

Proposed Curriculum for a 4-year MD/RDMS Program at The Ohio State University College of Medicine

Background: The precursor statement from the twentieth century was that ultrasound (US) is the stethoscope of the twenty first-century. The stethoscope, first used by Laennec in 1816 revolutionized humankind's understanding of the human body. Listening to lung sounds and heart sounds could provide one with information that could lead to diagnosis and hopefully, timely treatment. Similarly, ultrasound first used in the mid twentieth century was primitive and had low resolution. More grayscale and then color and advanced technologies have helped improve image quality and virtual 4-D imaging. The late twentieth century saw the miniaturization of the ultrasound devices as they became portable and accessible and more prevalent in many non-traditional imaging fields of medicine.

Thus the commentary on ultrasound has been whether it will become the stethoscope of the future. This sonographic hyperbole can be translated into a practical application of training if one considers the current infrastructure of medical education. Post Flexnerian medical student education consists of preclinical and clinical opportunities over a four-year graded curriculum. Dovetailing current ultrasound curriculum at the Ohio State University into the medical student experience can attempt to provide a consistent exposure to ultrasound and establish a basic curriculum that can lead to intermediate and advanced training in residency and fellowship.

- The use of ultrasound is changing significantly as ultrasound devices become smaller, less expensive and training increases.
- At the Ohio State University, a four-year extracurricular/curricular program has begun to train medical students to become sonologists. The current curriculum is based on a synthesized hypotensive ultrasound protocol, a seven stepwise approach to learning practical ultrasound, which includes a 10-40 point quality tool called B QUIET. Sonographic images are acquired in the Ultrasound Academy that provides centralized ultrasound education and assessment with machines and models.
- The goal of the program is to expose medical students to ultrasound in such a way that they are able to utilize it during the clinical years of medical school education and graduate with a basic level of knowledge and ultrasound skill.
- The next logical step in the evolution of this program is to make the program curricular and enable national certification by graduation from medical school. This will give future clinicians the training and necessary ability to incorporate ultrasound more fully into their practice during residency training.
- Ohio State has recently started a four-year Bachelor of Science curriculum in Sonography within the School of Allied Medical Professions.

Goal: Establish those basic curricula that will develop future sonologists (MD/RDMS) over the four years of medical school.

A sample curriculum for the four-year program is included below.

Medical School Year One (MSI)

1. All first-year medical students will be exposed to ultrasound during their initial 12-week anatomy experience. They will be taught ultrasound basics including basic physics, “knobology”, scanning techniques and image acquisition in a concurrent cadaveric lab. They will be encouraged to attend extra-curricular ultrasound anatomy practical sessions (One 3-hour US hands on session per block of Anatomy to be held the Wednesday evening one week prior to each block examination).
2. In November, at the end of the anatomy block, 80 medical students will be selected to participate in a seminar series dedicated to the focused assessment with sonography in trauma (FAST) scan. Fourth year medical students in Honors Ultrasound teach these four sessions.
3. At the end of November, these students will apply to an admissions committee composed of representatives from the departments of emergency medicine, obstetrics and gynecology, radiology, sonography, as well as a fourth year MD/RDMS student. This committee will select candidates based on academic potential and dedication to the program. By January, a small subset of these students (goal: ten) will be selected for matriculation into the MD/RDMS program.
4. The selected students will then enroll in ultrasound physics courses in the school of allied medical professions during the summer immediately following formal completion of College of Medicine coursework. They will continue to meet in a small group perfecting the FAST scan and basic sonographic imaging.
5. Students must pass three comprehensive examinations including both written and hands-on components as well as a focused physics exam prior to starting second year. Students will be responsible for information in a comprehensive manner throughout the four years.

Midterm (December): Basic US I principles and techniques, Basic Physics I, and a Practical Examination consisting of evaluation of independently saved images.

Final (May): Basic US I & II, Basic Physics I & II, Proctored Practical Exam.

