

More Than Just Baby Pictures

Should Diagnostic Medical Ultrasound Be a Self-Regulated Profession in Nova Scotia?

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This paper reviews the feasibility of self-regulation of the profession of diagnostic medical ultrasound technology in Nova Scotia. It reviews the history of ultrasound technology in Nova Scotia, defines the practice of diagnostic medical ultrasound technology, and provides a detailed analysis using the Alberta Health Professions Act as a test to answer whether the profession ought to be self-regulated.

MORE THAN JUST BABY PICTURES: SHOULD THE PRACTICE OF DIAGNOSTIC MEDICAL ULTRASOUND BE A SELF-REGULATED PROFESSION IN NOVA SCOTIA?

INTRODUCTION

Diagnostic medical ultrasound is a relatively young profession when compared to nursing or radiography. The first ultrasound machines were purchased for hospitals in Halifax in the early 1970's. Since then diagnostic medical ultrasound has evolved from an embryonic stage to what is now a mature and flourishing profession.

Perhaps the most widely known use of ultrasound is in the field of obstetrics and the detection of fetal abnormalities. However, there are many other uses. Diagnostic medical ultrasound can be used to investigate many areas of the human body such as abdominal organs, heart and circulatory system, neonatal brain and spine, and many areas of the musculoskeletal system. Ultrasound is a valuable tool to aid physicians in the diagnosis of their patients' diseases and disorders.

It must be noted, however, that not all ultrasound examinations have the same level of quality and accuracy. There are many factors that limit the diagnostic quality of an ultrasound examination, and three main factors are the patient's physical state, the age of the equipment and the operator's experience. Some factors are uncontrollable while others are not.

An uncontrollable factor is the size and shape of the patient's body. Obese patients are particularly challenging to diagnose because ultrasound waves are absorbed by tissues in the body. When there is a greater amount of fatty tissue between the transducer and the organ being scanned, the image is poorer. Other patient related factors that limit the quality of the ultrasound examination are spina bifida, contractures, motion and in the case of pregnancy, the position of the fetus.

The state of the ultrasound equipment is controllable to some extent. Regular inspections and maintenance keep the ultrasound equipment in safe working condition. However, the equipment used in diagnostic medical ultrasound is computer driven. As a result there are software updates available every year, but any system rarely lasts more than ten years. Fiscal restraints in Nova Scotia's health care system prevent acquisition of new equipment at an ideal rate. Sonographers working with aging ultrasound equipment are limited in the quality of the ultrasound examination that they can produce.

Regulating the practice of diagnostic medical sonography is something that we can strive to control. Operator experience and expertise plays a major role in the quality and accuracy of

every ultrasound examination. This paper will examine the need for regulation of the practice of diagnostic medical sonography in Nova Scotia.

First, the profession of diagnostic medical sonography will be defined, and the various uses of diagnostic medical ultrasound will be explained. A brief review of the history of ultrasound in Nova Scotia will illustrate the dynamic nature of this field of medicine. Section 25 (4) Regulated Professions of the Alberta Health Professions Act will be used as a test to illustrate the need for regulation of the profession of diagnostic medical ultrasound. Finally, a conclusion about the need for regulation of the practice of diagnostic medical ultrasound in Nova Scotia will be drawn.

WHO IS A DIAGNOSTIC MEDICAL SONOGRAPHER?¹

A sonographer is a health care professional who performs physical examinations using high frequency sound that is applied to the body via a transducer. A transducer is an instrument that converts electricity to high frequency pulses of sound and vice versa. The sound creates an echo which is then used to create a two dimensional image by a computer. Moving images are viewed during the examination by the sonographer who then decides which images best represent the presence or absence of diseases, abnormalities or normal variants. These two dimensional images can be compiled into three-dimensional images by newer ultrasound equipment.

The question “who is a diagnostic medical sonographer?²” is found in an information package produced by the Nova Scotia Society of Diagnostic Medical Sonographers. The package was used to promote the profession, and defined a sonographer as “a trained medical professional who uses non-ionizing high frequency sound waves to produce two-dimensional images of the body, either independently or in conjunction with a sonologist.³” A sonologist is a physician who is a specialist and is usually a radiologist, cardiologist or obstetrician. The role of the sonographer is different from most other diagnostic imaging professions in that there is some degree of interpretation involved in performing a diagnostic medical ultrasound examination. For instance, in the field of radiography the radiological technologist must ensure that the referring

¹ Nova Scotia Society of Diagnostic Medical Sonographers, Review (1989). “Diagnostic Medical Sonography in Nova Scotia”.

² “Diagnostic Medical Sonography in Nova Scotia”, *supra*, note 1 at 2.

