 3-credit hour rating and H299 carries a 6-credit hour rating.

Due to the student's employment in the lab, they are encouraged to be aware of the numerous learning experiences they can be exposed to, not just the assigned activities. However, students are only evaluated on course-related technical and professional requirements.

III.   Assessment Cycle

In addition to the required self-study process, the program has a multi-faceted scheme for continuous review of its curricular effectiveness. Monitored indicators of program effectiveness include:

Summative evaluation tools are completed annually and are as follows:
• surveys of program graduates
• surveys from employers of program graduates
• annual program and instructor evaluations completed by current students and their Clinical Liaisons
• review of graduates' Board of Certification exam pass rates, as well as critical review of scores in all test categories.

Formative evaluation tools process include:
• student academic performance in course work, final exams, including distribution of grades and students earning placement on Dean's List
• program's student attrition
• Course Evaluations – at the end of each course

See the link to the [Histo Schedule for Systematic Assessment](#)
Involved Parties:
- Program Director
- Education Coordinator
- Students
- Clinical Liaisons at Affiliate Sites
- Advisory Committee
- College administration

Student final examinations and final technical product are evaluated by the Education Coordinator and the Program Director.

Feedback from students, graduates, and employers is monitored annually through year-end student evaluations and graduate/employer surveys.

The Program Director monitors and reports program statistics that include certification, graduation, placement, and attrition rates. These rates are compiled and reported to NAACLS on a yearly basis. These rates are available to the public on the school's website.

Graduation rates are gathered, tabulated, and are tracked by the program annually. The number of applications admitted, denied, withdrawn, and dismissed are gathered annually. The Analysis of the review is used to formulate recommendations that improve the program's effectiveness. Graduates are confirmed and conferred annually.

Attrition Rates are gathered, tabulated, and are tracked by the Program Director (PD) annually. The results are presented to the advisory board by the PD and reviewed. Analysis and discussion of this rate takes place during annual advisory meetings. Continuing improvement is the goal of the program.

External certification examination scores are closely monitored for trends that would indicate amendments or revisions to the Program's curriculum. It is the Program's goal to have successful graduates, and one measure of their success is the ability to pass the certification examination. The graduate's success is, in turn, a measure of the Program's success.

Graduate BOC Certification Pass Rate data is collected and analyzed by the Program Director. Statistics are reported and kept on file for each graduation year. Annually, BOC Pass Rate data, along with national mean data, is reviewed by the program director and education coordinator. It is then provided to the advisory committee at the annual meeting. Weaknesses and strengths of

each sub-score are analyzed and compared to the curricular content. After careful review and discussion, the curriculum is adjusted accordingly. After 1 year, the changed curricular data is gathered and analyzed to see if the changes have improved.If improvement is seen, changes are kept. If there is no change the committee discusses if this area needs to be reviewed again the following year or not. If this area shows lower scores in data, we return to the previous curriculum, and it will be reviewed again during the next advisory committee.

The placement rate is evaluated annually. The employment rate is high (100%) for the Program's graduates, but this is probably because the student is already employed in the training laboratory and does not have to find a job. Some graduates have changed employers, and some have advanced in their own laboratories to positions of supervision. Several have become Clinical Liaisons of students in subsequent years.

Each fall the Program Director submits an annual report to NAACLS which includes three years of retention and graduate rates, pass rates on the ASCP credentialing exam, and employment rates. Since the program's inception in 1995 the IUSM HT program has earned full accreditation. The most recent award was in 2021 for ten-years. A "Year 5 Interim Report" will be required upon entering the fifth year of the accreditation award

IV.   Description of Assessment Methods

The purpose of evaluating students at regular intervals is to stimulate communication and help the Program Director, Education Coordinator, Clinical Liaison, and the student discuss and understand the student's level of achievement as compared to the expectations of the courses and the workplace. It should be viewed as a method to improve the student's performance through constructive input and a shared understanding of the expectations of the Program and the histology laboratory.