Physics Final (August): Physics portion of RDMS certification exam.

Year One Hours:

12 hours (4 three-hour) lectures during anatomy
3 hours lecture after anatomy
10 hours (5 two-hour) sessions with MED IVs
8 hours (4 two-hour) sessions on basic sonography
40 hours (5 eight-hour) observation shifts in an ED
24 hours (3 eight-hour) shifts in Interventional Radiology (IR),
echocardiography, and sonography suites.
60 hours (30 two-hour) physics didactics (June - Aug)
12 hours (6 two-hour) proctored hands-on sessions

Total: 169 hours

Medical School Year Two (MSII)

1. The 10 MD/RDMS students will function as the core group of the Med II “model pool.” The model pool consists of a group of 40 students who act as models for other ultrasound educational activities (first year anatomy ultrasound, Honors Ultrasound, resident and attending ultrasound education, et cetera). Each month, they receive 2 hours of didactic education in ultrasound and at least two more hours of supervised ultrasound hands-on experience.
2. In addition to modeling duties second year medical students within the program will attend monthly didactics, supervised practical sessions, ED, IR, echo, and general sonography observation shifts.
3. The topics covered throughout second year will be the FAST scan, intermediate echocardiography, the abdominal aorta, hepatobiliary imaging, and procedural ultrasound.
4. At the middle and end of the second year, students will be required to pass comprehensive written and practical examinations.

Midterm (December): Basic US Review, Physics Review I, Practical Examination (Review and evaluation of independently saved images).

Final (May): Basic US and Physics Review, Pathology Recognition Exam, Proctored Practical Examination using model patients (with and without pathology).

Practice RDMS Exam (80 Questions)

Year Two Hours:

16 hours (8 two-hour) lectures

16 hours (8 two-hour) supervised practical sessions

30 hours as ultrasound model

64 hours (8 eight-hour) ED observation shifts

48 hours (12 four-hour) shifts in IR, echocardiography, and general sonography suites.

Total: 174 hours

Medical School Year Three (MSIII)

1. The third year of medical school is a very busy 12 months for medical students. A busy ultrasound curriculum during this year is not feasible at this time. However, there are multiple opportunities to allow for ultrasound education. During their Clinical Skills Immersion Experience (CSIE), all medical students are exposed to ultrasound basics, cardiac and FAST scanning along with procedural ultrasound. The MD/RDMS students will be expected to act as “faculty” and help instruct their colleagues throughout the year.
2. Each Med III is allowed one elective rotation during their ambulatory medicine block. The students in the MD/RDMS program will be required to enroll in a Sonography elective created specifically for this program. This rotation will be composed of 4 1-week blocks. Each student will spend 1 week obtaining ultrasound images in the ED, working with (Emergency Medicine) EM faculty as well as a second-year EM resident during their ultrasound month. They will spend 1 week performing both obstetric and gynecologic ultrasounds, 1 week in the echocardiography and vascular labs, and finally 1 week in the sonography suite in the radiology department. This elective will also have dedicated student didactic sessions focused on each different discipline
3. Additionally scanning shifts in the emergency department will be available with residents, fellows and EM faculty during each month (Minimum of 8 eight-hour shifts).
4. Each month during third year, the students will receive a two-hour lecture in the evening on various ultrasound topics. These lectures will be given by various faculty members and will be in-depth discussions on specific topics to broaden their exposure to ultrasound. RDMS students will be preferentially selected for local rotations to allow them the opportunity to attend these lectures.
5. The third-year will also end with comprehensive written and practical final examinations.
Final (June): Basic US and physics review, pathology recognition, proctored practical examination using model patients (with and without pathology), evaluation of independently saved images. A practice RDMS exam (80 Questions) will also be administered at this time.