³ “Diagnostic Medical Sonography in Nova Scotia”, *supra*, note 1 at 2.

doctor's requisition is properly interpreted, and the radiograph acquired. The radiograph must then be critiqued by the technologist to ensure that the necessary anatomy has been captured, but there is no interpretation involved as to whether or not any disease process is present. The sonographer, by contrast, must first determine the presence or absence of any disease process and then capture the images that best can relay that information to the physician interpreting those images. The sonographer must also relay his or her findings to the physician in a written manner on a "sonographer's preliminary observations"⁴ form. The sonographer, generally, will also communicate abnormal findings to the physician verbally. This phrase from the Canadian Society of Diagnostic Medical Sonographers cuts straight to the heart of the matter - "Because of the high levels of decisional latitude and diagnostic input, sonographers have a high degree of responsibility in the diagnostic process"⁵.

A sonographer needs to have an extensive understanding of the human body, including anatomy, physiology, pathology and embryology. Basic knowledge of kinesiology would also be an asset when performing musculoskeletal examinations. There are certain physical and mental characteristics that are necessary to perform diagnostic medical ultrasound. The sonographer must be able to lift or assist patients who are unable to change position independently. Often it is necessary to perform examinations in the operating room or intensive care unit, so the sonographer must be able to move ultrasound equipment to these locations. Due to space constraints at the bedside in these areas the sonographer must often maintain a poor ergonomic posture for a prolonged period of time. Even in the ultrasound department the sonographer must be vigilant about the ergonomic arrangement of the equipment. Repetitive strain injuries are prevalent throughout approximately eighty percent of the profession.

It is said that the human eye can distinguish about 100 shades of gray. Some disease processes are apparent on a sonographic image as only a subtle difference in shades of gray from other surrounding tissues. A sonographer must practice the ability to distinguish shades of gray. A sonographer must also practice hand-eye coordination. Anyone who has played children's video games is aware of how important hand-eye coordination is. Sonographers must also be somewhat ambidextrous. In order to perform an ultrasound examination, the sonographer must glide the transducer across the patient's abdomen or other area of interest with one hand, and operate the ultrasound machine with the other hand. The operation of an ultrasound machine involves the manipulation of many knobs and buttons, as well as typing to label the image being recorded. The operation of a trackball is necessary to take measurements.

⁴ Canadian Society of Diagnostic Medical Sonographers, 1998, "Guidelines for Diagnostic Medical Ultrasound".

⁵ Canadian Society of Diagnostic Medical Sonographers, *What is a Diagnostic Medical Sonographer*, available at <http://www.ultrasoundcanada.ca> (last visited Sep. 14, 2010).

Sonographers are required to make decisions independently about the patient's examination. It is possible to acquire all the images as set out in a protocol and to completely omit a disease process or anomaly. For instance, it is possible to acquire images of a gallbladder that do not capture the presence of gallstones. In many instances it is easy to detect gallstones in a gallbladder due to the high degree of contrast between the stone that appears white and the bile that appears black.

There are other conditions that are very difficult to diagnose with ultrasound examination even in the most experienced hands. Some of these conditions are life threatening, for instance, ectopic pregnancy. An ectopic pregnancy most commonly occurs in the fallopian tube. As the pregnancy grows the fallopian tube can rupture causing internal hemorrhage. Physicians depend on ultrasound to detect this condition. The pregnancy can be very difficult to detect with ultrasound due to the subtle difference in shades of gray between the pregnancy and surrounding tissues.

Sonographers must possess many other skills, such as organizational skills, diplomacy when dealing with the public and other health professionals, and communication skills. Sonographers are often required to work under pressure in emergency situations⁶, and must be able to carry out basic nursing skills, and first aid skills in these situations.

Teaching is also a large component of the sonographer's job. Many hospitals in the Nova Scotia provide clinical placements for students in various health professions. Sonographers are expected to teach student sonographers and residents and fellows in various specialties.

In the past most employers have required that sonographers be credentialed by the American Registry of Diagnostic Medical Sonographers. Part of the requirement of retaining active status on the American Registry of Diagnostic Medical Sonographers is the maintenance of thirty continuing medical education credits per three year cycle. This requires a large commitment of time outside regular working hours for the sonographer.

More recently, the Canadian Association of Registered Diagnostic Ultrasound Professionals (CARDUP) has become recognized by employers. This Canadian registry has written knowledge examinations for the generalist category. The generalist category includes physics, patient care, abdomen and small parts, obstetric and gynecology as well as some vascular imaging. Echocardiography (ultrasound examination of the heart) and vascular technology (ultrasound examination of the blood vessels) are other areas of diagnostic medical ultrasound. CARDUP will have written examinations available for echocardiography in 2011. Written examinations for vascular technology will be available at a later date. An important difference between the

⁶ "Guidelines for Diagnostic Medical Ultrasound", supra, note 4 at 3.

