

MIDDLESEX COMMUNITY COLLEGE

ACADEMIC PROGRAM REVIEW

For

**Diagnostic Medical Sonography Certificate Program
Name of Academic Program**

2007 - 2008

Program Review Committee

**Thomas F. Walsh
Professor of Sonography**

**Ann Montminy
Dean, Health Division**

MIDDLESEX COMMUNITY COLLEGE

Academic Program Review

Table of Contents

Section I	Introduction
Section II	Mission, History, Program Operations, and Goals
Section III	Data
Section IV	Program Analysis <ul style="list-style-type: none">○ Target Population○ External Perspectives
Section V	Curriculum <ul style="list-style-type: none">○ Institutional Student Learning Outcomes○ Program Student Learning Outcomes○ Additional Curricular Opportunities
Section VI	Instructional Support
Section VII	Program Evaluation Summary

Middlesex Community College

Academic Program Review

Section I: Introduction

The Diagnostic Medical Sonography Certificate Program is open to individuals who are uncertified, although employed in the sonography field in a health care setting with access to a DMS department or others with a bachelor's degree in any major who can secure their own clinical site. This program has never gone under review.

Section II: Mission:

The mission of Middlesex Community College Diagnostic Medical Sonography Certificate Program is to serve the student, the community, and the sonography profession.

The Diagnostic Medical Sonography Certificate student is provided with academic and clinical experiences to become an entry-level skilled practitioner to provide diagnostic patient services using ultrasound and related diagnostics techniques. The DMSC student is responsible for producing the best diagnostic information possible with the available resources. The DMSC student acquires and evaluates data, while exercising discretion and judgment in performance of the clinical examination.

The community is provided with sonographers who, in addition to delivering essential patient care, can apply the knowledge and techniques in this highly specialized field. They are trained in sonography physics, instrumentation, obstetrical, gynecological, abdominal, and small parts sonography. In depth, comprehensive instructions are provided to produce ultrasound images used by physicians in the diagnosis of disease, injuries, and other medical conditions. Extensive clinical experience ensures thorough proficiency.

With the completion of the required course work the sonography profession is provided with a graduate who is eligible to take the American Registry of Diagnostic Medical sonographers certifying examination in Physics, Abdomen, and Obstetrics & Gynecology.

Historical Review:

The Diagnostic Medical Certificate Program (DMSC) began in the Fall of 1988. The DMSC students attended classes with the associate degree students. However the format of combining the two programs in the classroom was problematic. The DMSC program was then separated in the Fall of 1989. The curriculum is identical today except the courses at that time were 4 credits each. Changing the program to 3 credits for each course was implemented a year later. The main reason this change occurred was due to the long hours necessary for a 4 credit course. The DMSC program was also designed so that the clinical internship was the complete responsibility of the sponsoring hospital/private practice office without any involvement from the college in terms of clinical supervision or evaluation of the student performance. Individual aspects of each course stands alone given that learning occurs from the simple to complex within the course. Subsequent courses in the 4 courses sequence do not however, build upon one another in terms of complexity, since each course is a separate clinical speciality. The DMSC program was marketed so as to offer a sonography program to students who wanted to cross-train into this medical field, students with bachelor's degrees, and as a way to offer students access to an ultrasound program in the neighboring states that didn't have active programs. The program has been successfully running since its implementation in 1988.

Program Operation:

The program has existed for 20 years. Although the didactic lessons are up-to-date, a few issues have developed that need to be addressed regarding possible on-line availability, utilizing a power-point presentation.

Please note that the students are all self-directed, sometimes spending many months in securing a clinical site for internship before admission.

Clinical internship commitment is for one full year beginning in September:

Monday through Thursday, students are learning scanning skills at their clinical sites from 8:00 am – 4:30 pm.

Friday's are assigned at the college for two sonography courses, each semester, from 9:00 am to 3:15 pm.

In the event that the college is closed on any Friday, the student must spend the day at clinical.

Students must document 35 hours per week X 48 weeks for a total of 1680 hours of ultrasound training in order to be board eligible to take the national exams.