Year Three Hours:

80 hours Ultrasound rotation

3 hours CSIE

22 hours (11 two-hour) didactic sessions by Ultrasound Faculty

64 hours (8 eight-hour) ultrasound shifts

Total: 169 Hours

Medical School Year Four (MSIV)

1. RDMS students will be automatically enrolled in the existing **Ultrasound Honors** year-long elective as the final part of the curriculum. This academic program focuses on clinical delivery of ultrasound services, teaching others how to perform ultrasound, review of current research and development of an honors research project. This specific curriculum involves more advanced ultrasound education, including critical care, musculoskeletal, vascular, and ophthalmic sonography along with more experience in cardiac, aorta, biliary, and FAST imaging. Students have 2 hours of didactic training each month from a multidisciplinary faculty, at least 2 hours of directly supervised image acquisition, and a monthly journal club covering landmark and recent ultrasound related research articles. Minimum monthly requirements of self-scheduled scanning on models and collecting clinical ultrasound images make up a digital portfolio of images. Additionally, these fourth year students are responsible for teaching the FAST scan to a group of five first-year medical students. All US Honors students are required to complete a year-long project in ultrasound related to their eventual specialty's scope of practice.
2. All Ohio State students complete a Differentiation of Care (DOC) series, which includes the **DOC 1 (Emergency Medicine)**; approach to the undifferentiated patient. This DOC 1 has required lectures and hands-on time dedicated to ultrasound. The emergency departments at OSU Main and OSU East have ultrasound equipment and the students will be preselected at these clinical sites. This creates an opportunity for these students to practice clinical ultrasound where they will see more pathology during 4 additional 8-hour "scanning" shifts.
3. Students would be required to complete at least 56 hours of ultrasound in the radiology suite during the year.
4. Ohio State medical students have four elective rotations during their fourth year. MD/RDMS students will enroll in an ultrasound research elective. During this month, fourth year students would be able to choose a research project in the field of sonography to complete, in addition to providing a flexible schedule in which they could add more time scanning patients in any sonography lab they choose. This would allow these students to focus solely on ultrasound for one month. Students would be required to perform at least 20 ultrasound exams per week during this rotation.
5. Each student will record all ultrasound exams performed and observed. In the months of October and January students will report their numbers with written plans to remedy any deficiencies.
6. A final examination will be administered in April of the senior year
Final (April): Advanced pathology recognition, practical skills evaluation using model patients, and a practice RDMS examination (160 questions). A digital portfolio will also be constructed and tallied at this time.
7. The year would culminate with the submission of an application for RDMS certification to the Academy of Registered Diagnostic Medical Sonographers (**ARDMS**) with a letter of verification of scanning skill, number of total exams, and testimony of completion of

the curriculum from the Program Director and faculty. This will qualify under a modified 4A subcategory that will allow graduates with an MD degree to sit for the RDMS exam.

8. Students will graduate from the College of Medicine (June).
9. Finally, after graduation students will sit for and pass abdominal portion of the RDMS certification examination having already taken and passed the physics portion and thus join the registry as **RDMS** certified.

Year Four Hours:

20 hours (10 two-hour) lectures
20 hours (10 two-hour) supervised practical sessions
20 hours (10 two-hour) journal club meetings
64 hours (8 eight-hour) shifts performing ED ultrasound
10 hours (5 two-hour) intensive ultrasound physics review sessions
10 hours (5 two-hour) sessions teaching first-year students the
FAST exam
15 hours of independent ultrasound scans in Clinical Skills Lab
120 hours of research elective
56 hours in sonography suite

Total: 335 hours

Hours for Entire Program

Total: 847 hours

Student Leaders in Ultrasound

The Ultrasound Academy relies on a fair amount of student leadership to meet its goals. The formalization of an MD/RDMS curriculum will create a pool of talented and dedicated students who will assume a degree of responsibility for their own ultrasound education and that of their peers and underclassmen, both within and outside the Ultrasound Academy.

