

**Indiana University School of Medicine
Health Professions Programs**

2020 – 2021 Assessment Report

The Health Professions Programs (HPP) include the *undergraduate* programs that reside within the School of Medicine. These include:

<u>Program</u>	<u>Degree Awarded</u>
Clinical Laboratory Science	B.S.
Cytotechnology	B.S.
Histotechnology	Cert., A.S.
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.

** Graduate and MD programs within the School of Medicine fall under the purview of different administrative offices. They are not included in this report.

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

Most of the IUSM Health Professions Programs 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 (Clinical 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 Health Professions Programs 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 Clinical 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 programs 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 Clinical 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 CLS 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 programs 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, every program within HPP has 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 programs 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
CLS	Histotechnology	Nuclear Medicine
Cytotechnology	MIT	Radiography
Radiation Therapy	Respiratory Therapy	Paramedic Science
	IUFW Medical Imaging Sciences	

Advising and Student Population

Students are not directly admitted to the IUSM Health Professions Programs. Prior to admission into IUSM, most advising for students is accomplished through academic 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 with the assistance from the HPP academic advisor.

Profiles of Learning for Undergraduate Success

The structure of the HPP programs 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 admissions is competitive and is open to many different educational institutions, we have no clear way of identifying which freshman will enter our cohorts. Thankfully, the flexibility of the Profiles allow 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 may have. 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: Ongoing Impact of COVID-19

COVID-19 has had a significant impact on the Health Professions Programs, but thankfully the situation has normalized in comparison to Spring 2020. During the restrictions of Spring 2020 through beginning of Fall 2021 many programs experienced significant disruptions in teaching and assessment practices. However, because of the nature of our professions, many assessments still took place albeit in smaller groups or in an online environment. Additionally, credentialing

exams remained a requirement for our graduates so there is high quality comparable about student performance during and following the height of the pandemic. Speaking broadly, programs still had exceptional outcomes compared to national averages. Unfortunately, several programs did see dips in individual and average scores while overall pass rates remained high. The factors underlying these scores have not been explored thoroughly but the rapid change in teaching and assessment modalities, the loss of irreplaceable in-person experiences, weakened relationships among students and between students and faculty, and overwhelming stress and uncertainty all likely played a role. Currently, our on-campus students have returned to in-person instruction and assessment. Likewise, our clinical affiliates have welcomed our students back into their healthcare environments. Generally speaking, faculty are now more comfortable with remote teaching so they are currently leveraging hybrid and flipped classroom experiences to promote student learning versus using remote technology as a COVID-19 related mandate. Utilizing technology is also driving a change in mindset among faculty and academic leadership around distance education. As any casual consumer of the news knows, the healthcare industry is desperate for more professionals to fill vacancies created by COVID-19 and the mass exodus of baby-boomers from the workforce. HPP programs are limited by physical space and the capacity of our clinical affiliates to provide externships. Distance education allows us to contemplate best uses for our physical space and distribute student externships to other geographic areas.

Special Emphasis 2: Progress to date in implementing and assessing 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. As requested by PRAC, we are including a list of program learning outcomes that have been reaffirmed or updated during the winter of 2021.

In response to a request from PRAC to provide updated learning outcomes ahead of the HLC reaffirmation, [here is a folder](#) from our unit.

Special Emphasis 3: An account of progress in identifying, developing, redesigning, and implementing experiences included in the Record and of any assessment findings.

Every Health Professions Program has experiences that could be acknowledged in the Record. Our clinical experiences, as well as capstone/research experiences, would all be candidates for the Record. Within the HPP Executive Committee we have discussed this, but there hasn't been much traction due to the distractions caused by the pandemic. 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 things 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. Our unit is looking at strategies to encourage broader adoption of the Record in our group. We hope to hold an HPP workshop in the Fall of 2022 to jumpstart the submission of experiences for the Record.

Clinical Laboratory Science, B.S.
PRAC Report

I. Program Description

Clinical Laboratory Science (CLS) is a B.S. degree program in the IU School of Medicine's Department of Pathology and Laboratory Medicine. As with other programs in IUSM, CLS does not have direct admission. Students complete the equivalent of three years of undergraduate coursework in University College or other schools in the IU or Purdue systems and then apply for admission to the professional year (Fall, Spring, Summer I) of our major. The program is only offered in a full-time, cohort style format. The IUSM CLS program admits 12 students per year. We coteach with the IU Health CLS program which also admits 12 students per year. The CLS program prepares its graduates to pass the American Society for Clinical Pathology's (ASCP) Board of Certification exam. This exam is a national credentialing exam for professionals working in clinical laboratories. Graduates from our program are highly sought after locally and nationally. Graduates enjoy a direct path from their education to their future professions as Medical Laboratory Scientists.

II. Learning Outcomes

The IUSM CLS program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Our programmatic learning outcomes are informed by NAACLS standards, IUPUI's Profiles of Learning for Undergraduate Success, and Entry Level Curriculum and Body of Knowledge publications by The American Society for Clinical Laboratory Science and American Society for Clinical Pathology (ASCP).

Here is a link to an Excel sheet that maps the IUPUI Profiles, NAACLS Entry Level Competencies, NAACLS Standards, and CLS Program Learning outcomes <https://go.iu.edu/440T>

Below is a list of our seven programmatic Student Learning Outcomes:

- 1: Knowledge: Demonstrate an understanding of the underlying scientific principles of laboratory testing, including technical, procedural, and problem-solving aspects. Recognize the importance of proper test selection, causes of discrepant test results, deviations of test results, and correlation of abnormal data with pathologic states.
- 2: Technical Skills: Perform proficiently in the full range of clinical laboratory tests in areas such as hematology/hemostasis, clinical chemistry, immunohematology/transfusion medicine, microbiology, serology/immunology, urine and body fluid analysis, and molecular and other emerging diagnostics. Identify and troubleshoot pre-analytical, analytical, and post-analytical components of the testing process. Play a role in the development and evaluation of new test systems and interpretative algorithms.
- 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. Demonstrate scientific literacy by finding, interpreting, critically analyzing, scientific literature to inform decision making for the benefit of the profession and the patient community
- 4: Clinical Studies: Engage in the scientific process by understanding the principles and practices of clinical study design, implementation, and dissemination of results.
- 5: Educational Methodologies and Training Responsibilities: Effectively apply educational methodologies and terminology at a level to train/educate users and providers of laboratory services.