There are two evaluation forms to be completed by the Clinical Liaison for each registered student. The Professional Performance Evaluation (PPE) form is used in the practicum (H281-H284) courses and counts 15% of the overall grade for each practicum course.

The Technical Skills Evaluation (TSE) form is used only for evaluating technical skill as it is achieved in the current practicum (H281-H284) courses and counts 15% of the overall grade for each practicum course.

The student must score a minimum of 77% for a passing grade on course final exams and cumulative comprehensive examinations. In addition, each exam question must have a minimum of 65% correct scores. If below this percentage questions are pulled and reviewed. The Program Director and Education Coordinator determine if the question or course material need modifications. Final exams are reviewed at the end of each course and the comprehensive exam is reviewed annually to assess the effectiveness of these tools in conjunction with overall objectives, goals, and competencies. Modifications that may be warranted are incorporated into these assessment tools and marked for follow-up.

ASCP exam pass rates and sub-scores are analyzed annually. The lowest sub-scored area is reviewed, analyzed and curriculum modifications and updates are made. The number of graduates taking the exam versus the number not taking the exam is reviewed annually. Graduate surveys are modified as needed to address any program area under review.

Outcome measures, such as year-end, graduate, and employer surveys, are tabulated annually by the Program Director and presented for review and evaluation by the Advisory Council. Additionally, the BOC section scores are reviewed by the Program Director and Advisory Board members for weaknesses and strengths. Weaknesses and strengths of the outcome measures are

carefully considered, and curriculum is adjusted based on results of the outcome measures. Potential program changes and ways for improvement are discussed during advisory council meetings. Meetings amongst the faculty, staff and Clinical Liaisons are held to further drive improvement strategies and curricular changes suggested during council meetings. Depending on the changes determined to be necessary, action plan is developed, implemented and outcomes analyzed for signs of improvement. Outcome assessment summary tables, complete with action plans, are maintained by the Program Director. Action plans are followed up by the Program Director through electronic communication or additional meetings.

V. Assessment Findings & Planned Improvement

When evaluating assessment data for the PRAC report we use the data submitted on the NAACLS 2022 Annual Report. This report includes the last 3 academic years.

Table 1: ASCP Board of Certification Exam Results IUSM HT Program

ASCP BOC Certification Pass Rates for Graduates from the following years:

Graduated between 7/1/18 - 6/30/19: 63
Graduated between 7/1/19 - 6/30/20: 42
Graduated between 7/1/20 - 6/30/21: 47

	For students who graduated between 7/1/18-6/30/19	For students who graduated between 7/1/19-6/30/20	For students who graduated between 7/1/20-6/30/21
A) # who sat for the ASCP BOC exam within first year of graduation	56	34	32
B) # who passed the ASCP BOC exam within the first year of graduation	46	30	28
Yearly Certification Pass Rate Percentage: (B/A) x 100	82	88	88

Indiana University School of Medicine
Medical Imaging Technology Programs
PRAC Report 2022

I.   Program Description

The Indiana University School of Medicine - Medical Imaging Technology (MIT) baccalaureate degree is designed to prepare competent, entry-level technologists in the cognitive, psychomotor, and affective learning domains in advanced diagnostic medical imaging technology concentrations. Medical Imaging Technology Programs include:

- MIT Clinical-Cardiac Interventional/Vascular Interventional, Computed Tomography, Magnetic Resonance Imaging, Mammography, Modality Intern
- MIT Non-Clinical
- Diagnostic Sonography

MIT Clinical

The MIT Clinical program is a 10-month, 30 credit hour program that begins in the Fall semester and ends the following Spring semester. Students entering this track of the program must meet Indiana University's General Education Core requirements and other program prerequisite courses prior to program start; therefore, students earn a bachelor's degree upon program completion. The MIT Clinical Program has five modality-specific majors, from which incoming students must declare prior to program start: cardiac-interventional/vascular interventional, computed tomography, magnetic resonance imaging, mammography, and modality-intern. Students in this program take 15 modality-specific credits each semester.

