

Ultrasound Practitioner Master's Degree Curriculum and Questionnaire Response by the SDMS Membership

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Following publication of the ultrasound practitioner (UP) master's degree educational proposal in August 1999, the UP Commission published a questionnaire to obtain feedback from SDMS membership to the UP concept. This article contains the results of that data collection. Additionally, as progress has been made in the development of UP programs around the country, refinement of the curriculum, as originally proposed, has begun. This article contains a breakdown of required didactic and clinical education for the midlevel provider in diagnostic ultrasound.

Key words: ultrasound practitioner, midlevel provider, ultrasound practitioner curriculum

The July 1999 publication of the *Journal of Diagnostic Medical Sonography (JDMS)* included the article "The Ultrasound Practitioner—A Proposal: Response to the SDMS for the Development of a Middle-Care Provider in Ultrasound Imaging." The article, written by the Ultrasound Practitioner Commission, proposed a new profession, the ultrasound practitioner (UP).¹ In the fall of 1999, two open forums were held in conjunction with the SDMS Annual Conference in Anaheim, California, to solicit response on the proposed UP concept. The UP proposal was presented to invited universities and medical ultrasound association groups, as well as to the SDMS membership at large. These open forums were well attended and did, for the most part, generate among the participants a strong reception to this new midlevel provider idea.

Following the open forums, several universities continued their discussion with the UP Commission with regard to the plausibility of creating a UP program at their respective institutions. As described in the original proposal, the master's degree was designated as the standard level of entry for this profession. This would enable academic programs to be consistent from the start without variation or confusion. UP programs will not be offered as a

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certificate, an associate of arts degree, or a bachelor's degree.

The proposed UP educational curriculum, reviewed below, is derived from the core physician assistant (PA) and nurse practitioner (NP) models. This approach is what the UP Commission believes is necessary to ensure adequate education and training standards, as well as credibility. As related to the clinical experience required by the UP degree, the PA/NP models offered characteristics that appeared to meet the role of this provider. For example, similar to the NP model in which the individual must first be a nurse before entering an NP program, the UP professional will have to have had 5 years of diagnostic ultrasound experience and be certified by the American Registry of Diagnostic Medical Sonographers (ARDMS) prior to entering a UP program. UP programs will be at the master's degree level, which is also an attribute of NP programs. This ensures "experience" in the field, with only graduate-level providers entering the profession.

From the PA profession, the rigorous continuing medical education requirement ensures ongoing competency in a changing and continuously evolving field. Additionally, the PA national board exam is repeated every 6 years. This encourages practitioners to keep up to date in the field. As with the PA and NP models, the UP curriculum is consistent with this requirement. In fact, experienced sonographers who have completed a master's-level PA or NP program have only didactic and clinical work in the "diagnostic image interpretation" core and electives to complete in order to be eligible for the UP national board exam (still to be developed). PAs and NPs who are not sonographers would be required to complete an ultrasound program, successfully pass ARDMS exams, obtain 5 years of experience as a sonographer, and complete the UP Image Interpretation Core and Clinical Imaging Rotations to be eligible for UP board exams.

Sonographers who want to advance their education as UPs will have to complete the curriculum described below. The description includes a list of prerequisites that will have to be completed prior to entering a UP master's program. Next, the coursework in the two major components of the master's curriculum is listed. The first component is a foundational core curriculum in basic sciences that provides students with a global understanding of

clinical medicine. The second component includes coursework that prepares the student for advanced sonographic diagnosis and image interpretation. In this component, UP students will be required to complete a core set of required courses followed by elective tracks in general practice, women's health, vascular ultrasound, or cardiac ultrasound. Upon successful completion of the master's-level coursework described below, the UP student will be eligible to sit for the UP board exam and enter into clinical practice as a UP. This practice will be subject to individual state licensure authorization, which has yet to be developed or implemented. As envisioned, this midlevel provider will work as part of a team with a physician or sonologist in a manner very similar to a PA.