Goal

1. The Diagnostic Medical Sonography Certificate Program prepares students for entry into a professional specialty that requires technical skills to produce quality sonograms used for the diagnosis of disease and injury.

Core Curriculum:

The Diagnostic Medical Sonography Certificate Program meets the Core Curriculum and the General Education courses due to Admission Prerequisites which states: Completion of a two-year allied health education program that is patient-care related or Bachelor's degree.

Diagnostic Medical Sonography – Certificate

SON 111	Sonographic Physics and Instrumentation
SON 225	Principles of Abdominal Sonography
SON 226	Sonographic Principles of Obstetrics & Gynecology
SON 227	Sonographic Subspecialties

Section III: Data

The Institutional Research Office will provide a significant portion of the data. Your committee is encouraged to request additional relevant information from Institutional Research and to develop and conduct alternative assessments as well. Some examples of assessments that the committee may choose to implement are student focus groups and/or student surveys. Input from relevant internal groups such as Advising, Admissions, and/or connected departments will also be necessary. Please include a copy of the data from Institutional Research and all committee-developed surveys or focus questions in the Appendix of the review.

3. a. **Please note important trends, patterns and issues that emerge through the enrollment, academic progress and retention data. (Data from Institutional Research Office)**

Trends:

- 1. DMSC review data has demonstrated a downward trend in applications since 2004 (See Appendix A)**
- 2. DMSC review data on application has demonstrated a downward trend in enrollment since 2004.**
- 3. DMSC review data recently demonstrated an upward trend in attrition. Based on exit interviews, I concluded that this reduction is the result of:**
 - a. There is a tremendous amount of information for each college course within a semester**
 - b. No established scanning skill objectives are systematically taught either at the college or clinical intern site**
 - c. Clinical guidance offered by clinical agencies does not meet students' expectations. The most successful students are more aggressive and self-taught generally, as a whole.**
 - d. This academic year, the program began with thirteen students and by graduation there were only eight students who were successful. The result is that there was only a 61.5% completion rate.**
- 4. DMSC review demonstrated a decreased number of graduates since 2003:**

2003	25
2004	21
2005	20
2006	22
2007	17
2008	8

c. Please summarize findings from student surveys, student focus groups, and/or other types of surveys and focus groups the Committee chose to undertake. (Data from surveys and/or questions developed by the Committee)

The method of data collection was student focus group, in which a total of eight students participated. Please see Appendix for the list of questions.

The following is a condensed version of the overall findings:

1. There is no access to scanning laboratory to help each other with scanning practice issues.
2. Coordination between didactic and clinical portions of the program should be improved. We suggest a clinical coordinator to ensure their practice in various clinical agencies.
3. The college should offer feedback on students' scanning techniques and suggest ways of improvement. Presently most students feel abandoned in their clinical area.

In addition, anecdotal data from affiliating agency personnel indicates:

- a) The 12 month program length is too short to adequately prepare a sonographer.
- b) New competition from Beth Israel Hospital exists that may be draining the pool of qualified candidates. B&I recently implemented an 18 month long certificate program in March 2008.

Section IV: Program Analysis

Target Populations:

4. a. Is this program intended to serve a target population(s)? Please explain.

The DMSC curriculum was designed to offer a sonography program to students who wanted to cross-train into this medical field, students with bachelor's degrees, and a way to offer students access to an ultrasound program in the neighboring states that didn't have an active program.

- b. Are there plans to recruit/market for this program by targeting any new or different groups? Please explain. Are there additional student recruitment and/or marketing efforts in which program faculty would like to be involved? Please be as specific as possible.

Various components of the DMSC program course curriculum are available on-line. Last year I was invited by the U.S. Navy to take a short cruise on an aircraft carrier that was scheduled for

decommission. During my visit I toured the medical facilities on the ship. I noticed an ultrasound machine, so I mentioned to the physician that I was a sonographer. He explained to me that there was a great demand for sonographers in the Navy. Therefore, it may be feasible to market our program to the military, and in particular, the Navy, especially when the ships are on deployment, as well as to health care professionals in the local area for whom on-line course delivery would be appropriate. Marketing this new option through the Business & Industry area is appropriate.