MIT Non-Clinical

The MIT Non-Clinical program is of a variable timeframe, 30 credit hour program that can begin in the Fall or Spring semesters. Students entering this program must meet Indiana University's General Education Core requirements and other program prerequisite courses prior to program start; therefore, students earn a bachelor's degree upon program completion. Students in this program choose to take from 3 credits to 15 credits per semester, allowing for flexible duration of program length.

Diagnostic Sonography

The Diagnostic Sonography program is an 18-month, 46 credit hour program that begins Summer Session II and ends the following Fall semester. Students entering the program must meet Indiana University's General Education Core requirements and other program prerequisite courses prior to program start; therefore, students earn a bachelor's degree upon program completion. The ultrasound program has two subspecialty tracks incoming students must declare prior to program start: medical sonography and echocardiography.

II.   Learning Outcomes

The IUSM MIT and Diagnostic Sonography Programs learning outcomes align with industry educational standards and are appropriately mapped to adhere to the IUPUI Profiles of Learning for Undergraduate Success (PLUS). The learning outcomes in relation to the six program goals include:

Goal 1: Students will demonstrate clinical competency.
Learning Outcomes:
- Students will effectively perform advanced diagnostic medical imaging procedures. (Psychomotor)
- Students will demonstrate appropriate knowledge of advanced diagnostic medical imaging procedures. (Cognitive)

Goal 2: Students will demonstrate effective communication skills.
Learning Outcomes:
- Students will use effective oral communication skills with patients and clinical staff. (Affective)
- Students will demonstrate effective written communication skills. (Cognitive)

Goal 3: Students will think critically and apply problem solving skills in the healthcare environment.
Learning Outcomes:
- Students will evaluate the exam and make logical procedural variations. (Psychomotor)
- Students will evaluate images for differential diagnoses. (Cognitive)

Goal 4: Students will demonstrate professional values.
Learning Outcomes:
- Students will demonstrate appropriate professional values in the clinical setting. (Affective)
- Students will demonstrate an understanding of ethical obligations as described in their designated advanced imaging Code of Ethics and Scope of Practice. (Cognitive)

Goal 5: Students will have the knowledge of professional development opportunities.
Learning Outcomes:
- Students will demonstrate knowledge of professional development resources. (Cognitive)

Goal 6: To prepare competent entry-level technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for their designated advanced imaging concentration.
Learning Outcomes:
- Students will successfully complete the program. (Affective)
- Students will express confidence in the overall quality of skills learned while in the program. (Affective)

III. **Curriculum and Learning Environment**
Medical Imaging Technology – Clinical and Non-Clinical
Didactic courses are designated as synchronous and asynchronous online courses and clinical practicum learning is held at central Indiana hospitals, imaging centers, and other clinical sites. Students rotate to multiple clinical sites throughout the program to experience a wide range of examinations and environments.

Diagnostic Sonography Program
Two program courses are designated as online courses while the rest are divided between in-person didactic, laboratory, and clinical practicum learning opportunities. Didactic and

laboratory courses are held at Gatch Willis Hall while clinical practicum learning is held at central Indiana hospitals, imaging centers, and other clinical sites. Students rotate to multiple clinical sites throughout the program to experience a wide range of examinations and environments.

MEDICAL IMAGING TECHNOLOGY – NON-CLINICAL TRACK					
Fall			**Spring**		
Description	Course	Credits	Description	Course	Credits
Medical Imaging Informatics	RADI-R 402	3.0	**Intro to MIT Leadership**	RADI-R 413	3.0
The Teaching Technologist	RADI-R 418	3.0	**Trends and Issues in MIT**	RADI-R 416	3.0
MIT Theory I	RADI-R 451	3.0	**MIT Theory II**	RADI-R 453	3.0
MIT Projects I	RADI-R 456	3.0	**MIT Projects II**	RADI-R 457	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	**Multiplanar Anatomy and Pathology for MIT II**	RADI-R 473	3.0
	Total Credits	**15.0**		**Total Credits**	**15.0**
	Cumulative Total	**105.0**		**Cumulative Total**	**120.0**