Prerequisite Coursework for Master's-Level Eligibility

Undergraduate prerequisite courses suggested for eligibility to begin coursework in the core curriculum include the following:

- A baccalaureate degree in any major
- Five years of clinical experience as an ARDMS-certified sonographer
- General chemistry (6 credits w/lab)
- General physics (6 credits w/lab)
- General biology (6 credits w/lab)
- Human physiology (3 credits w/lab)
- Human anatomy (3 credits w/lab)
- College algebra (6 credits)
- Statistics (3 credits)
- Psychology (3 credits)
- Humanities (8 credits)
- English (6 credits)
- Introduction to computers or equivalent (3 credits)

Graduate Foundation/ Core Didactic Curriculum

The UP Commission has made the following recommendations for the master's-level core curriculum:

- Pharmacology
- Biomedical ethics or health law
- Patient history and physical assessment
- Advanced human anatomy and physiology

- Advanced pathophysiology and clinical correlation
- Research methodologies
- Biostatistics
- Psychosocial aspects of medical care

The next phase of professional development included developing clinical experience guidelines for the UP student. The UP Commission reviewed the requisite clinical experiences of PAs, NPs, medical students, and nursing students. All of these health provider student populations are required to obtain global experience before entering into subspecialty areas. In the imaging world and in diagnostic sonography specifically, national board exams have been set up to allow sonographers to study in one specialty area and take specialty national board exams. For example, individuals might begin their ultrasound experience by doing only vascular ultrasound. While they gain experience over the years in this specialty area, they may never learn the anatomy of other parts of the body. The UP Commission, based on advice from physician groups, has decided that in order to gain an appropriate perspective of the medical field in which the UP will be participating and “interpreting,” the UP will need a global base. The core clinical rotations proposed are similar to those of other midlevel health care providers and expose the UP student to all major aspects of medicine.

Graduate Foundation/ Core Clinical Education

Clinical rotations. Students will spend 600 hours of observational exposure in any five of the following areas:

- Family practice
- Emergency medicine
- General medicine
- Pediatrics
- Cardiology
- Obstetrics/gynecology
- Surgery
- Oncology

Some have thought that the UP Commission’s idea was to create a “mini-sonologist” by providing a master’s degree in advanced sonology. While the most

probable outcome is that those taking the UP path will become experts in their existing area of sonography specialty, the UP Commission’s goal is to have the students entering these programs acquire a global perspective and experience before, or at least while, becoming more specialized. When UP students rotate through the clinical sites, the experiences they have will be comparable to those of PA or NP students. UP students will shadow a provider, participate in the provision of health care, be subject to review, and, at a minimum, be supervised directly during their clinical experience.

This is similar to the current clinical experience of the sonography student. Some clinical sites may offer more exposure than others. A core experience, however, is expected. This clinical core is well illustrated in the *Sonography Clinical Assessment Notebook*, a clinical evaluation tool published by the SDMS Educational Foundation. The relevance of this experience is no different than it is for the medical student, the PA or NP student, or the resident physician. Some of the experience is for exposure. Some is for competency. Clinical experience provides an overall perspective of the impact and outcomes inherent in interpretation and midlevel practice for the UP student. Emphasis and documentation of clinical competency requirements is the method by which all medical training at all levels is done.

Sonographers opposing the development of the UP concept often consider themselves UPs already. It must be appreciated that while they may be extremely adept at their area of specialization, UPs by acquiring a standardized global understanding of medicine will be more legitimately qualified to interpret. The UP Commission is not breaking new ground or suggesting more than traditional requirements for midlevel practice. The core curriculum and clinical model already exists for all of medicine, and there is a great deal of overlap in these aspects of education. It would be inappropriate to have a midlevel provider obtain anything less than that which is suggested for the UP if the goal is to provide high-quality services. The UP must gain an overall perspective of medicine before or at least while becoming more of an expert in a specialty area. Otherwise, he or she will not be considered a midlevel specialist provider.

Graduate Didactic Image Interpretation Core Curriculum

These courses are being developed and will be published at a later date.

Graduate Clinical Image Interpretation Core Education

Rotations will include the following for all UP students (3 weeks each or 480 clock hours total):

- Radiology (adult and pediatrics)
- Cardiology (adult and pediatrics)
- Obstetrics/gynecology
- Vascular

During the core clinical imaging rotations, the student will be present at reading sessions for all exams and will learn the appropriate reporting methods for interpretation of pertinent imaging as well as nonimaging studies performed in these areas. All students will rotate through all of the core image interpretation rotations.