- c. Are there plans to change or add to strategies currently in place to assess the program's fit with student interest and market demand?

A hybrid program may be formatted, with on-line training for faculty, and online delivery of theoretical content and face to face meetings monthly. In addition supervised scanning skill lab sessions would strengthen the clinical component.

Option supervised scanning skills lab sessions.

- d. Are program faculty and staff currently working with the Academic Planning Center or other areas of the College to interest students in taking courses in the program? Describe these interactions and the roles that the parties play.

The program recruits all applicants from outside of the college.

- e. Are there additional student recruitment/marketing efforts in which program faculty and/or staff would like to be involved? Please be as specific as possible.

Perhaps B+I marketing the program as a hybrid program.

- f. Please comment on any Advanced Placement (high school) or Articulation Agreements (4-year institutions) that apply to your program. Are the agreements current and signed by all partners? What percentage of students in the program takes advantage of each agreement?

There are no placement/articulation agreements.

External Perspectives:

- 5 a. Based on a review of other college catalogs, list the colleges in our general area that have similar programs and comment on significant differences from the ones we currently offer that bear further exploration.

Beth Israel Hospital has begun their own certificate program in March 2008 with four students. Their program is 18 months in length.

BI admission requirements are basically the same as our program. The prospective student must have graduated from a Two Year Allied Health Degree program or have completed a Bachelor's Degree in any major.

In addition to the above criteria, applicants must have the following prerequisites complete prior to the start of the program. A grade of B or higher is required from a college level Human Anatomy and Physiology with a lab I & II.

A computer literacy course.

Springfield Community College and Bunker Hill Community College offer associate degree programs only.

- b. Based upon the committee's knowledge of institutions beyond our geographical area that have exemplary programs or are known for their 'best practices,' comment on significant similarities or differences at MCC and in what areas that bear further exploration.

N/A

6. Please describe mechanisms or procedures currently in place to monitor changes in the job market and review the program's currency and "fit" with the educational interests and needs in our region. Explain how these groups have contributed and/or impacted the program's offerings.
- a. Relevant external parties, such as advisory groups, corporations/agencies, professional groups, outside licensure/accrediting bodies, etc. If there is an advisory committee in place, please comment on the frequency of meetings and the contributions/impact the committee has had on the program. Include names of members and minutes of the meetings in the appendices of the program review.

1. **Advisory Board meets once a year. (See Appendix B)**
2. **JRC-DMS Employer Survey**
3. **JRC-DMS Program Resource Survey**
4. **JRC-DMS Student Program Resource Survey**
5. **JRC-DMS Graduate Survey**

- b. Relevant internal groups or individuals, such as other departments, programs or areas at the college that: (1) utilize your courses as prerequisites for their courses and/or program or (2) supply prerequisites for your courses.

Graduates of other Health Careers programs (ex: RT, Nursing) are admitted if they have achieved licensure and have 2 years of patient-care experience.

- c. Other populations (i.e., students, alumni, community members, cooperative education supervisors, practicum supervisors, service learning supervisors, community agencies).

N/A

Section V: Curriculum

Program Student Learning Outcomes (PSLOs)

7. a. Identify your Program Student Learning Outcomes
- **Students will be able to identify and evaluate the abdominal structures: gallbladder/biliary system, liver, spleen, great vessels, pancreas, renals, and retroperitoneum/peritoneum. Demonstrates, identifies, and evaluates abdominal pathology. Measures as indicated using appropriate caliper placement.**
 - **Students will be able to identify and evaluate pelvic organs and structures using transabdominal/transvaginal imaging. Demonstrates, identifies, and evaluates gynecologic pathology. Measures as indicated using appropriate caliper placement.**
 - **Students will be able to identify and evaluate first, second and third trimester pregnancies, pelvic organs,**

and structures. Obtains, identifies, and evaluates accurate fetal measurement parameters in the first, second, and third trimesters. Demonstrates, identifies, and evaluate fetal cranial, thoracic anatomy, abdominal and musculoskeletal anatomy, and fetus well-being in the first, second, and third trimesters.