ARDMS and CARDUP registries is a clinical competency assessment. The clinical assessment is being used by all accredited schools in the Canada. The clinical assessment is currently used in the generalist, echocardiography and vascular technology categories. Due to the high level of skill involved in the performance of an ultrasound examination it is essential that candidates be assessed on their ability to perform an ultrasound examination in a competent manner. The Canadian Association of Registered Diagnostic Ultrasound Professionals is becoming more and more accepted and required by employers as a requirement for employment. This registry also requires maintenance of continuing medical education credits.

ABOUT ULTRASOUND

Ultrasound is used to examine any body part that does not contain bone or air. It can be used to examine any solid or fluid filled organ in the abdominal cavity. Ultrasound is used to assess the appendix, and can be used to assess focal areas of the bowel, especially in pediatric cases.

Ultrasound is used to assess the uterus and ovaries, as well as the fetus. The neonatal spinal cord and brain can be assessed by ultrasound. The Doppler effect from blood flow has long been used in echocardiography and vascular technology. Intra-cavity ultrasound probes can be used on obstetrics, gynecology, urology, gastro-intestinal, and echocardiography applications. Ultrasound is also used in ophthalmology.

Ultrasound has some applications in the musculoskeletal system. Ultrasound is the preferred imaging modality when congenital hip dislocation is suspected in the neonate. The rotator cuff of the shoulder can be examined with ultrasound when tears are suspected.

Ultrasound can also be used for guidance during invasive procedures including biopsies, aspirations, amniocentesis and paracentesis. These procedures are carried out by a physician and a sonographer will assist with the procedure.

PROFESSIONAL REGISTRIES

The American Registry of Diagnostic Medical Sonographers (ARDMS) is recognized internationally. The ARDMS was established in 1978. Active registration with the ARDMS was the requirement of Canadian employers for many years. This was due in part, to the fact that there was no Canadian registry in existence.

The Canadian Association of Registered Diagnostic Ultrasound Professionals was established in 2000. This registry was necessary in order to address issues with Canadian Medical Association

requirements for accreditation of schools and bilingual policies. There was a seventy percent positive response from Canadian sonographers for the development of a Canadian registry. The clinical assessment is an essential component of the CARDUP registry.

DEVELOPMENT OF PROFESSIONAL SOCIETIES

The Canadian Society of Diagnostic Medical Sonographers was founded in 1981 with the purpose of promoting the profession of diagnostic medical sonography, and providing educational opportunities for its members. In 1987 a group of Maritime sonographers met to discuss the development of a Maritime Society of Diagnostic Medical Sonographers. Sonographers from New Brunswick opted to form their own society, and so sonographers from Nova Scotia formed the Nova Scotia Society of Diagnostic Medical Sonographers. Sonographers from Prince Edward Island became associate members at that point, and later became full members of the NSSDMS. The NSSDMS is closely associated with the Canadian Society of Diagnostic Medical Sonographers and has adopted the bylaws of the CSDMS almost verbatim.

HISTORY OF ULTRASOUND IN NOVA SCOTIA

Radiologists in Halifax began teaching radiological technologists how to perform ultrasound examinations in the early 1970s. In the late 1970s some of these new sonographers wanted to gain more professional recognition and wrote the American Registry of Diagnostic medical Sonographers examinations. Training on the job was common. There soon was a need to provide sonographers with a short course in that would allow preparation for the ARDMS examinations. The Victoria General School of Diagnostic Medical Ultrasound opened in 1983. This school provided a three month course designed only for those sonographers who had been practicing for a year or more. The last three month program was held in 1988.

A need for a more complete program including a clinical component was soon recognized. The Victoria General School revamped its program in order to train people who had no on the job experience in ultrasound at all. The prerequisite for the program was a diploma in radiography. This prerequisite was eventually expanded to include any health profession with at least a two year training period. This type of training program was used across Canada and was known as a post-diploma program.

In 1999 the first entry level program was developed in Nova Scotia as a partnership between the Queen Elizabeth II Health Science Schools and Dalhousie University. The Health Sciences program now accepts students with a high school diploma or university degree, and there are five

streams from which a student can choose. One of these streams is ultrasound. The ultrasound students can exit the program after completion of the third year with a diploma, or they can complete a fourth year and earn a baccalaureate degree in health science. Sonographers who already hold American Registry of Diagnostic Medical Sonographers or Canadian Association of Registered Ultrasound Professionals credentials and have been working in the field can enter a post diploma program to earn the degree in health science.