Graduate Elective Clinical Image Interpretation Rotations

While all students will rotate through the core image interpretation didactic and clinical rotations, they will also have elective didactic and clinical rotations within their program, enabling them to specialize in their area of interest. Of note is that one of these areas is general practice. The person with an interest in general practice will likely be the one who works with a family practice physician or group, in which case he or she will be involved mostly in primary care. Others will more likely work with radiologists, obstetricians, perinatologists, gynecologists, vascular surgeons, or cardiologists.

Students will choose an elective specialty area consistent with their 5 years of sonography experience. They will perform 600 hours of UP clinical internship in this track. If a student chooses to follow more than one of the following tracks, a minimum of 500 hours must be completed in each area. This will include didactic (15 semester hours) and clinical (500 hours) components as listed below:

General Practice

Advanced abdominal imaging to include other modalities
 Advanced abdominal pathophysiology
 Invasive procedures
 Advanced hemodynamics and physiology
 Patient management and follow-up
 Clinical internship to include 500 cases and/or 600 hours

Women's Health

Prenatal diagnosis
 Embryology
 Prenatal testing and assessment
 Pelvic examination techniques
 Nonimaging testing
 Fetal anomalies, syndromes, and aneuploidies
 Advanced hemodynamics/physiology
 Breast disease
 Patient management and follow-up
 Clinical internship to include 500 cases and/or 600 hours

Vascular

Nonimaging vascular testing and interpretation
 Vascular pathologies
 Interventional procedures
 Advanced hemodynamics/physiology
 Patient management and follow-up
 Clinical internship to include 500 cases and/or 600 hours

Cardiac

Advanced hemodynamics/physiology
 Congenital heart disease and corrective procedures
 Acquired heart disease
 Medical and surgical treatment
 Contrast agents
 Other cardiac testing (Holter monitors, treadmills)
 Electrophysiology
 Patient management and follow-up
 Clinical internship to include 500 cases and/or 600 hours

Sample Curriculum

This is a sample curriculum to demonstrate how the UP program might progress. The reader may contact

George Washington University by e-mail at ultrap@gwu.edu to ask questions about a master's degree UP program in development.

Fall Year 1

- Advanced human anatomy and physiology
- Research methodologies
- Psychosocial aspects of medical care
- Pharmacology

Spring Year 1

- Advanced pathophysiology and clinical correlation
- Biostatistics
- Patient history and physical assessment
- Biomedical ethics or health law

Summer Year 1

- Clinical foundational core rotations (five 3-week rotations) (600 hours)

Fall Year 2

- One month didactic instruction and clinical imaging interpretation core curriculum with rotations in each of the following areas: radiology, cardiology, obstetrics/gynecology, vascular (480 hours)

Spring Year 2

- Image interpretation didactic courses in general, women's health, vascular, or cardiac elective track

Summer Year 2

- Clinical rotations in elective track (600 hours)

Total clinical practicum: 1680 hours

National board exam: late fall

It will be the responsibility of the universities developing the UP program to provide advisement for program eligibility and acceptance, as well as proof of program completion in order to qualify for national board examinations once the board examination is implemented.

Membership Response to the Questionnaire

Early in the progressive process, a questionnaire was developed in order to receive feedback from the membership (see the appendix). Following publication

of the questionnaire,² 254 responses were obtained, both online at the SDMS website and by mail before the deadline, at which time data were collected.

As evidenced by respondent specialties, it is apparent that there are interested potential UP students from all primary specialty areas. Additionally, specialty clinical institutions from around the country have expressed interest in becoming clinical sites for rotating UP students. The percentage of respondents' specialties are as follows:

Specialty	Percentage
Abdomen	53.4
Adult echocardiography	25.7
Obstetrics/gynecology	70.4
Neurosonology	8.7
Ophthalmology	1.2
Pediatric echocardiography	5.5
Vascular	44.7

The composite results from the questionnaire indicate positive support for the UP concept by the respondents (Figs. 1-9).