The Ultrasound Academy hopes to provide structured mentorship to all constituencies. Toward that end, student leadership positions will be created in order to facilitate growth in programs that meet the practical ultrasound needs of students, residents, fellows and attending physicians. The student programs currently in place and those planned are meant to encompass the broad spectrum of sonographic uses at the clinical bedside. Medical student leaders will allow a steady refinement of current clinical practice and need and bring this back to the skills center to help create learning opportunities with ultrasound.

Two MD/RDMS students from each class will be selected by faculty and staff to act as class liaisons. They will assist with scheduling of formal and informal ultrasound activities, image cataloging, count verification, and goal achievement for their respective classes. These student leaders will be points of contact for their respective classes, both within the Ultrasound Academy and the College of Medicine. The pair of student leaders from each class will also act as points of contact for underclassmen in the Ultrasound Academy when scheduling individual and group tutorials, combined class activities, and Grand Round guest lecturers.

Criteria for leadership

- In good standing / academically excellent at OSUCOM
- The class liaisons will be selected on a yearly basis.
- Selection one year will not guarantee selection for subsequent years.
- All members of each class will have the opportunity to apply each year.
- Selection will be competitive
- Students will be chosen based on motivation, commitment, knowledge base, willingness to learn, and leadership potential.

These two class leaders will fit into the chain of command regarding program, class, faculty, and student feedback. Where appropriate students will address their class leaders regarding problems, conflicts, suggestions, curriculum critique, etc. This feedback will flow up the chain of command (med 1 leaders to fourth year student with med 1 curriculum responsibility). Issues observed by faculty will be either addressed individually or through respective class leaders. This may also be accomplished via fourth year MD/RDMS students assigned to the respective class.

Students within the MD/RDMS classes will be expected to act as ultrasound liaisons to their respective medical school classes.

First year students will help with anatomy ultrasound sessions, anatomy scanning times, hands on time for interested students, and completion of surveys and class statistics.

Second year students will be student leaders for the model pool and will act as liaisons for medical school interest groups where US specialty specific workshops may be appropriate.

Third year students will serve as “faculty” for ICM, CSIE and EM elective rotations where they will help teach their peers the basic techniques of ultrasound. In this manner the student leaders can be part of a simple construct that puts emphasis on training future sonographers and sonologists.

Fourth year students will have more responsibilities as "student faculty". They will coordinate underclassmen education, they will act as points of contact regarding their respective specialty choices (Obstetrics and Gynecology, Emergency Medicine, Anesthesia, Internal Medicine, General Surgery, Radiology, Ophthalmology, Otorhynolaryngology, Urology, etc.) for interest groups, fourth year intern preparation workshops, and other activities where appropriate.

Senior Medical Student Sonographers: The two fourth year student leaders will have a great deal of authority and responsibility over the program as a whole. They will use their fellow fourth year RDMS students as counselors in specific roles (one for each curriculum year, technology officer(s) for US machine in-service, image archiving, audio/video, webmaster, etc. facilities coordinator, treasurer, interest group president, and other academic positions as needed.

Each sonographic skill, from detecting a heart beat to performing a procedure to looking for a pregnancy to detecting fluid where it should not be, can be learned following a simple paradigm. The Clinical Skills Education and Assessment Center provides the infrastructure while the Ultrasound Academy provides the content and focus of learning. To cross over from a novice operator to basic, intermediate and advanced practitioners of ultrasound requires much training. The stepwise learning of skills can be layered amidst a medical school curriculum to provide a comprehensive integration of sonography into medical education.

The first years get acquainted with the machine and how to scan. The second years get to experience how it feels to be scanned and learn some advanced techniques. The third years get a focused intervention on how to use ultrasound as a tool on the wards. The fourth year provides three opportunities to get involved with ultrasound. The DOC 1 explores the shock state and how practical ultrasound can be used at the bedside. The Advanced Topics in Emergency Medicine allows students the opportunities to refine their ultrasound skills. Finally the Ultrasound Honors program is a longitudinal program to allow structured learning and independent scanning while encouraging teaching, mentorship and leadership. Thus students can learn ultrasound and can electively choose to get more practical experience.