6: Supervision, management, administration: Apply safety and governmental regulations and standards in clinical laboratory science. Apply knowledge of principles and practices of administration and supervision as applied to clinical laboratory science to improve the efficiency of the workplace as well as contribute to quality assurance/quality improvement plans and collaborative healthcare teams to ensure quality healthcare delivery to the community.

7: 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.

III. Curriculum and Learning Environment

The professional year (fall, spring, summer I semesters) of the CLS program is divided in two phases: August-February students are engaged in the classroom and student laboratory, and March-July students are in clinical laboratories completing their clinical externships. The program is typically taught entirely face-to-face with students engaged in the curriculum Monday-Friday 8am-5pm. This report focuses on the 2019-2020 academic year which was unaffected by COVID-19 until the start of our clinical rotations in March 2020. On the first day of clinical rotations, we sent our students home because guidance from IUPUI, IUSM, and IU Health were coming out too rapidly to make actionable plans. We then took several days recess and relaunched a 100% virtual form of clinical rotations that continued until the students graduated in July 2020. In the 2020-2021 academic year, the sequence of the curriculum and the teaching modalities was changed significantly as a result of the COVID-19 pandemic. We could not social distance in our student laboratory with the entire cohort of students present so it was necessary to break the cohort in half and teach each section of the laboratory back-to-back. While one group of students was in the student laboratory learning and applying technical skills, the second group of students was elsewhere watching online asynchronous lectures. For the 2020-2021 clinical rotations, they were mostly back to face-to-face instruction.

IV. Assessment Cycle

The CLS program's assessment cycle is straightforward since it has a one-year cohort format. Many of our courses are broken into shorter 3 or 4 week modules. Students are assessed within and at the end of each module through a variety of formats but most typically paper-based classroom exams and practical laboratory-based assessments. Students must earn at least a 75% on each assessment or perform remediation to demonstrate competency. Students must earn a 75% in each module or each course. If they fail to achieve 75% in either, the student is required to perform remediation to demonstrate competency. Demonstration of competency is required before proceeding into the next module of the course or proceeding into clinical rotations. Students follow a detailed curriculum while on clinical rotations and must pass or demonstrate competency following remediation. While competency is typically defined as 75%, some assessments have a minimum standard that is 90% or 100%. Finally, there is an end of the program summative assessment that the faculty has created that mirrors the ASCP credentialing exam. Students must pass also pass this assessment with a 75% or demonstrate competency through remediation. The ASCP credentialing exam is an important part of our assessment cycle. Score from each area of our curriculum as well as an overall composite score are provided by

ASCP to the program director. The final part of our assessment cycle is a one-year post graduation survey graduate and employer survey.

Student evaluations of teaching and faculty self-reflection are an important part of our program's assessment cycle. Faculty compose course reviews for each lecture, laboratory, and clinical rotation course at the end of each cohort of students. These course reviews include two parts. The first part is a formal review of Student Evaluations of Teaching where each faculty member identifies themes in the evaluations, identifies a course of action, and then revisits these actions the following year to update them with outcomes. Program directors review every student evaluation of teaching and each faculty member's response. It should be noted that the Student Evaluations of Teaching are unique for our program (we do not use Blue) and we require 100% student completion. The second part of the course review process is where faculty reflect on student performance in their course, student evaluations of teaching, and personal critical review of the course. During this process, faculty present assessment data and identify trends or changes in the student performance over time, reflect on changes implemented during the academic year, and identify changes that will be implemented the next year. Faculty present the review to all CLS faculty during a faculty meeting.

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. For several decades the IUSM CLS program has had 100% retention, 100% graduation, 100% pass rate on the ASCP credentialing exam, and 100% employment in the field or placement into a professional school. The IUSM CLS program was awarded a ten-year accreditation in October 2015 and submitted a five-year interim self-study in 2019.

V. Description of Assessment Methods

The CLS program's learning objectives are listed in section II and the [previously given link](#) provides access to a matrix that outlines how we assess each. We've also written a [brief narrative](#) on how we assess each learning objective if more context is needed. <https://go.iu.edu/44mD> In brief, the primary goal of our program is to prepare students to begin their professions as Medical Laboratory Scientists. With this in mind we have two big tasks which are usually complimentary (but not always). First, we need to prepare our students with the knowledge, skills, and professional attributes to succeed in the profession. In simple terms, we need to make sure they can do the technical "work" and have the underlying knowledge and critical thinking skills to understand human health, identify errors or discrepant results, and resolve those errors or discrepancies. The second task is to prepare them to pass the ASCP credentialing exam which is the gatekeeper into the profession. The ASCP credentialing exam reflects a slightly outdated body of knowledge and skills and neglects many of the technological advances that have changed our field in the past twenty years. As a faculty, we must carefully balance three educational targets, where the test is, where the profession is right now, and where the profession is going in the future.

The assessment of our learning objectives is heavily dependent on maintaining a very tight link between programmatic learning objectives, course learning objectives, and lecture/lab learning objectives. Every course in our program has course level learning objectives which are informed by and feed into the program learning objectives. Likewise, each day's classroom and laboratory sessions also have learning objectives which ensure the course' objectives are met. It is not uncommon for a traditional 50-minute lecture to have thirty or more specific learning objectives. These lecture or laboratory learning objectives are incredibly detailed and are designed to benefit

the student and the faculty. For any question in any formative or summative assessment, faculty and students can point to a specific lecture/laboratory objective. The learning objectives are carefully worded so that the verbs (list, compare/contrast, describe, calculate, perform, etc) inform the students how they will be required to demonstrate their knowledge and the expected level of performance (within one deviation, 100% accurate and precise, etc).

We use a number of different tools to assess our program's learning objectives. As a compressed science-based program we rely heavily on multiple choice exams to assess classroom learning. To make these assessments more authentic and target a higher cognitive level we place a special emphasis on case study style questions. We perform item analysis on all exams which allows faculty to remediate at an individual and classroom level. In laboratory environments we employ authentic practical exams and demonstrations of competency such as identifying unknown microorganisms, performing peripheral blood cell differentials, etc. We also rely heavily on observations of student performance by faculty, program directors, and clinical affiliates. These observations are not only used to provide instantaneous formative feedback but they are also used to inform periodic student self-reflections and conferences with program directors. Students also complete a portfolio project in our capstone course to demonstrate mastery of many of our learning objectives. Our program's end of the year summative exam and the ASCP credentialing exam provide further evidence of our student's achievement. Finally the one-year post-graduation graduate and employer surveys provide us with additional information about how our program is preparing students for the real-world.