MEDICAL IMAGING TECHNOLOGY – CLINICAL TRACK | CARDIAC/VASCULAR INTERVENTIONAL					
Fall			**Spring**		
Description	Course	Credits	Description	Course	Credits
MIT Projects I	RADI-R 456	3.0	**MIT Projects II**	RADI-R 457	3.0
CI/VI Principles & Procedures I	RADI-R 468	3.0	**CI/VI Principles & Procedures II**	RADI-R 469	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	**Multiplanar Anatomy and Pathology for MIT II**	RADI-R 473	3.0
Clinical Practicum: CI/VI	RADI-R 481	6.0	**Clinical Practicum: CI/VI**	RADI-R 481	6.0
	Total Credits	**15.0**		**Total Credits**	**15.0**
	Cumulative Total	**105.0**		**Cumulative Total**	**120.0**

MEDICAL IMAGING TECHNOLOGY – CLINICAL TRACK | COMPUTED TOMOGRAPHY					
Fall			**Spring**		
Description	Course	Credits	Description	Course	Credits
MIT Projects I	RADI-R 456	3.0	**MIT Projects II**	RADI-R 457	3.0
CT Principles & Procedures I	RADI-R 466	3.0	**CT Principles & Procedures II**	RADI-R 467	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	**Multiplanar Anatomy and Pathology for MIT II**	RADI-R 473	3.0
Clinical Practicum: CT	RADI-R 482	6.0	**Clinical Practicum: CT**	RADI-R 482	6.0
	Total Credits	**15.0**		**Total Credits**	**15.0**
	Cumulative Total	**105.0**		**Cumulative Total**	**120.0**

MEDICAL IMAGING TECHNOLOGY – CLINICAL TRACK | INTERN

Fall			Spring		
Description	Course	Credits	Description	Course	Credits
MIT Projects I	RADI-R 456	3.0	MIT Projects II	RADI-R 457	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	Multiplanar Anatomy and Pathology for MIT II	RADI-R 473	3.0
Modality Principles & Procedures I	RADI-R 4XX	3.0	Modality Principles & Procedures II	RADI-R 4XX	3.0
Internship in MIT	RADI-R 479	6.0	Internship in MIT	RADI-R 479	6.0
	Total Credits	15.0		Total Credits	15.0
	Cumulative Total	105.0		Cumulative Total	120.0

MEDICAL IMAGING TECHNOLOGY – CLINICAL TRACK | MAGNETIC RESONANCE IMAGING					
Fall			Spring		
Description	Course	Credits	Description	Course	Credits
MIT Projects I	RADI-R 456	3.0	MIT Projects II	RADI-R 457	3.0
MRI Principles & Procedures I	RADI-R 464	3.0	MRI Principles & Procedures II	RADI-R 465	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	Multiplanar Anatomy and Pathology for MIT II	RADI-R 473	3.0
Clinical Practicum: MRI	RADI-R 483	6.0	Clinical Practicum: MRI	RADI-R 483	6.0
	Total Credits	15.0		Total Credits	15.0
	Cumulative Total	105.0		Cumulative Total	120.0

MEDICAL IMAGING TECHNOLOGY – CLINICAL TRACK | MAMMOGRAPHY					
Fall			Spring		
Description	Course	Credits	Description	Course	Credits
MIT Projects I	RADI-R 456	3.0	MIT Projects II	RADI-R 457	3.0
Mammography Principles & Procedures I	RADI-R 470	3.0	Mammography Principles & Procedures II	RADI-R 471	3.0
Multiplanar Anatomy and Pathology for MIT I	RADI-R 472	3.0	Multiplanar Anatomy and Pathology for MIT II	RADI-R 473	3.0
Clinical Practicum: Mammography	RADI-R 486	6.0	Clinical Practicum: Mammography	RADI-R 486	6.0
	Total Credits	15.0		Total Credits	15.0
	Cumulative Total	105.0		Cumulative Total	120.0