The Ultrasound Academy provides the educational construct while the lab environment encourages participation, leadership, and teaching responsibilities. For the sharing of ideas, techniques, tips and pearls on how to... e.g. perform an appropriate transvaginal ultrasound exam, the hands on lab is an ideal working environment for sonography training. Students can learn these ultrasound skills at the ultrasound academy. As they progress through medical school they can participate in the governance of the Ultrasound Academy as student leaders and help refine and improve the experience.

Physical Resources

1. The Ohio State University Main and East Emergency Departments.
2. Nationwide Children's Hospital Emergency Department.
3. Nationwide Children's Hospital Radiology Department.
4. The Ohio State University Main and East Radiology Departments.
5. The Ohio State University Ross Heart Hospital Echocardiography lab.
6. The Ohio State University Obstetrics and Gynecology Department and Maternal-Fetal Medicine sonography suites.
7. The Ohio State University Clinical Skills Education and Assessment Center.

Citations

1. Flexner. Medical Education in the United States and Canada 1910. The Carnegie Foundation for the Advancement of Teaching. 1910.
2. Arger, et al. Teaching Medical Students Diagnostic Sonography. J Ultrasound Med 2005 24: 1365-1369.

Ultrasound Academy

MED I

- **Anatomy:** By the end of the module the participant will be able to...
 - Operate an ultrasound machine and transducer to optimize an image
 - Distinguish internal jugular vein from carotid artery
 - Develop a Doppler signal that demonstrates arterial waveform
 - Distinguish Gall bladder and Liver Lobes
 - Distinguish Hepatic Versus Portal Veins/Triad
 - Save a still image and labeled video clip to a digital media/portfolio
- **FAST (Focused Assessment with Sonography for Trauma)**
 - Perform a FAST Exam...
 - Perihepatic view
 - Perisplenic view
 - Pericardial
 - Posterior cul de sac

MED II

- **Model Pool**
 - Focused Cardiac (LAX, SAX, & SUX)
 - Focused Aorta (SMA, Long & short axis's)
 - Procedures (CVC & PIV)
 - Critical Care (PTX, CVP, & Focused vascular)
 - Hepatobiliary (GB, Portal triad, & Pancreas)
 - Pelvic (IUP)
- **ISP (Independent Study) Ultrasound**
 - Focused Cardiac (LAX, SAX, & SUX)
 - Focused Procedures
 - Focused Critical Care
 - US guided Regional Anesthesia

MED III

- **CSIE (Clinical Skills Immersion Experience)**
 - Focused CVC
 - Focused Cardiac
 - Focused fluid localization
- **EM-Ultrasound Elective**
 - Clinical Scanning in the ED-proctored by faculty
 - Request study, populate forms, acquire images, clinical interpretation and close exam
 - Reading Room time looking over the required images and perform Q/A
 - Quality report for personnel file
 - Follow up studies and confirmation
 - Dictations
 - Specialty Elective Ultrasound Scanning (e.g. MSK, Ophtho)
 - Clinical protocols on models
 - Clinical enrollment of patients

MED IV

- **DOC 1 Clerkship (The Undifferentiated Patient)**
 - Approach to the patient in shock
 - ABC's and Ultrasound
 - Trinity
 - Critical Care
 - Cardiac, vascular, PTX, procedures, volume status
- **US Honors**
 - Focused Cardiac
 - Focused Aorta
 - Focused Trauma
 - Focused Pelvic
 - Focused Abdominal
 - Focused Procedures
 - Focused Vascular
 - Focused MSK
 - Focused Ophthalmology
 - Mentoring of first year medical students via FAST program
 - Ultrasound Honors project
- **ATEM (Advanced Topics in Emergency Medicine)**
 - Focused Cardiac
 - Focused Aorta
 - Focused Pelvic
 - Focused Assessment with Sonography for Trauma