Additional comments added to the end of the questionnaires by individuals revealed many thoughtful suggestions for university program development. Of course, most were located close to the respondent making the suggestions. Similarly, we requested any names from respondents of physicians who might be supportive to UP development. Some suggestions included physicians interested in having

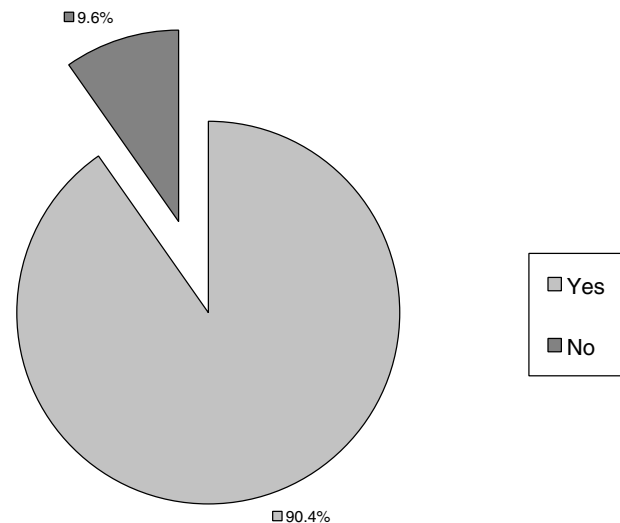


FIG. 1. Percentage in favor of ultrasound practitioner development (questionnaire item 1).

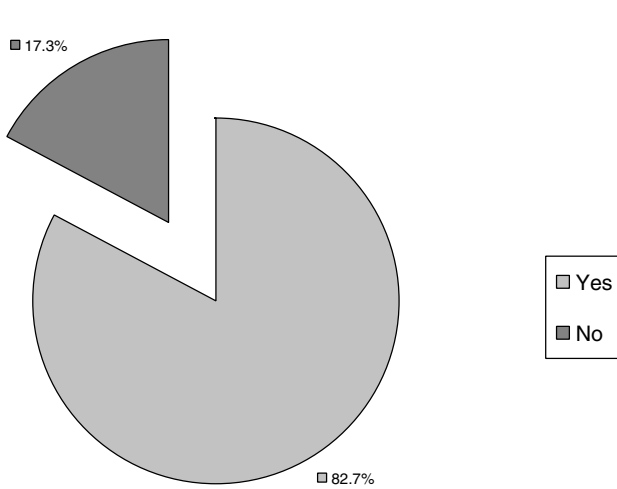


FIG. 2. Percentage interested in becoming an ultrasound practitioner (questionnaire item 2).

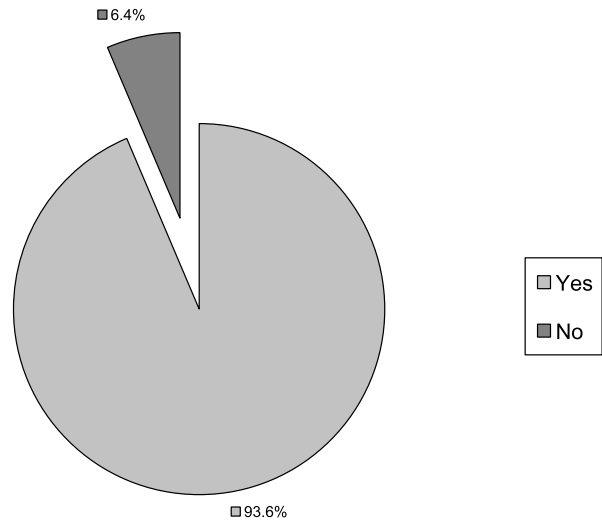


FIG. 4. Percentage interested in online education (questionnaire item 5).

clinical rotations for UP students. Unfortunately, nearly all names were given without addresses or contact numbers; however, this list of names was viewed as supportive and suggested a national base for clinical sites, future work sites, and places for high-quality student recruitment.

Conclusion

This article presents additional information with regard to the UP master’s curriculum and the results

of the SDMS membership survey related to UP development.