Note: Course numbers will change starting Summer 2023

DIAGNOSTIC SONOGRAPHY PROFESSIONAL COURSES*			
Junior Summer II			*Professional Curriculum Total 46 credits*
Description	Course	Credits	
Introduction to Diagnostic Sonography Projects	RADI-R 360	2.0	
Introduction to Diagnostic Sonography Lab	RADI-R 361	3.0	
Diagnostic Sonography Clinical Observation	RADI-R 380	1.0	

	Total Credits	6.0			
	Cumulative Total	80.0			

Junior Fall			Junior Spring		
Description	**Course**	**Credits**	**Description**	**Course**	**Credits**
Principles of Diagnostic Sonography I	RADI-R 351	4.0	**Principles of Diagnostic Sonography II**	RADI-R 352	4.0
Diagnostic Sonography Lab I	RADI-R 362	3.0	**Diagnostic Sonography Lab II**	RADI-R 363	3.0
Ultrasound Physics I	RADI-R 434	3.0	**Ultrasound Physics II**	RADI-R 435	3.0
Clinical Practicum: Ultrasound Imaging	RADI-R 381	3.0	**Clinical Practicum: Ultrasound Imaging**	RADI-R 382	3.0
	Total Credits	13.0		Total Credits	13.0
	Cumulative Total	93.0		Cumulative Total	106.0

Senior Summer			Senior Fall		
Description	**Course**	**Credits**	**Description**	**Course**	**Credits**
Clinical Practicum: Ultrasound Imaging	RADI-R 484	6.0	**Diagnostic Sonography Lab III**	RADI-R 461	1.0
			Introduction to Diagnostic Sonography Professional Life	RADI-R 475	3.0
			Clinical Practicum: Ultrasound Imaging	RADI-R 485	4.0
	Total Credits	6.0		Total Credits	8.0
	Cumulative Total	112.0		Cumulative Total	120.0

IV. Assessment Cycle

Student benchmark results are tabulated annually. The Clinical and Non-Clinical Programs conduct benchmark analysis mid-semester and at the end of each semester. The Diagnostic Sonography Program conducts benchmark analysis at the end of the Fall semester to coincide with senior student program end.

V. Description of Assessment Methods

Based on the program goals and outcomes, assessment tools and benchmarks have been identified to analyze programmatic success. Assessment tools capture data throughout the entire program. Student cumulative test scores, assignment scores, clinical rotation evaluation scores, student graduation rate, and graduate survey scores are used as assessments tools.

VI. Assessment Findings & Planned Improvement

Clinical and Non-Clinical Programs
The Clinical and Non-Clinical Programs have been capturing program assessment data since 2016. Link to 2021-2022 Program Assessment Review for B.S. Medical Imaging Technology and 2021-2022 B.S. Medical Imaging Technology Assessment of Student Learning.
Diagnostic Sonography Program
The Diagnostic Sonography Program began capturing program assessment data with the Class of 2021 cohort. This coincides with the hire of a new Program Director.
Link to Program Student Learning Outcomes Medical Sonography.docx

VII.   Assessment of Covid 19 Adaptations

Clinical and Non-Clinical Programs

All didactic courses were already asynchronous and synchronous Zoom format pre-Covid; therefore, there were no changes to the learning format. Lab and clinical practicum courses were held in-person.

In the summer of 2022, the MIT Program Director looked at pass rates for student credentialing exams. There were no changes in the percent of students who passed their credentialing exams compared to pre-covid. Also, a brief comparison of average course grades was made to pre-covid cohorts and there was no identifiable drop in overall student grades.

Diagnostic Sonography Program

For both the Ultrasound Physics R434/435 and Ultrasound Principles R351/352 courses, we changed to a synchronous Zoom format for both the Fall 2020 and Spring 2021 semesters. This allowed us to continue these courses without interruption even if in-person classes were not permitted. We realized this format worked well enough that these courses could be offered either in-person, on Zoom or as a hybrid format. During the Fall 2021 and Spring 2022 semesters, students were allowed to choose if they wanted to come to campus for in-person format or on Zoom format. Lab and clinical practicum courses were held in-person.