- **Intern Preparedness**

- Coordinated by US Honors students and interest group leaders
- Specialty Ultrasound State of Affairs/Logistics (e.g. OB/gyn)
- Clinical Scenarios & indications (e. g. pelvic pain & early pregnancy)
- Protocols (Focused IUP, R/O Ectopic)
- Scanning, knobology, image optimization
- Anatomy and sonographic windows (e.g: Sag UT, Cor UT, ROV/LOV, CVX)

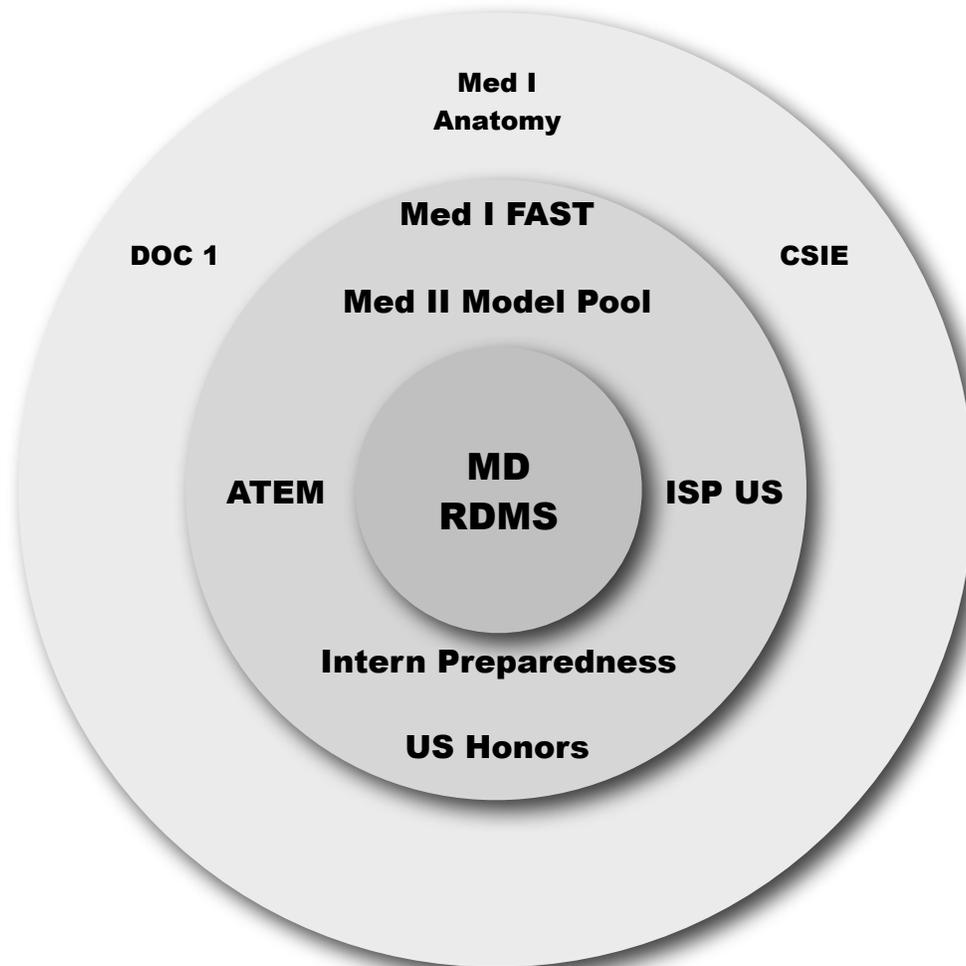
Spring Checkout Exams

- Declare level of training (Medical Student, Resident, Fellow, Attending)
- Review Credentials, verified activity, CME or equivalent
- Digital portfolio reviewed
- Exit exams are documented digitally, quantified and filed
- Written recommendations and review collated
- Final Recommendations
 - Portable and transferable

Three-tiered exposure of medical students to US training in a Medical Center environment.