VI. Assessment Findings & Planned Improvement

When evaluating assessment data for the PRAC report we use the cohort of 2019-2020 because of the importance of comparing our ASCP credentialing exam scores against national and university-based means and to include data from the one-year post graduation survey. As previously mentioned the students in this cohort were dramatically affected by the COVID-19 pandemic because their clinical externships were moved to an entirely virtual format. The typical assessments we conducted during each clinical rotation were moved into an online format and the manner in which certain areas of knowledge and technical skill were assessed in new ways. Practical exams were moved into an entirely online format which meant some activities such as identifying unknown microorganisms or performing white blood cell differentials were approximated using pictures and videos online. Since students were virtual, they missed out on valuable clinical instruction. Simultaneously, the program's faculty also lost daily evaluations of each student's clinical performance from clinical preceptors. Overall, students performed exceptionally well academically during online clinical rotations, though we regret that the teaching and assessments were not as authentic and clinically based as they had been in prior years. Thankfully, we were able to hold our end of the year cumulative exam in an in-person format. This end of year exam did not need to change substantially from prior year's exams. The continuity of this exam and the ASCP credentialing exam allowed us to have two unchanged data points to use in comparisons with other cohorts. Not surprisingly, we had lower scores on both exams than in prior years. Despite the lower averages, we felt it was not necessary to make dramatic changes to our curriculum because of the extraordinary challenges that spring and summer 2020 presented to our students and faculty. For instance, we saw a big drop in Laboratory Operations/Safety scores in the 2019-2020 cohort. Item analysis on the test indicated that this drop was mainly caused by students missing questions on the application of Quality Control and Quality Assurance. While our lectures remained similar the loss of applying this

knowledge in a clinical environment negatively affected our outcomes. Despite overall lower scores, 100% of our graduates passed the ASCP credentialing exam while only 80% pass nationally.

Table 1: ASCP Board of Certification Exam Results IUSM and IU Health CLS Programs

	2018			2019			2020		
	IU	MH	Natio n	IU	MH	Natio n	IU	M H	Natio n
BLOOD BANK	601	666	494	576	644	508	53 3	52 8	500
CHEMISTRY	724	681	528	555	613	510	55 2	56 4	498
HEMATOLOGY	681	658	522	628	646	508	63 5	58 6	504
IMMUNOLOGY	588	592	480	662	630	487	55 5	53 0	484
MICROBIOLOGY	732	721	519	603	646	501	62 3	55 1	496
URINALYSIS AND OTHER BODY FLUIDS	665	690	514	562	567	502	56 7	56 6	495
LABORATORY OPERATIONS	568	559	519	645	643	505	45 8	56 4	499
MEAN SCALED SCORES	665	666	512	594	629	503	57 1	55 5	496

Note: IU represents IU School of Medicine CLS Program; MH represents IU Health Methodist Hospital CLS Program which coteaches with the IU CLS Program; Nation is the national mean for the calendar year

Year	Day 1 of Exam	Day 2 of Exam	Composite (Ave Day 1+2)	Blood Bank Ave	Chemistry Ave	Hematology Ave	Lab op/ Safety Ave	Serology/ Viro Ave	Micro Ave	Urine/ BF Ave
2015	84.70	85.35	85.02	87.60	80.75	88.85	84.42	82.37	83.09	88.86
2016	82.75	81.71	82.23	88.97	75.20	83.06	84.72	79.40	77.96	88.80
2017	79.87	79.96	79.91	86.70	72.88	83.74	75.36	74.88	79.70	83.15
2018	85.7	83.83	84.76	89.13	80.23	89.16	80.85	77.54	84.32	88.32
2019	85.29167	85.91667	85.60	88.85	81.45	89.05	83.93	84.72	82.78	89.58
2020	79.86	77.67	78.76	83.61	71.09	83.13	69.50	80.69	76.81	87.50

Table 2: End of Year Cumulative Exam IUSM and IU Health CLS Programs

The main take-away message from the one-year post-graduation survey is that students and employers were moderately dissatisfied with the lack of “hands-on” clinical training. The loss of clinical externships led to longer on-the-job training times and slightly lower graduate performance reviews in 2020 when compared to previous years. For the cohort that just graduated in 2021, clinical rotations were reinstated.

A second take-away from the graduate and employer surveys is that students felt underprepared in molecular diagnostics. We have identified several factors for this finding. First, there was a substantial increase in the number of our graduates who were hired to work in molecular diagnostics because of the pandemic. Second, the entirety of our hands-on molecular training occurs during clinical rotations. Since clinicals were virtual, students were only exposed to theoretical knowledge and explanations of workflow. They didn’t have firsthand experience. Despite unique circumstances due to COVID-19, we are making stepwise changes to bolster molecular diagnostics throughout our curriculum. Namely, we are being more intentional about including learning objectives that include molecular technologies and their diagnostic and predictive values in medicine. For the most part, our faculty have identified they are already talking about the information, but it needs to be more intentional and then assessed. We are also seeking new relationships with our industry and clinical partners to provide additional hands-on training with current and upcoming technologies. The teaching of molecular technologies is still a major area of friction for our program. Employers are adopting cutting edge molecular technologies that they expect students to use while the ASCP relies on antiquated testing that illustrates phenotypic traits and theoretical underpinnings. The ASCP can’t test on proprietary molecular technology, regardless of how widespread it is adopted. Without dropping old methodologies from the content outlines for the credentialing exam, the breadth and depth of the field is increasing but instructional time is static.

From the cohort of 2018-2019 and 2019-2020 we recognized the need to improve our instruction in point-of-care instrumentation. While this area is under-valued by the ASCP credentialing exam, it is an important area of practice for our students. We recognized a deficiency in instruction in this area from end of course student evaluations. The clinical partner that was helping us with this instruction had lost their enthusiasm, so we sought help from a different clinical partner. We made a stepwise change in 2019-2020, but because of COVID we were unable to implement a complete transition until 2020-2021. Our initial impression from 2020-2021 is that the students received a more intentional learning experience that included deeper discussions and expanded hands-on experiences than in prior years. Student evaluations from this year indicated a positive experience. We will analyze graduate and employer evaluations in the next assessment cycle to confirm this impression.

From the cohorts of 2018-2019 and 2019-2020 we identified that students are facing challenges merging into our professional community of practice. When we stepped back and looked at a multiplicity of formal and informal data, we realized that many of the issues faculty, clinical preceptors, graduates, and employers had were all elements of this community of practice. To this end, we have immersed ourselves in the literature of professional identity development and created a robust and ongoing system of direct instruction, self-reflection, and one-on-one dialogue to guide students through this important transition in their personal and professional lives. This new program was implemented for the cohort of 2021-2022.