The total online and hybrid format worked well enough we collaborated with IU South Bend Ultrasound Program to enroll their ultrasound students into our didactic courses. IU South Bend students attend our didactic courses via Zoom. IUPUI students now attend all courses on campus in-person to better accommodate their didactic and lab course schedules.

In the summer of 2022, the Diagnostic Sonography Program Director looked at pass rates for student credentialing exams, specifically, the Sonography Principles and Instrumentation and the concentration specialty board examinations. There were no changes in the percent of students who passed their SPI or specialty credentialing exams compared to pre-covid. Also, a brief comparison of average course grades was made to pre-covid cohorts and there was no identifiable drop in overall student grades.

Medical Imaging and Radiologic Sciences – IU Fort Wayne
Bachelor of Science in Medical Imaging

I.   Program Description

Medical Imaging and Radiologic Sciences (MIRS) is a B.S. degree program offered at IU Fort Wayne under the administration of the IU School of Medicine's Department of Radiology and Imaging Sciences. The program offers two concentration options, radiography (or radiologic technology) and sonography (or ultrasound technology). The sonography track was recently launched and will graduate their first cohort in 2024. Prior to admission to the three-year professional program, students are designated as pre-medical imaging: radiography or pre-medical imaging: sonography majors as they complete required general education prerequisite courses. Admission to the professional portion of either concentration is competitive and is based on a composite score derived from the prerequisite GPA, submitted recommendation forms, medical imaging preadmission testing, and a personal interview. Students must apply for admission to the professional program of choice directly to the Office of Medical Imaging and Radiologic Sciences by the first business day of March to be considered for admission the following academic year. The number of students admitted each year is based on total clinical capacity of approximately 20 students for radiography and currently 7 students for sonography.
Students in the radiography track complete coursework and clinical rotations focused primarily on diagnostic radiography, and also have the opportunity to explore and study several advanced imaging modalities and career pathways such as CT, MRI, and Mammography. Graduates are immediately eligible to register for the American Registry of Radiologic Technologists (ARRT) Examination in Radiography. Each graduate must pass the national exam and become certified as a Radiologic Technologist in Radiography, RT(R), before applying for certification examination in another modality.
Students in the sonography track will complete coursework and clinical rotations in abdomen, obstetrics and gynecology, and vascular sonography. Graduates are eligible to apply to sit for the American Registry of Radiologic Technologists (ARRT) Examination in Sonography and/or the American Registry for Diagnostic Medical Sonography (ARDMS) Examinations. Graduates of the IU Fort Wayne Medical Imaging and Radiologic Sciences program are highly sought by employers in the Fort Wayne region and beyond.

II.   Learning Outcomes

The radiography track is accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT) and the sonography track is in the process of seeking accreditation from the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS). MIRS learning outcomes are designed to meet the Standards and Guidelines of both programmatic accrediting agencies and align with IUPUI's Profiles of Learning for Undergraduate Success.
MIRS assesses Student Learning Outcomes (SLOs) related to four (4) broad Student Learning Goals as required by accreditation: Communication Skills, Critical Thinking, Professionalism, and Clinical Competence. Students enrolled in the MIRS professional program are expected to demonstrate knowledge, skills, and behavior related to each of the four goals as shown through measures of the current program SLOs. As outlined in accreditation guidelines, each goal is measured through two (2) related learning outcomes. MIRS Student Learning Goals and SLOs are driven by the program mission and are listed in student handbooks and on the program website. The program mission, goal statements, and related SLOs are developed by program faculty, reviewed annually, and revised as needed as part of the assessment and continuous program improvement process.
In addition to following the JRCERT and JRC-DMS Standards and Guidelines, MIRS SLOs support the IUPUI & IUFW Profiles of Learning for Undergraduate Success categories: Communicator, Problem Solver, Innovator, Community Contributor. The correlation of MIRS SLOs to the IUPUI & IUFW

Profiles of Learning for Undergraduate Success is documented in a curriculum map as part of the programs assessment plan and has been identified below for this report.