- **Students will be able to identify and evaluate superficial structures: breast, scrotum, soft tissue, prostate, appendix, pediatric hips, thyroid, and vascular structures. Demonstrates, identifies, and evaluates superficial structures pathology. Measures as indicated using appropriate caliper placement.**

- **Students will be able to evaluate patient needs and acoustic characteristics, select, maintain, and adjust equipment to provide optimal sonographic evaluation.**

b. Please describe your program's plan for ongoing, annual assessment of its PSLOs.

After completion of the DMS certificate program, graduates are eligible to take a national certification examination in all three categories; 1. Sonographic Physics and Instrumentation, 2. Obstetrics & Gynecology, and 3. Abdomen.

If graduates decide to take the national exams, they are mandated to take the Physics exam plus one other of their choice. Occasionally, students may choose to take only the OB/Gyn or Abdomen or both examinations. The specific exam chosen will be determined by their job description/duties or interest. Monitoring the results of the exams given by the American Registry for Diagnostic Medical Sonography is the ongoing annual assessment plan.

Action Plan for Increasing the Registry Examination
Take and Pass Results.

The following is my proposed action plan to increase the number of student participants in taking and passing registry examinations.

1. Within each of the following sonography courses: (1) Ultrasound Physics and Instrumentation, (2) Abdomen and (3) OB/Gyn, class time will be set aside to discuss the benefits of taking these registry examinations.
2. Initial benefits will include the following topics, (however additional topics will be developed as the discussions become on-going):
 - a. Discuss how it will increase the students' status in the profession.
 - b. Describe the program accreditation outcomes and discuss how their participation in taking these examinations helps to maintain in good standing the program accreditation from which they graduated.
 - c. Discuss the career opportunities if the registered sonographer chooses to seek a faculty or educator position.
 - d. Discuss that passing these examinations recognizes one's achievements as a leader in the sonography field.
3. Integrate student support services for registry review that would address the following;
 - a. Test-taking anxiety.
 - b. Anxiety in taking credential examinations.
 - c. Assistance if they should fail any examinations.
- c. If applicable, discuss any changes you have made to your PSLOs and/or the ways in which the courses in the program support those PSLOs since your last program review.
- d. Map the way in which your program provides opportunities for students to progress towards achievement of each Program Student Learning Outcome, by noting in which courses the outcomes are Introduced (I), Developed (D), or where students are expected to demonstrate Proficiency (P).

**Curriculum Map I:
Course Opportunities for Student Achievement of PSLOs**

PSLO	Course Abdomen	Course OB/GYN	Course Physics	Course Subspecial..
Abdomen	P	P	P	P
Obstetrics	P	P	P	P
Gynecology	P	P	P	P
Physics	P	P	P	P
Subspecialties	P	P	P	P

The program is not designed in a simple to complex progression. Each course stands alone as a specialty, and students are expected to reach proficiency by course completion.

- e. Please comment on the **sequencing of** opportunities for students to develop and achieve each PSLO within the program, as noted on Curriculum Map I.

Each course is self-contained.

- f. On the following pages, please indicate **how each PSLO is attained and how the attainment of each is assessed**. If the strategy for attainment of a PSLO is contained within a particular course, please list the course first, with the relevant activity (or activities) listed next to each course. If there is nothing currently in place that is intended to provide for the attainment of a particular outcome or to assess the extent to which the outcome has been realized, please leave the appropriate space blank. The blanks will help to identify areas which need further development.

PSLO I

Graduates will demonstrate knowledge and understanding of acoustic physics, Doppler ultrasound principles, and ultrasound instrumentation.

Knowledge: 80% of graduates of the program who takes the sonographic physics exam will pass the exam. (See Appendix C)

Program will periodically assess its effectiveness in achieving its stated goals and learning domains.