Cytotechnology, B.S.
PRAC Report

I. Program Description

Cytotechnology (CT) is a Bachelor of Science degree program in the IU School of Medicine's Department of Pathology and Laboratory Medicine. As with other competitive programs in IUSM, CT does not have direct admission. Students complete the equivalent of three years of undergraduate coursework in University College or other schools in the IU (or other) system/s and then apply for admission for the professional year (Fall, Spring, Summer I) of this major. The program is only offered in a full-time, cohort style format. The IUSM CT program admits 8 students per year.

[Cytotechnology | Health Professions Program | IU School of Medicine](#)

The CT program prepares its graduates to pass the American Society for Clinical Pathology's (ASCP) Board of Certification exam. This exam is a national credentialing exam for professionals working in clinical laboratories.

[Board of Certification \(ascp.org\)](#)

Graduates from our program are highly sought after locally and nationally. Graduates enjoy a direct path from their education to their future professions as cytotechnologists.

II. Learning Outcomes

The IUSM CT program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). Our programmatic learning outcomes are influenced by CAAHEP Standards and Guidelines, and IUPUI's Profiles of Learning for Undergraduate Success.

This is the link to CT Entry Level Competencies, via CAAHEP Standards and Guidelines: [Standards and Guidelines \(caahep.org\)](#)



Microsoft Word
Document

(IU Cytotechnology Program and the Profiles of Learning for Undergraduate Success)

Below is a list of our five programmatic Student Learning Outcomes:

1: **Knowledge:** Demonstrate an understanding of the underlying scientific principles of laboratory testing, including technical, procedural, and problem-solving aspects. Recognize the importance of proper test selection, causes of discrepant test results, deviations of test results, and correlation of abnormal data with pathologic states.

2: **Technical Skills:** Perform proficiently in the full range of cytology tests including (but not limited to):

- screening and interpretation of gynecologic and non-gynecologic (including fine needle aspiration) cytology samples
- triage specimens for additional studies
- prepare a report using contemporary and reproducible terminology
- explain and apply basic principles of specimen acceptance and rejection
- use a microscope and other instruments to properly prepare and visualize a specimen for systematic morphologic review and interpretation
- use basic laboratory skills and techniques with an awareness of emerging diagnostics

- Identify and troubleshoot pre-analytical, analytical, and post-analytical components of the testing process.

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. Demonstrate scientific literacy by finding, interpreting, critically analyzing, scientific literature to inform decision making for the benefit of the profession and the patient community

- prepare a report using contemporary and reproducible terminology

4: Supervision, management, administration:

- The graduate will be able to explain quality control and quality assurance requirements of applicable accrediting/regulatory agencies including, but not limited to requirements related to competency assessment and proficiency testing.
- The graduate will demonstrate knowledge of the appropriate slide evaluation limits as outlined by regulatory agencies and demonstrate the ability to document daily workload.
- The graduate will be able to explain the principles and practices defined by HIPAA.
- The graduate will be able to explain the requirements and provide documentation that supports maintenance of certification/licensure to practice cytology.
- The graduate will have a basic understanding of informatics and demonstrate the ability to effectively use the laboratory information system (LIS) including but not limited to viewing patient history, entering results and signing out cases.
- The graduate will be able to comply with laboratory safety measures and regulations.
- The graduate will have a basic awareness of emergency preparedness as a member of the healthcare workforce

5: Professional and ethical conduct and Continuing Professional Development:

- The graduate will be able to explain the importance of continuing education for maintenance of on-going competence.
- The graduate will be able to demonstrate knowledge of the consequences of specimen evaluation on patient management.
- The graduate will be aware of cytotechnologist opportunities within professional societies and the cytology community at-large (e.g., patient advocacy, volunteerism, education, research).
- The graduate will be able to demonstrate knowledge of the ethical role and responsibilities of the cytotechnologist by practicing honesty and integrity in professional duties.
- The graduate will be able to demonstrate knowledge of the ethical role and responsibilities of the cytotechnologist by practicing the principles of good professional relationships with patients, peers, staff, faculty, and the public

Curriculum and Learning Environment

The professional year (fall, spring semesters, summer I) of the CT program is divided in two phases: August-mid October students are engaged in the classroom and student laboratory, and mid-October-June the students spend 16 hours per week in clinical laboratories completing their

clinical externships. During on the 2019-2020 academic year which was unaffected by COVID-19 until March 2020, the abrupt pivot was to spend one week at home viewing virtual cases via a vendor website. Lectures and quizzes were conducted via Zoom. In April 2020 the students drove to the lab to pick up microscopes for “at home slide evaluation” and were also given trays of archived, de-identified slides. This process continued weekly (drop off evaluated slides, pick up new slides) through June 2020. During the 2020-2021 academic year, the students were allowed to attend lab rotations at affiliate sites. Unable to provide adequate distance during our Aug/Sept/Oct student laboratory sessions, the cohort was divided in half and faculty taught repeat laboratory sessions back-to-back.

Assessment Cycle

The CT program’s assessment cycle is linear with a one-year cohort format. Courses are “block” scheduled. Students are assessed within and at the end of each morphology course via a variety of formats:

- Canvas based “written” quizzes, variable format (multiple choice, T/F, matching, short answer, essay)
- Canvas based visual quizzes, multiple choice and/or short answer format
- In person glass slide assessments at microscope
- Final exam sequence with written, visual, and practical component

Students must earn at least a 70% on each assessment or perform remediation to demonstrate competency. Students must earn a 77% in each course. If one fails to achieve 77% in either, the student is required to perform remediation to demonstrate competency. Students follow a detailed curriculum while on clinical rotations and must pass or demonstrate competency. Finally, there is an end of the program summative assessment that the faculty has created that mirrors the ASCP credentialing exam. Students must pass also pass this assessment with a 77% or demonstrate competency through remediation. The ASCP credentialing exam is an important part of our assessment cycle. Scores from each area of our curriculum as well as an overall composite score are provided by ASCP to the program director. The final part of our assessment cycle is a six month post graduation survey graduate and employer survey.

Student evaluations of teaching and faculty are an important part of our program’s assessment cycle. Faculty members compose course evaluations for each course closely mirroring Blue. We require a student completion of greater than 50% of each class. Before the start of each new class, faculty members reflect on student feedback , and identify changes that will be implemented the next year.

Six months following graduation, graduates employed in the laboratory (or a related field) and their supervisors are surveyed using CAAHEP approved/provided surveys. Again, faculty members review and reflect on these findings and include the results in an annual report to CAAHEP.