The UP Commission has received many requests for information with regard to UP master’s-level professional programs. Because the programs do not yet exist, the only response that can be given currently is to “be patient.” There are universities and colleges throughout the country that are interested. The academic process for development, justification, and approval of new programs is often extensive and takes time to complete. The process for new graduate-level

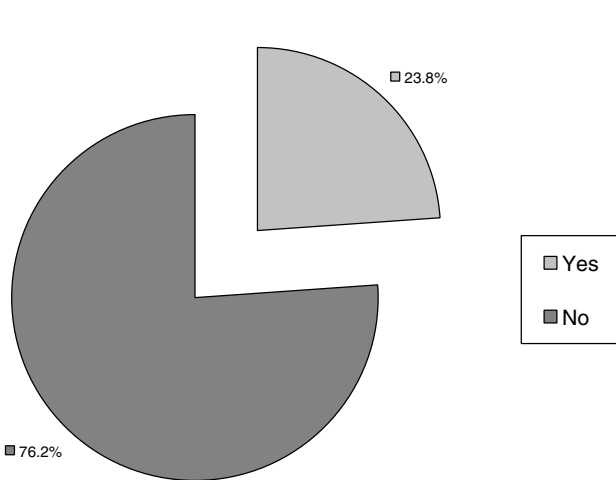


FIG. 3. Percentage willing to relocate in order to attend master’s program (questionnaire item 4).

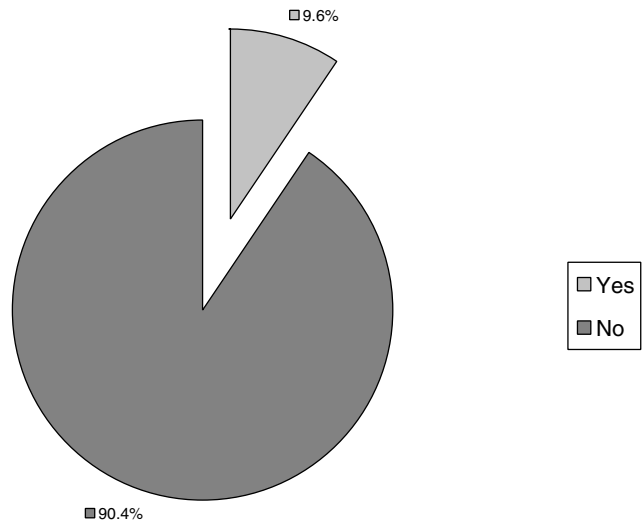


FIG. 5. Percentage taking graduate-level coursework (questionnaire item 8).

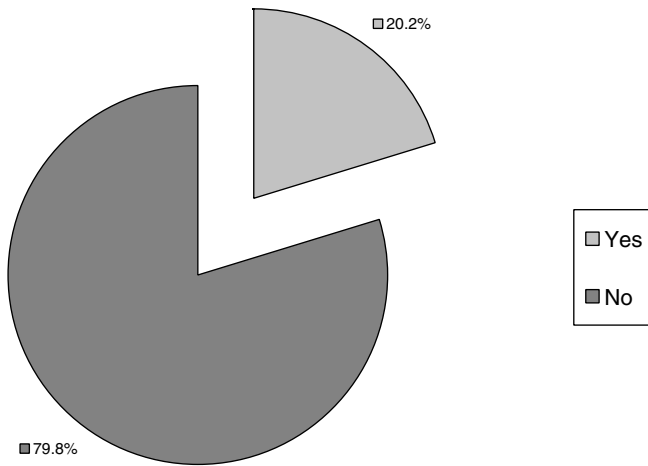


FIG. 6. Percentage currently taking coursework to complete a bachelor's degree with ultrasound practitioner as a possible career path (questionnaire item 9).

programs may be more extensive than for undergraduate programs. In the best of circumstances, the process will often take years to complete before programs may admit students. Three universities that have initiated the process of program development anticipate recruiting students in the spring of 2002 for classes beginning in August 2002. Please log on to the SDMS Web site and review the "careers" link for updated information.