Strategies for Attainment		Assessment Strategies
Course	Activities	
Sonographic Physics	Lectures, quizzes, exams	Quizzes, exams
	Physics Review in August - Lecture	
	Conferences	

- Describe how this Program Student Learning Outcome is **assessed for proficiency** at the **program level**.
 1. ***Quizzes + examinations***
 2. ***Exit survey***
 3. ***National credentialing sonographic physics examination performance***
 4. ***Employer satisfaction survey***
 5. ***Job (positive) placement***

- What does the program's data analysis reveal about student achievement of this PSLO within the program?

Please see handout: Exams Pass Rate Data

- What curricular and/or instructional changes are planned within the program as a result of this data (if any)? Consider:
 - The scope and sequence of Introductory, Developing, and Proficiency level student learning opportunities

- The adequacy of the range of learning experiences and assessment methodologies that your program offers to meet student learning needs

All students who have taken the test performed well.

Future Trend:

The ARDMS is considering letting students take the test before they graduate from the program.

Additional Curricular Opportunities:

9. Please describe any interdisciplinary courses which are provided as an integral part of this program.

N/A

10. **Please comment on experiential/ work-based learning opportunities in the program (i.e., co-op, internships, service learning). Discuss how the content of the experience relates to course credit. How do you calculate the number of contact hours required in relationship to the credit awarded? What percent of students participate in each of these activities? Indicate any problem being faced in incorporating work-based learning.**

11. All DMSC students are in a clinical internship, which they secured on their own. They receive no college credits for their scanning experience while in clinical. The only credits they receive are from the 4 theory courses within the program; a total of 12 credits. The program does not offer placement opportunities but does inform the student, via e-mail networking, of current jobs opening in the local area. The major problem that exists with regard to work-based learning in this program relates to the lack of coordination that exists between clinical facilities and college faculty. College faculty have no contact with the clinical agencies to determine if and how students are applying skills. In addition, lack of supervised lab experience means that students are learning totally in the clinical area with no opportunities to practice skills in a non-threatening environment prior to clinical experience. There are also no opportunities for remediation if students do not successfully demonstrate scanning skills.

12. Please comment on the uniformity and appropriateness of content in multi-section courses and subsequent courses now in place. Do all courses have the proper prerequisites? Is the flow and relationship of courses to one another satisfactory? Are there changes indicated, based upon program objectives and/or new needs identified through the assessment process?

There are no multi-section courses in this program. . Each course is a stand alone course, in that learning occurs from simple to complex within the course. Subsequent courses in the 4 course sequence do not build upon one another in terms of complexity since each course is a separate clinical speciality.

12. a. Please comment on the role of developmental courses in the program? Which ones are relied upon by significant numbers of students in the program? What conclusions are you able to draw about the impact of these courses on students' preparation levels?

The enrollment data indicates strong reading and math skills, so there has been no emphasis placed on developmental courses.

- b. Please comment on the role of developmental courses outside the program. Which courses in the program are relied upon by significant numbers of students, and which courses outside the program are relied upon by significant numbers of students? What conclusions are you able to draw about the impact of these courses on students' preparation levels?

Due to the high threshold for program acceptance, we do not experience students from the population enrolled in developmental courses .

- c. In the event that there are admissions criteria for acceptance into the program, describe the rationale and process for establishing and reviewing the admission criteria. Do current criteria produce a pool of students who are adequately prepared to succeed in the program?

Required prerequisites are established by the ARDMS national testing agency for sitting for their national exams.

Completion of a two-year, patient care-centered training program (e.g. Diagnostic Medical Sonography, Radiologic Technology, Registered Nurse) or a Bachelor's degree in any major. Students entering with Bachelor's degrees that are non-medical or which lack science courses are not well prepared. To be successful in this program, students should successfully complete Anatomy + Physiology I + II at the college. Concomitantly, a course in medical terminology would be beneficial.

13. Describe the array of instructional methodologies in required or elective courses. (e.g. face to face, online, hybrid, self-paced, experiential, inquiry/problem-based, case studies, projects, etc.)