Minimum thresholds (three year rolling cycle) include:

- Student retention of at least 80%
- Positive placement of graduates of at least 75%
- ASCP Board of Certification Pass rate of at least 80%
- Graduate Survey
 - At least 50% return rate
 - At least 80% satisfaction rate

- Employer Survey
 - At least 50% return rate
 - At least 80% satisfaction rate

For several years the IUSM CT program has exceeded these thresholds. The IUSM CT program was awarded a ten-year accreditation in November 2015.

III. Description of Assessment Methods

The CT program's learning objectives are listed in section II .

The primary goal of our program is to prepare students to begin their professional careers. Students need to be prepared with the knowledge, skills, and professional attributes to succeed in the profession. They need to demonstrate competency performing the technical “work” and have the underlying knowledge and critical thinking skills to understand human health, identify errors or discrepant results, and resolve those errors or discrepancies.

The final task is to prepare them to pass the ASCP credentialing exam which is the gatekeeper into the profession. The ASCP credentialing exam is a computer adaptive test wisely preventing faculty from “teaching to the test.” The last few weeks of our time together is spent doing comprehensive reviews of all topics and going through practice tests and review material. Due to the adaptive nature of the credentialing exam, no two examinees will have the same test. This likely accounts for the broad disparity in IU graduates' scores in one area (Fine Needle Aspiration, see Table 1).

We use a number of different tools to assess the outcomes of our program's learning objectives. As a compressed science-based program we rely heavily on multiple choice exams to assess classroom learning. Case based learning is heavily incorporated as it mirrors workplace expectations. **(Figures 1, 2)** We perform item analysis on all exams allowing faculty to remediate at an individual and classroom level. In laboratory environments we employ authentic practical exams and demonstrations of competency largely determined by evaluating glass slides. We rely heavily on observations of student performance by faculty, program directors, and clinical affiliates.

Figure 1 daily log sheet
 Problem based learning with prompt feedback from clinical affiliate staff

Log #	Specimen Source	Case #	No. of Slides	Student Diagnosis	Final Diagnosis	Technologist	Score
1	GYN	30860	1	AIS (reviewed with Josh)	LSIL, and atrophy	KR	
2	GYN	30861	1	NILM	Agree	KR	
3	GYN	30862	1	NILM	Agree	KR	
4	GYN	30863	1	NILM	Agree	KR	
5	GYN	30864	1	NILM, actinomyces with acute inflammation	NILM	KR	
6	GYN	30865	1	NILM, with acute inflammation	Agree	KR	
7	GYN	30866	1	NILM	Agree	KR	
8	GYN	30867	1	NILM (atrophic background)	Agree	KR	
9	GYN	30932	1	NILM, with acute inflammation	Agree	MC	
10	GYN	30933	1	NILM	Agree	MC	
11	GYN	30934	1	HSIL, CIS	NILM	MC	
12	GYN	30935	1	NILM, with shift in flora and acute inflammation	Agree	MC	
13	GYN	30936	1	NILM	Agree	MC	

Figure 2
 Weekly assignments summarizing outcomes of case based/problem based learning

TH-A465-20408 > Grades

/view Actions IU Grading

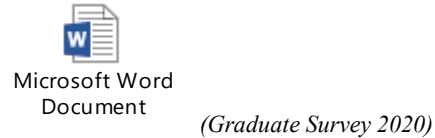
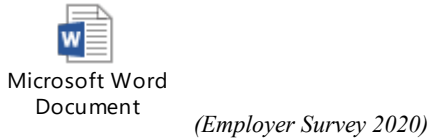
Assignment Names

Search Assignments

Screening week of... Out of 2,100	Screening week of... Out of 2,900	Screening week of... Out of 3,200	Screening week of... Out of 3,500	Screening week of... Out of 3,800	Screening week of... Out of 4,100	Screening week of... Out of 4,400	Screening week of... Out of 4,700
2,320.5	1,899.5	2,057	3,836.7	2,244	5,000	2,149.5	3,113.75
968.1	6,258	1,712	3,446.9	4,136	5,111.33	3,980	4,375
2,900	4,541.5	1,856	1,368	2,695	3,599.41	2,908.5	2,568
2,184	4,140	1,875	3,416	2,244	3,691.5	2,366	3,776.25
2,240	3,797.5	3,487.5	5,900	8,640	3,710.5	5,473.12	7,900
3,840.06	4,295.19	3,757	3,920	4,658	6,012.5	3,740	4,504.95
1,528	1,745	2,184	2,350	4,365	3,145	3,087.5	4,277
1,848	2,831	4,004	3,381	2,769.5	6,384	Excused	Excused
-	-	-	-	-	-	-	-

Students also complete a self-determined project in our capstone course to demonstrate mastery of many learning objectives (provided in course syllabi). Our program’s end of the year summative examinations (written, visual, and glass slide practical) and the ASCP credentialing exam provide further evidence of our students’ status and achievements.

Per CAAHEP guidelines we send out post-graduation graduate and employer surveys six months after graduation as previously described. These provide additional information about how the IU program is preparing students for their careers.



IV. Assessment Findings & Planned Improvement

When evaluating assessment data for the PRAC report the cohort of the graduation classes of 2020 and 2021 was used (16 first time examinees) comparing the IU program ASCP credentialing exam scores against national means. While the students’ experience in the clinical environment was negatively affected by Covid restrictions, 100% of 2019-2020 graduates passed the ASCP credentialing exam and 7/8 (87.5%) of 2020-2021 graduates passed on the first attempt exceeding the 80% threshold.

Table 1: ASCP Board of Certification Exam Results IUSM CT Program, combined results Class of 2020 and Class of 2021

Minimum Passing Score: 400

ASCP BOC exam category	2019-2021 IU Cytotechnology Program first time examinees (16)	National Scaled Mean for same testing cycle	Observation	Challenge
Gynecologic cytology	511	538	Lower than national mean	Discern how to improve upon these scores and implement plan for improvement
Respiratory cytology	550	546	Higher than national mean	
Urinary tract cytology	578	557	Higher than national mean	
Body fluid cytology	551	544	Higher than national mean	
Fine Needle Aspiration	481	548	Lower than national mean	
Laboratory Operations	549	531	Higher than national mean	Discern how to improve upon these scores and implement plan for improvement Scores vary broadly From 249-738

Reviewing course evaluations (Table 2) for the calendar year of 2020, the lower satisfaction rate and dismal return rate reflects the mood of the class at that time. More meaningful to faculty members than the data were the personal comments.