- **Tier 1-** Every student gets the minimum exposure:
 - Anatomy lectures, hands on demonstrations, individual hands on
 - CSIE includes two hour ultrasound exposure
 - DOC 1 includes US in shock didactics and hands on
- **Tier 2**
 - Med 1 FAST program
 - Med 2 US Model Pool
 - Med 3 US Electives
 - Med 4 US Honors & ATEM
- **Tier 3** MD RDMS

MD RDMS PARADIGM (Medical Doctor, Registered Diagnostic Focused Sonographer)



MD RDMS FAQ's

What is the RDMS certification?

The American Registry of Diagnostic Medical Sonography is an organization that certifies ultrasound professionals after completion of standard requirements and successful completion of a certification exam.

What is the purpose of the dual degree of MD and RDMS?

If ultrasound continues to expand in use at the clinical bedside, incorporation into medical education will need systematic standardization. This degree exposes the medical student to ultrasound education integrated over four years of medical school. The hope is to prepare future physicians with those skills necessary to utilize ultrasound at the clinical bedside.

Who should apply to the MD RDMS program?

Serious students, interested in acquiring ultrasound skills should apply. Structured mentorship, teaching, and guiding others on how to use ultrasound will be the roles of those who complete this program. New graduates are expected to utilize ultrasound during their resident and attending career and help others learn to use this modality.

What is the difference between a comprehensive and a focused exam?

A comprehensive exam is a traditional exam usually performed by a sonographer in an ultrasound suite and interpreted by an imaging specialist (e.g. a radiologist). A focused or limited exam is performed by a clinician at the bedside and looks to answer a specific medical question. Many non-traditional imaging specialties are including ultrasound into their training with focused ultrasound.

Do I have to be an MD candidate to enroll in this program?

This program is for medical school matriculants only and does not accommodate sonography students looking to obtain a medical degree. Students will not be permitted to continue and complete the program should they discontinue their medical school education.

Do I have to participate in the model pool if I am not comfortable having others scan me?

Participation into the model pool is encouraged but not an absolute requirement. Some individuals may have modesty or religious objections to this and would not be required to model. Participation in didactics, hands on and shadowing would still be required.

Am I allowed to select electives other than those listed in the curriculum?

By selecting the MD RDMS curriculum, students have dedicated sonography as their "minor". Thus electives in the 3rd and 4th year should have a sonography focus. Special circumstances and away rotations that provide ultrasound exposure will be considered and should be directed to the program director.

MD RDMS FAQ's

What is the definition of failure to progress within this program?

At each year in the program, sonography progress will be measured. This assessment includes review of collected images, hours of participation, completion of a written exam and an exit interview. Minimum standards are expected and failure to meet those will result in recommendations for remediation. If remediation is not completed successfully, the student will be asked to leave the MD RDMS program.

What is the due process a student has before being labeled failure to progress?

At 3-4 month intervals, each member's participation will be reviewed by the program's administration to ensure adequate progress. If deficiencies are detected, students will be notified by email and given steps toward remediation. If by the next quarter sufficient progress is not made, students will be called to a meeting with the director to discuss further remediation and resolution of the deficiencies. If the student does not make up the deficiencies, they will be asked to leave the program to focus on an MD degree only.

What are the repercussions of failure to progress?

If a student fails to progress and does not remediate in a timely manner, they will be asked to leave the program and focus solely on the MD program. If a student is having difficulty with the MD curriculum, they will be referred to the PCASC according to OSUCOM guidelines.

What are the checkpoints in the program, what are the requirements, and when are the students assessed?

Checkpoints in the system are recorded in Medstar and Carmen where students can track their exams, participation, quizzes and progress with each yearly requirement(s).

What happens if my digital portfolio is not complete during the checkpoints?