The timeline originally established by the UP Commission for required completion and graduation

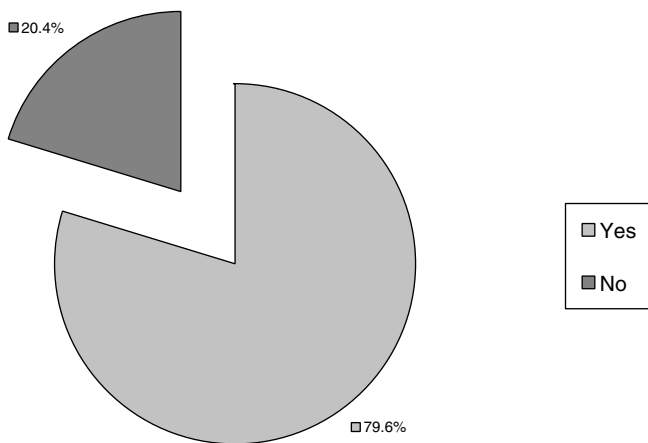


FIG. 7. Percentage staying in the field of sonography if ultrasound practitioner does not develop (questionnaire item 10).

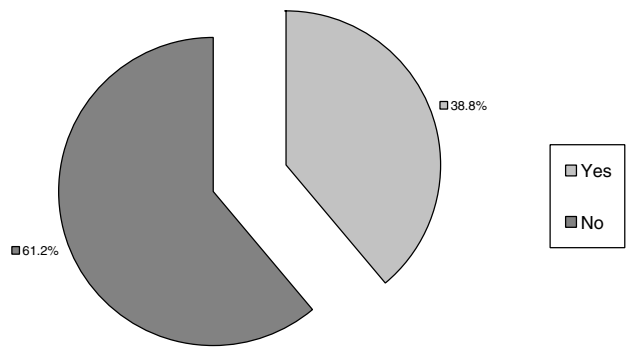


FIG. 8. Percentage pursuing a master's in another field if ultrasound practitioner does not develop (questionnaire item 11).

from a UP master's program in order to be eligible for board exams or UP practice was 2010. It would seem reasonable, given the length of time proposal-to-program implementation typically occurs, that one decade is appropriate.

Full development of the UP concept will require educational programs, certification examinations, and legislative authority. This article updates the SDMS membership on one of these three initiatives. Additional reports on UP national board examination development and legislative initiatives will be provided through the *JDMS*. Each of these necessary processes has its own timeline, challenges, and opportunities.

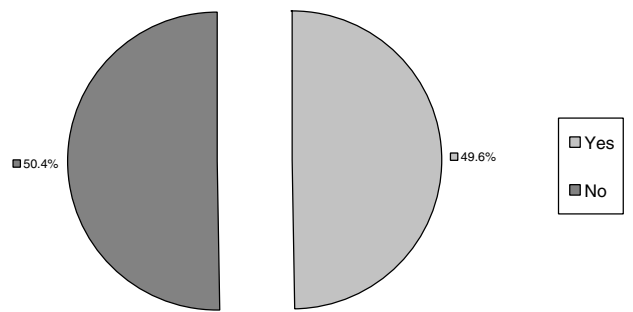


FIG. 9. Percentage who are graduates of an accredited ultrasound program (questionnaire item 15).

Appendix
Ultrasound Practitioner Questionnaire

To SDMS Members:

It is important to us that we know your level of interest in the ultrasound practitioner (UP) professional. Please answer the following questions regarding your interest in UP development. Please fax your responses to the SDMS executive office or go to the SDMS Web site and respond to the questionnaire online.

1. Are you in favor of UP development?
Yes___ No___
2. Are you interested in becoming a UP?
Yes___ No___
3. What is your location?

4. Would you be willing to relocate to attend a master's program?
Yes___ No___
5. Would you be interested in online education?
Yes___ No___
6. What is your suggestion for a university contact in your area?

7. Do you know a physician who might be a UP advocate?

8. Are you currently taking graduate-level coursework?
Yes___ Area_____ No___
9. Are you currently taking coursework to complete your bachelor's degree with UP as a possible career path?
Yes___ No___
10. If UP does not develop, do you see yourself staying in the field of sonography for the rest of your career?
Yes___ No___
11. If UP does not develop, would you pursue a master's degree in another area/field?
Yes___ No___ If so, which area/field?

12. Which factors would encourage you to pursue practitioner option?

13. Which factors would discourage you from pursuing practitioner option?

14. What specialty area do you currently practice?

15. Are you a graduate of an accredited ultrasound program?
Yes___ No___
16. How long have you been ARDMS certified?
_____ years

References

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