Table 2 2020 course evaluations summary (partial)

Course number/name	Grading period	% of class responding to survey	Summary of course evaluations (1=poor, 5=excellent)
PATH A442 Cytology of Body Fluids	Spring 2020	4/8 (50%)	4.39/5 87.8%
PATH A470 Seminar	Spring 2020	1/8 (12.5%)	3.61/5 72.22%
PATH A490 investigations (revised course due to Covid restrictions)	Summer 2020	5/8 (62.5%)	4.66/5 93.26%*
PATH A455 Cytology of Fine Needle Aspiration	Summer 2020	4/8 50%	** Stats pending, technical glitch
PATH A412 Gynecologic Cytology, Normal	Fall 2020	7/8 87.5%	4.96/5 99.2%***
PATH A422 Gynecologic Cytology, Abnormal	Fall 2020	8/8 100%	4.93 98.6%
PATH A465 Certification Internship	Fall 2020	7/8 87.5%	4.97/5 99.32%
PATH A470 Seminar	Fall 2020	8/8 100%	4.99/5 99.74%

**"This course was ok given the certain circumstances. Some parts of it were confusing"*

***"I think it sucked that we had to do a majority of the learning over Zoom, that's not really the way I learn, because I'm a visual learner and just having the powerpoint and words, is really hard for me."*

****"I wouldn't change the layout of this course. Barb is always open to any suggestions we have on the spot of each quiz or exam and how the course can improve. Barb made this course exciting and taught the information in a way that made me love learning about everything normal gyn cytology!"*

Reviewing the post graduate surveys from students showed few deficits; one graduate made a request for more material on FNA of salivary gland. Canvas modules were augmented with additional learning opportunities.

Reviewing post graduate surveys from employers left us wanting to ask more and different questions than the routine CAAHEP provided survey. In April 2020 with departmental support, a survey of employers from the past 10 years who had hired IU graduates was conducted. The greatest deficit identified was in the area of professionalism. Employers stressed that this feedback was regarding all new hires, not just IU graduates.



Microsoft Excel
Worksheet

(2020 Employer Survey Questions – IUSM)

29 complete and 9 partial responses were received, totaling 38 respondents for a 76.3% response rate. 19 (50%) shared comments via free text. The top two areas for improvement included poor attitude (47.37%) and insufficient skill set (26.32%). Comments regarding poor attitude included not being patient focused, lack of attention to detail, and lack of flexibility. Poor morphologic skills and insufficient experience on rapid assessments during procedures were noted as shortcomings.

Conclusions

Maintaining communication with communities of interest is crucial. Identifying shortcomings and creating solutions is critical to preparing new graduates for the workforce.

The full text of the abstract and poster may be found here:



Microsoft Word Document

(2021 Abstract for ASC)

DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE
Indiana University School of Medicine

IMPROVING PROFESSIONALISM FOR NEW GRADUATES OF CYTOTECHNOLOGY PROGRAMS
Barbara McGarry Train, Zach M. Howell, Rebecca Buckner, Amy Young, Patrick Russell, Fred R. Skarstedt
Department of Pathology & Laboratory Medicine, Indiana University School of Medicine, Indianapolis, Indiana

ABSTRACT	RESULTS	What has been a recent disappointment with a new hire?	CONCLUSION
<p>Introduction: The response provided a mixed picture regarding work attitudes in a laboratory setting. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p> <p>Methods and Results: The survey was distributed to new graduates from the program. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p> <p>Conclusion: The survey provided a mixed picture regarding work attitudes in a laboratory setting. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p>	<p>Results: The survey provided a mixed picture regarding work attitudes in a laboratory setting. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p> <p>Employers - Where are you located?</p> <p>Employers - What is your practice setting?</p>	<p>Disappointments: The survey provided a mixed picture regarding work attitudes in a laboratory setting. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p> <p>Phase take responsibility for the energy you bring into this space.</p>	<p>Conclusion: The survey provided a mixed picture regarding work attitudes in a laboratory setting. The majority of respondents were new graduates from the program. The majority of respondents were new graduates from the program.</p> <p>References:</p>

(2021 Professionalism Poster)

In response to these findings, the timing of the traditional professionalism lecture was moved from summer to spring. Professional traits such as attendance and timeliness begin in the fall semesters. Stressing attention to detail and being patient focused is a daily mantra. The goal is to weave concepts of professionalism throughout the academic year.

In summary, the IU Cytotechnology Program has 5 programmatic student learning outcomes:

- 1: Knowledge
- 2: Technical Skills
- 3: Communication
- 4: Supervision, management, administration
- 5: Professional and ethical conduct and Continuing Professional Development

A myriad of assessment tools are used to support and produce graduates with a high degree of knowledge and skill to benefit the patients of the state of Indiana and beyond.

**Indiana University School of Medicine
Radiation Therapy Program
PRAC Report 2021**

I. Program Description

The Indiana University School of Medicine (IUSM) Radiation Therapy Program is a baccalaureate degree program and accredited by the Joint Review Committee on Education in Radiologic Technology (JRCERT). The IUSM Radiation Therapy Program requires students to successfully complete 48 credit hours of prerequisites and general-education requirements. Students must then apply for admission to the professional program in the junior and senior years. The IUSM Radiation Therapy Program offers two-degree tracks: one for non-radiographers and one for radiographers. The non-radiographer track consists of a 22-month professional core and commences during Summer Session II of the junior year. The radiographer track consists of a 20-month professional core and commences during the Fall semester of the junior year. Courses in the IUSM Radiation Therapy Program are sequential and therefore must be taken in the order specified by the program's curriculum for the assigned degree track. The didactic and clinical experiences are Monday through Friday from 8:00 am until 4:30 pm, with continuous enrollment during the professional core. To qualify for graduation from the IUSM Radiation Therapy Program, students must complete 120 credit hours of coursework and achieve clinical competency. The IUSM Radiation Therapy Program prepares its graduates to pass the American Registry of Radiologic Technologists (ARRT) Board of Certification Examination. This is a national credentialing exam for professionals to become certified and registered with the ARRT and to work as a radiation therapist. The major purpose of the IUSM Radiation Therapy Program is to prepare graduates to be leaders in the field of radiation therapy who define excellence in the health and welfare of patients through treatment of disease.

II. Learning Outcomes

The IUSM Radiation Therapy Program learning outcomes are in alignment with the JRCERT accreditation standards and the American Society of Radiologic Technologists (ASRT) professional curriculum. In addition, our program learning outcomes are appropriately mapped to adhere to the IUPUI Profiles of Learning for Undergraduate Success (PLUS).