The DMSC lectures are in the power-point format. The lectures and handouts are arranged for on-line availability, within a reasonable time frame.

Section VI: Instructional Support

14. a. Please discuss the adequacy of the staffing level in the program to teach students enrolled in the program.

Although staffing has not been an issue traditionally, the addition of a part time clinical coordinator would provide for on-going assessment of student progress. Converting most lectures into the power-point format has enabled the students the opportunity to keep current with all teaching materials, in a practical way. This recently incorporated style of disseminating information has helped with student attendance issues, i.e. lateness and/or absences.

- b. Please discuss the adequacy of the staffing level in the program to advise students enrolled in the program.

As program coordinator, I receive one release time to coordinate this curriculum. There have been no staffing problems for advising students enrolled in this program. My additional duties include overseeing any contract issues, arranging college outside activities, and acting as a liaison between students and their clinical internship venues throughout the academic year.

15. What specific support services and activities (i.e., tutoring, media, library, disabled student support, computer labs, service learning) does this program require? Please comment on the availability and adequacy of these services. Be specific about any current deficiencies or projected needs.

The support service most frequently used by the DMSC Program is the computer lab located in building 6. Some students possess home computers with inadequate memory for the successful retrieval of all of the ultrasound data (mainly images).

16. How adequate and appropriate are program facilities and equipment? Please be specific about current deficiencies or projected needs.

The DMSC program has adequate and appropriate facilities and equipment. During my years as program coordinator, I have successfully secured, from the ultrasound community, multiple state-of-the-art ultrasound machines, stretchers, and supplementary equipment, worth well over a million dollars. Recently, Brigham and Women's Hospital has donated a very extensive ultrasound teaching file. Providing lab experiences for students would allow the certificate students to take advantage of this exceptional technology.;

17. Please describe any professional development needs of program faculty or staff.

30 Continuing Medical Education Credits for maintaining certification as an RDMS (Registered Diagnostic Medical Sonographer).

18. Describe the sources of program funding. Are the funds adequate to support the program? Is the current use of funds effective to realize program goals? Does the program leadership have input into the program budget?

One course reassignment for program coordinator to teach the course. The program funding is provided by the college and is adequate to meet program needs.

Please provide any additional information that you consider important in assessing this department/area.

Section VII: Program Evaluation Summary

This section should be completed based upon review and consideration of both the data supplied in **Section II** and the questions posed in **Sections III, IV, V, VI and VII.**

- A. Program Strengths
(Bulleted List with reference to the question(s) numbers in the program review where this strength is explained.)
- **Data from 2004, 2005, and 2006 indicates most students passed the physics exam and a majority of other ultrasound exams.**
 - **Results of the certification.**
 - **The opportunity to cross-train from another medical career that meets the needs of many medical centers. Allows medical doctors from foreign countries who cannot as physicians work very close to diagnosing normal and pathological conditions.**
 - **Allows veterinarians and veterinarian assistants to learn sonography because sonography programs are not established in their profession.**
 - **Opportunity for students with advanced degrees to re-invent themselves into the exciting field of sonography.**
 - **Allows hospital administrators, radiology department heads the chance to sit in on lectures, not to become sonographers, but to better understand the role of a sonographer.**
- B. Program Needs for Improvement, Proposed Plans for Improvements, Budgetary Implications, Timelines

Program Needs (Reference the question in the program review where this need is explained.)	Proposed Plans for Improvement (Bulleted list of suggestions.)	Financial Needs to Make Improvements	Proposed Timelines for Implementation
Hybrid Program	On-line training for faculty	\$2000.00	Fall 2010
Scanning Skills practice added on-site to the program		\$2000.00 per year. for film & gel	Fall 2010
Curriculum Modification	To accommodate hybrid delivery.		Fall 2010
Marketing to the Navy and other interested populations through B+I.		N/A	On-going
Require A&P I&II pre-requisites for all entering students.	Proposal to academic standards & FSA Fall, 2009	N/A	Implement Fall, 2010