The current goals and related SLOs are:
Program Goals for Student Learning
1. Students will communicate effectively in the health care setting.
2. Students will utilize critical thinking and problem-solving skills.
3. Students will model professionalism.
4. Students will demonstrate clinical competence.

 Student Learning Outcomes
 The student will:
- Exercise effective communication skills with patients. (Goal 1) (Communicator)
- Apply effective interdisciplinary communication skills. (Goal 1) (Communicator)
- Execute logical procedural variations for non-routine situations. (Goal 2) (Problem Solver, Innovator)
- Evaluate medical image quality. (Goal 2) (Problem Solver)
- Exhibit the professional responsibilities of medical imaging technologists. (Goal 3) (Community Contributor)
- Engage in self-development related to professional practice. (Goal 3) (Innovator)
- Demonstrate clinical procedural proficiency. (Goal 4) (Problem Solver)
- Utilize appropriate safety practices. (Goal 4) (Community Contributor)

III.   Curriculum and Learning Environment

The Bachelor of Science in Medical Imaging is an integration and correlation of general education, specialized professional courses, and supervised clinical experience. In order to provide a foundation for personal and professional growth, all students are required to complete a series of general education courses along with professional education courses. The majority of general education coursework is required to be completed in preparation for and prior to beginning the professional program. The professional education curriculum is a structured, full-time, 33-month cohort-based program beginning Fall semester each year. Professional education is a combination of classroom and laboratory instruction and clinical experience.
The majority of professional didactic courses are conducted in classrooms and dedicated imaging labs on the IU Fort Wayne campus and are delivered face-to-face and/or hybrid with face-to-face meetings at least 50% of the time. Two didactic courses are currently delivered 100% online, and four additional courses are proposed for online delivery beginning in Fall 2023 (See section VII, Impact of COVID-19). Clinical education is completed in the imaging departments of local hospitals and outpatient centers.
In clinical practice, students utilize the theories and concepts that are presented in the professional curriculum. Under the supervision of physicians and registered technologists, students will progress from observing to assisting, and subsequently to completing the imaging examinations.

IV.   Assessment Cycle

An Assessment Report including all student learning outcome results and program effectiveness data is drafted annually by the MIRS Assessment Working Group and then reviewed by the MIRS Assessment Review and Advisory Committee to gather input for the purpose of program improvement.
The Assessment Working Group includes MIRS Faculty representatives and support Staff. The Working Group is responsible for gathering and inputting assessment data, completing the initial analysis of results, and preparing the assessment plan and report for the Assessment Review and Advisory Committee. The group also updates the assessment plan and report template each year to reflect

recommendations made by the Assessment Review and Advisory Committee and/or the accrediting agencies.

The MIRS Assessment Review and Advisory Committee is comprised of all program Faculty and Staff and at least 3 members from the program's communities of interest (such as medical imaging professionals; healthcare professionals, educators, and advisors outside of medical imaging; students and assessment specialists). It is the responsibility of the MIRS Assessment Review and Advisory Committee to counsel, suggest, and recommend items to the Faculty that will benefit the program(s) and meet the needs of the medical imaging community. The MIRS Assessment Review and Advisory Committee serves in an advisory role to provide the following functions:
1. Review the instructional Program content for current techniques and procedures necessary to meet/exceed the needs of the standards of the accrediting agencies, as well as those of the medical imaging community.
2. Evaluate the assessment plan to ensure continuous Program improvement.
3. Review and provide feedback on Program effectiveness data and student learning outcomes results.
4. Provide input on the quality and relevance of education provided by MIRS.

In addition to members who have committed to serve on the Assessment and Advisory Committee, all clinical site managers, technologists, and current students are invited to attend the annual Assessment and Advisory Committee Meeting and participate in the program assessment and advisory process.
Meeting minutes for all assessment-related discussions and documented feedback for improvement plans are included at the end of each annual report.