The IUSM Radiation Therapy Program determined the program's goals with open discussion with our Advisory and Assessment Committee to align with the JRCERT specified criteria in relation to clinical competency, communication, and critical thinking. It was also important for our goals to reflect our program and institutional missions, focusing on quality patient care, excellence in education, innovation and research, professional development and growth, and promoting leaders in the field of radiation therapy. The program's goals were established to be student-focused and representative of the entire student cohort. Our diverse set of goals allow a multitude of student learning outcomes to be assessed and thereby establish student success. The student learning outcomes were determined by the Advisory and Assessment Committee as an

attainable measurement of the students' academic achievements. Our student learning outcomes were selected to encompass a vast range of skills and characteristics that define success as a radiation therapist. The Advisory and Assessment Committee specifically emphasize communication skills, problem-solving and decision-making skills, team practice, patient safety, and professionalism. The IUSM Radiation Therapy Program's learning outcomes also represent a measurement of the new graduates' success as entry-level radiation therapists.

Here is a link to the IUSM Radiation Therapy Program's 2020-2021 Outcomes Assessment Plan: [IUSM Radiation Therapy Program 2020-2021 Outcomes Assessment Plan](#)

Here is a link to an Excel sheet that maps the IUPUI Profiles of Learning for Undergraduate Success (PLUS) with the IUSM Radiation Therapy Program learning outcomes: [IUSM Radiation Therapy Program Outcomes Mapped to IUPUI PLUS](#)

Below is a list of our program learning outcomes in relation to our five program goals:

Goal 1 (Students will be clinically competent radiation therapists) Learning Outcomes:

- Students will demonstrate knowledge of radiation therapy procedures
- Students will apply principles of radiation protection for patients, self, and others
- Students will perform radiation therapy simulation procedures
- Students will deliver radiation therapy treatments as prescribed by a radiation oncologist
- Students will perform basic radiation therapy dose calculations and access treatment plans

Goal 2 (Students will communicate effectively) Learning Outcomes:

- Students will demonstrate effective communication skills (oral)
- Students will demonstrate effective communication skills (written)

Goal 3 (Students will think critically and apply problem-solving skills in the healthcare environment) Learning Outcomes:

- Students will evaluate patients for effects, reactions, and therapeutic responses
- Students will apply basic research methods

Goal 4 (Students/Graduates will have knowledge of the value of professional development and growth) Learning Outcomes:

- Students will participate in professional development and service-learning activities
- Students will formulate methods for the pursuit of lifelong learning
- Students/Graduates will become members of a professional organization

Goal 5 (Graduates will be successful at performing tasks/duties as entry-level radiation therapists) Learning Outcomes:

- Graduates will pass the ARRT national certification exam on the first attempt
- Graduates will be employed within 12 months postgraduation, if pursuing employment
- Graduates will successfully complete the program within 20 months for radiographers and 22 months for non-radiographers
- Graduates will be satisfied with their education
- Employers will be satisfied with the graduate's performance

III. Curriculum and Learning Environment

The IUSM Radiation Therapy Program's curriculum is established by the American Society of Radiologic Technologists (ASRT) and follows accreditation guidelines set forth by the JRCERT. As previously mentioned, the IUSM Radiation Therapy Program offers two-degree tracks: one for non-radiographers and one for radiographers. The non-radiographer track consists of a 22-month professional core and commences during Summer Session II of the junior year. The radiographer track consists of a 20-month professional core and commences during the Fall semester of the junior year. Courses in the IUSM Radiation Therapy Program are sequential and therefore must be taken in the order specified by the program's curriculum for the assigned degree track. The classroom and clinical experiences are Monday through Friday from 8:00 am until 4:30 pm, with continuous enrollment during the professional core. During the junior year, students will attend didactic courses on Mondays, Wednesdays, and Fridays, and clinical courses on Tuesdays and Thursdays. During Summer Session I of the senior year, students are enrolled in RAON-J450 (Clinical Practicum II) where they spend Monday through Friday learning at their assigned clinical rotations. Beginning Summer Session II through graduation, students are in clinic on Mondays, Wednesdays, and Fridays, and attend didactic courses on Tuesdays and Thursdays. The student must receive an average course grade of 75% or above to pass each course in the professional program. Students who fail to attain a 75% grade will not be allowed to complete the program and must repeat the course to be eligible for the degree.

Here is a link to our curriculum for the non-radiographer and radiographer degree tracks: [IUSM Radiation Therapy Program Curriculum](#)

The 2020-2021 PRAC report focuses on the ongoing impact of the COVID-19 pandemic and the efforts taken in higher education to ensure students continue to experience a positive and instructive learning environment during these unprecedented times. The IUSM Radiation Therapy Program continues to follow the recommendations set forth by Indiana University and the Centers for Disease Control (CDC). Beginning March 2020, in adherence to the required policy from Indiana University, all didactic courses transitioned to a virtual, hybrid format which required significant changes to instructors' teaching methods to maintain student engagement. The IUSM Radiation Therapy Program taught all didactic courses online via Zoom. The curriculum material during this time remained the same and course instructors continued to hold office hours for students in a virtual setting. Since students could not attend clinic at our affiliated hospitals during the start of the pandemic, the IUSM Radiation Therapy Program transitioned the students' clinical experience to a 100% virtual format as well. The ASRT created online clinical modules for students to remain engaged in their clinical experience. A radiation therapist from Indiana University Health University Hospital also conducted virtual clinical labs with students during this time. Once approval was received from IUSM, as well as IU Health, students safely returned to the clinical setting for an in-person clinical experience in the Summer 2020 Term adhering to the established IUSM Radiation Therapy Program COVID-19 Contingency Plan guidelines. Students were scheduled to attend clinic on different days to maintain social distancing guidelines and to adhere to the JRCERT standard that only one student will be assigned to rotate on a treatment machine at a given time. For the 2020-2021 academic year, students continued to receive face-to-face clinical instruction, attended in-person

clinical labs following social distancing guidelines, and continued virtual didactic course instruction per university policy. Clinical preceptors continued to evaluate students' clinical performance during this time. Students complete course evaluation feedback in both the clinical and didactic settings. Program faculty used these evaluations to assess student performance as well as areas for improvement.

IV. Assessment Cycle

The IUSM Radiation Therapy Program along with the Advisory and Assessment Committee review all areas related to student success to identify necessary improvements, that include but are not limited to, changes, revisions, updates, or new formats that need to be put into practice. This reevaluation process occurs annually. The program reexamines its mission statement to assure that it still aligns well with IUSM's mission and expectations, as well as supports student success within the program.