Students are required to save the necessary ultrasound exams during each year of training. If this portfolio does not meet the minimum requirements during each checkpoint, students will be given one quarter to make up the deficiencies. If the problem remains after this quarter, the student will meet with the program director to discuss the issue and develop a plan for completion of requirements. If this plan is not completed in the allocated time, the student will be asked to leave the program.

Are there opportunities to make up assignments from the rotation?

Yes, but students should make every effort to meet requirements and fulfill assignments on time. Extenuating circumstances should be communicated with the program directorship as soon as they are known so a mutual arrangement may be met to fulfill all requirements in a timely manner.

What is online pedagogy and how is it used in the MD RDMS program? Online pedagogy is a form of asynchronous learning where students and faculty communicate through online media. The MD RDMS uses posted material to secure learning management systems such as Carmen to provide material for MD RDMS matriculants. This material augments synchronous learning with faculty and personnel in the skills lab, clinical sites and reading rooms where students interact real time with ultrasound professionals.

MD RDMS FAQ's

As an MD RDMS, am I allowed to participate in the online forums, blogs, podcasts, wiki's, and video streamings?

The MD RDMS program is a leadership-training program as well as a training program to learn ultrasound. Students will be encouraged to create content to post on the Learning Management System and to participate in interesting cases, findings or other material that others could learn from.

ADMINISTRATIVE FAQ'S

Why should I invest in ultrasound education?

Current practice of ultrasound in medicine has shown that the technology has outpaced education. Many specialties are looking to learn about ultrasound and do not have physician champions to lead the way. Early exposure to ultrasound in medical education can provide students the necessary skills to expand their knowledge in residency and develop into ultrasound leaders in their respective fields.

What is meant by Sonography being the stethoscope of the twenty first century?

Moore's Law of integrated circuits applies to all electronic technologies that continue to miniaturize and yet hold more information. Ultrasound devices have turned from very large devices to those that can be carried by hand by many bedside clinicians. Thus, 21st century clinicians can use these devices much like traditional stethoscopes to "listen and see" the heart, lungs and other areas within the body. The main difference is that ultrasound is an imaging procedure and thus can generate a bill for acquisition and professional interpretation of the generated images.

What is the benefit of having an MD RDMS dual degree curriculum?

Students are excited to learn a practical skill and opportunities for hands on learning are preferred. Developing a specialized program distinguishes an institution to provide those necessary skills sought by residency programs.

What does the degree confer onto the recipient upon completion?

This degree will demonstrate a dedication to ultrasound exposure and proficiency and will not confer the ability to complete comprehensive ultrasound scans as a physician. The successful MD RDMS matriculant will have established a solid foundation upon which to use ultrasound during residency training and beyond to finally apply for ultrasound privileges at their hospital of employment.

MD RDMS FAQ's

So I have decided to develop an educational ultrasound infrastructure...

What are the start up costs?

Each program will need ultrasound equipment, probes, gel, supplies and an information learning system. Additionally a dedicated coordinator, physician champions and clinical supervisory sites are a must for successful programs.

What administrative coordination is needed?

An administrative coordinator is needed to collate student attendance, progress, digital portfolio, quizzes, clinical rotations, evaluations and other program administration.

How will progress in the program be tracked?

Online tracking within the Learning Management System (LMS) and personal observation (evaluations) will be the main ways to track progress.

What are the resources needed with information systems?

A LMS such as Carmen can be utilized to distribute materials and content to the program matriculants.

How do I recruit faculty to participate in ultrasound education?

Clinical faculty at clinical sites are busy providing care and students at times slow clinical productivity. Financial relationships between the clinical faculty and the medical school will have to be developed so that faculty are encouraged to participate in education and mentor future providers of clinical care.

What are the incentives for clinical sites that provide preceptors?

Besides academic promotion, the clinical sites will need financial incentives to encourage participation and defray loss in productivity.

Where will the program be in five to ten years?

If the program develops as planned, a coordinated stream of medical students will become housestaff and attendings and the program will be a model for expanding ultrasound education and influencing clinical care.