V. Description of Assessment Methods

Each student learning outcome is assessed annually using direct measures and is measured during the students' 1st or 2nd year (formative) and 3rd year (summative) in order to document and monitor the expected progression of learning as the student advances thorough the program. SLO (Student Learning Outcomes) assessment metrics, including benchmarks, are selected by MIRS Faculty and are most commonly results that come from existing course and/or clinical assessment tools (rubrics, test questions, clinical evaluations, etc.); however, tools are occasionally developed specifically for the purpose of documenting student learning for program assessment (secret shopper clinical evaluation). Metrics are reviewed annually by the MIRS Assessment and Advisory Committee and tools, benchmarks, etc., may be revised or a new tool selected when deemed necessary.
Program effectiveness metrics are also assessed annually using direct and indirect measures as defined by accrediting standards. Program effectiveness benchmarks for Certification Examination Pass Rate, Job Placement Rate, and Program Completion Rate are defined by accreditation Standards; program effectiveness benchmarks for Graduate and Employer Satisfaction are determined by MIRS Faculty. Benchmarks not determined by the JRCERT are reviewed annually by the MIRS Assessment Committee and revised as needed.
Measures of SLOs are collected by the appropriate course Faculty and are submitted to the MIRS Administrative Support staff for documentation on the Assessment Report. Measures of Program Effectiveness are collected by the Program Director and Administrative Support staff.
The IUPUI/IUFW Profiles of Learning assessments are completed using IUPUI guidelines and are submitted to the School of Medicine as requested. A mid-point assessment is completed during the spring semester in the second year of the professional program using metrics from a student project required in RADX R206, Advanced Patient Care, and a final assessment is completed during the final semester of the program using metrics from the student capstone project required in RADX R481, Medical Imaging Capstone.

VI.   Assessment Findings and Planned Improvement

The MIRS Assessment and Advisory Committee meets annually to review the assessed results related to each SLO and all Program Effectiveness data and provides feedback with recommendations for program improvement related to student learning as well as the assessment process. In addition to the members who have committed to serve on the committee, other individuals from the program's communities of interest are invited to attend the annual Assessment and Advisory Committee Meeting and participate in the program review process.

The discussion and feedback from meeting attendees is documented in the assessment report results section, as well as in meeting minutes. The program implements program and assessment changes based on feedback from committee members and other individuals who attend. Examples of planned improvements from the 2021-2022 assessment cycle include: increasing the benchmark for the SLO *effective interdisciplinary communication* based on a 4 year trend of exceeding the benchmark, decreasing the benchmark for the SLO *utilize appropriate safety practices* due to the determination that the benchmark was unattainable for students (expectation was that all 3rd year students achieve a perfect score for the semester), identifying or developing a new tool to measure the SLO *student engagement in self-development* due to seemingly unreliable variable results for the past 4 years, begin work to add a radiography leadership option that would fulfill/take the place of the advanced imaging modality course and clinical requirement (based on committee discussion around increased *job placement* in advanced modalities compared with routine radiography and feedback from imaging administrators).

VII.   Impact of COVID-19

For the second year in a row since the inception of the program (more than 30 years), the radiography program graduates did not achieve a 100% 1st attempt pass rate on the ARRT credentialing exam. In 2021 one (1) student did not pass, and in 2022 two (2) students did not pass on the 1st attempt. The students did all pass on the 2nd attempt; however, the reported outcome is assessed using 1st attempt data only. The faculty have discussed at length the impact of COVID-19, including distance learning and student mental well-being, on the pass-rate results while also acknowledging the benefits of increasing online and hybrid course offerings in the MIRS curricula (such as flexibility in scheduling, reduced costs and time spent commuting, and work/life harmony). An ad hoc curriculum committee, comprised of all full-time faculty, was formed in August of 2022 to determine how to best incorporate distance education and maintain desired program outcomes. The committee's work was completed in December 2022, and the result is a curriculum change that will include six (6) 100% online courses in the curriculum as well as several courses that will remain hybrid now that we are "post-COVID." In order to address concerns about pass rate outcomes, all faculty have committed to conducting all core content courses at least 50% in person and all exams in person.