The IUSM Radiation Therapy Program reviews the Outcomes Assessment Plan each year prior to its annual meeting with the Advisory and Assessment Committee. If there is any concerning or confusing data, the program faculty consults with the Advisory and Assessment subcommittee to determine if any immediate items need to be addressed. Mid-academic year, the Advisory and Assessment Committee gather (on an annual basis), where the Outcomes Assessment Plan is thoroughly reviewed and analyzed. The Advisory and Assessment Committee discusses trends in assessment, provides feedback from the clinical preceptors, and brainstorms methods for improvement. The Advisory and Assessment Committee monitors the students' success closely focusing on any areas that are unsatisfactory. The Advisory and Assessment Committee formulates an action plan for any unmet benchmarks or unsatisfactory results. The Advisory and Assessment subcommittee reconvenes and reviews the Outcomes Assessment Plan as needed.

V. Description of Assessment Methods

The IUSM Radiation Therapy Program utilizes collective feedback from the Advisory and Assessment Committee (who are clinical supervisors), clinical instructors/staff, and program faculty to gauge student performance and competency level both didactically and clinically. The program analyzes the feedback to develop student learning outcomes and implements various ways of assessing the students' abilities such as communication skills, professionalism, clinical competency, critical thinking skills, and civic engagement. Additionally, the feedback is used to create measurement tools to establish attainable benchmarks that provide evidence-based results for each student learning outcome. The feedback from clinical preceptors is vital to the program's analysis of students' weaknesses and highlight areas of needed improvement. The Advisory and Assessment Committee utilizes this feedback to analyze, monitor, and revise necessary components of the Outcomes Assessment Plan on an annual basis. Here is a link to the IUSM Radiation Therapy Program's 2020-2021 Outcomes Assessment Plan: [IUSM Radiation Therapy Program 2020-2021 Outcomes Assessment Plan](#)

Additionally, we assess our capstone courses to IUPUI Profiles for Learning for Undergraduate Success (PLUS). The IUSM Radiation Therapy Program has six instructional areas that we collectively consider our capstone experience. The instructional areas include all

the clinical courses RAON-J350, 351, 450, 451, 452, and 453. The clinicals allow students to practice their clinical skills in a hospital setting alongside licensed radiation therapists. Here is a link to our 2021 capstone mapping and assessment documents: [IUPUI PLUS Mapping and Assessment 2021](#)

VI. Assessment Findings & Planned Improvement

The assessment findings from the 2020-2021 academic year illustrate areas of great success, as well as areas for improvement. The IUSM Radiation Therapy Program re-evaluated the Outcomes Assessment Plan and implemented a variety of new measurement tools and benchmarks. Students throughout the 2020-2021 academic year expressed how remote learning with our rigorous curriculum was quite challenging, yet students persevered with a 100% program completion rate for the Class of 2021. The results are successful because the students persevered through the COVID-19 pandemic with unwavering support from clinical instructors, clinical supervisors, didactic course instructors, and the program. The IUSM set idealistic and realistic goals for student success during this time. The institution also offered financial support and counseling, psychological support and counseling, and increased academic support and counseling.

Upon review of our 2020-2021 Outcomes Assessment Plan, the IUSM Radiation Therapy Program implemented changes to our current assessment, including changes to various measurement tools and benchmarks. For example, the Advisory and Assessment Committee increased the benchmark for student learning outcome 4.2 tool 2 (Students will formulate methods for the pursuit of lifelong learning) from 90% to 93% in 2021. The change improved student learning outcomes by inspiring students to write a more thought-provoking plan on techniques to continuously engage in lifelong learning opportunities throughout their career. The benchmark was met during the 2020-2021 assessment. The trend continues to show student success. The results are good because students demonstrate proficiency in their writing skills and have a great interest in the subject matter. The Advisory and Assessment Committee were pleased with the results of the new benchmark.

In contrast, throughout the 2020-2021 Outcomes Assessment Plan, the IUSM Radiation Therapy Program highlights areas of planned improvement based on students not successfully meeting the program's benchmarks. For example, the benchmark was not met for student learning outcome 1.1 tool 1 (Students will demonstrate knowledge of radiation therapy procedures) for both the overall average and individual student scores. The results are not satisfactory because students continue to struggle with retention of vast material required to successfully pass a comprehensive exam. They appear to be able to reiterate the information but not discern it well enough to select the best answer in a multiple-choice format. Students appear to do well with the assignment that is aligned with the comprehensive exam. The comprehensive exam review was made available to the students. The Advisory and Assessment Committee discussed reasons as to why students are not successful, and concluded students are not properly preparing for an exam of such large content. The course instructor will continue to encourage students to study all cancers in their entirety throughout the prior semester leading up to the comprehensive exam and to utilize the cancer table assignment as a guide. The course instructor will make optional practice quizzes

available prior to the comprehensive exam. The Advisory and Assessment Committee is in agreement with the practice quizzes and will re-evaluate during the next assessment cycle. Due to the unprecedented COVID-19 pandemic, the IUSM Radiation Therapy Program had to implement changes to the 2020-2021 Outcomes Assessment Plan when necessary to maintain appropriate measurement tools to assess students' performance. For example, the measurement tool for student learning outcome 2.2 tool 1 (students will demonstrate effective written communication skills) had to be changed due to COVID-19 restrictions. The written lab assignment could not be completed for the 2020-2021 assessment period as it is an in-person clinical assignment. The Advisory and Assessment Committee decided instead of not having a measurement tool at all, it was best to use the RAON-J409 Senior Research Project for this assessment cycle. The benchmark was met for the substitute measurement tool. The results are successful due to the Principal Investigator being actively involved which enhances the overall research experience. The research project included both a written paper and an oral presentation. The Advisory and Assessment Committee agreed that for the next assessment cycle (2021-2022), the measurement tool and benchmark will revert to RAON J404 Written Lab Assignment with a benchmark of $\geq 90\%$ for both the class average and individual student scores.

The aforementioned information identifies some of the assessment findings that can be found in the IUSM Radiation Therapy Program's 2020-2021 Outcomes Assessment Plan. Here is a link to the IUSM Radiation Therapy Program's 2020-2021 Outcomes Assessment Plan: [IUSM Radiation Therapy Program 2020-2021 Outcomes Assessment Plan](#)

Additionally, the IUSM Radiation Therapy Program continues to report student success in meeting assessment benchmarks and expectations involving our six capstone courses throughout the program. Here is a link to our 2021 capstone mapping and assessment documents: [IUPUI PLUS Mapping and Assessment 2021](#)