NOVA SCOTIA SOCIETY OF DIAGNOSTIC MEDICAL SONOGRAPHERS RECOMMENDATIONS⁷

In 1989 the Nova Scotia Society of Diagnostic Medical Sonographers prepared an information package for distribution to various government officials, union officials and hospitals. In this package were some recommendations made by the NSSDMS regarding the practice of diagnostic medical ultrasound. Among these was a recommendation that all sonographers in the province should hold the American Registry of Diagnostic Medical Sonographers credential in the specialties that they are practicing. This would have ensured that all sonographers in the province met a minimum level of education. This recommendation would also have also ensured that all sonographers maintained current knowledge in the field of ultrasound through the continuing education required by ARDMS to maintain active registration.

The NSSDMS also recommended that all sonographers in Nova Scotia become members of the Canadian Society of Diagnostic Medical Sonographers. The CSDMS provides comprehensive liability insurance for its members. Membership has many other benefits that promote a high level of professionalism. These recommendations are still valid today.

WHAT IS HAPPENING IN OTHER PROVINCES

There is a movement towards regulating the field of diagnostic medical sonography in various provinces. All of this work is in varying stages of being completed. Sonographers in British Columbia are investigating the possibility of joining with medical laboratory and medical radiology technologists to form a Joint Regulatory College.

In Alberta, ultrasound imaging, including any application of ultrasound to a fetus is a restricted act. Sonographers practice this restricted activity under the authority of a regulated group – physicians and surgeons. Sonographers must be registered with either ARDMS or CARDUP in

⁷ Nova Scotia Society of Diagnostic Medical Sonographers, supra, note 1 at 6.

order for the ultrasound facility to receive accreditation from the College of Physicians and Surgeons of Alberta. Sonographers in Alberta are interested in becoming a self-regulated profession. They are currently investigating the pros and cons of becoming a self-regulated profession.

Sonographers in Saskatchewan have been invited into discussions with the Medical Diagnostics Legislative Working Group. This group is investigating the possibility of creating a type of umbrella legislation that would regulate a number of professions such as medical laboratory and medical radiological technology.

The Regulated Health Professions Act of Ontario⁸ lists 14 “controlled acts”. One of these controlled acts is “applying or ordering the application of a form of energy”. In the regulations there is a definition for “diagnostic ultrasound” and a list of exemptions for this controlled act⁹. The exemptions apply to when the application of sound waves are ordered by a member of regulated health profession with ordering authority and when the sound waves are applied in a public hospital, private hospital, independent health facility or fixed site where health services are customarily performed. This in no way defines the entry to practice requirements for persons practising diagnostic ultrasound technology.

In Ontario, sonographers have been working with the Ontario Health Professionals Regulatory Advisory Council. All discussions have been delayed until 2013 when the Ontario Society of Diagnostic Medical Sonographers will re-submit their proposal to HPRAC.

The New Brunswick Society of Diagnostic Medical Sonographers has worked for a number of years to create “An Act Incorporating the New Brunswick Society of Diagnostic Medical Sonographers”. The intent is to have this Act presented in the legislature at some point.

WHAT IS HAPPENING IN NOVA SCOTIA

Nova Scotia has no form of regulation for the profession of diagnostic medical ultrasound. Sonographers in Nova Scotia are currently seeking self-regulation together with radiological technologists, nuclear medicine technologists, magnetic resonance technologists and radiation therapists. What would be the benefit of self-regulation? Does the profession of diagnostic medical ultrasound need legal status?

⁸ S.O. 1991, c. 18.

⁹ O. Reg. 107/96.

These questions will be answered with a detailed analysis using the Alberta Health Professions Act¹⁰ as a test.

SHOULD DIAGNOSTIC MEDICAL SONOGRAPHY BECOME A SELF-REGULATED PROFESSION IN NOVA SCOTIA?

The Health Professions Act¹¹ of Alberta, section 25(4) will be used as a test to prove that ultrasound should become regulated in Nova Scotia. Under section 25(4) there is a list of areas that the Advisory Board may investigate when a profession applies to become regulated. These areas will be explored as a test to prove that ultrasound should become a regulated profession in Nova Scotia because these areas could be applicable in any province and for any profession.

Section 25 of the Health Profession Act of Alberta reads as follows:

25 (1) A group of persons seeking to be a regulated profession must apply to the Minister for recommendation to the Legislature that this Act be amended to include the proposed profession as a regulated profession.

(3) On receipt of an application under subsection (1), the Minister may direct the Advisory Board to investigate whether the profession should be regulated under this act.

*(4) when conducting an investigation under subsection (3), the Advisory Board may investigate as it considers necessary and, without limiting the generality of the foregoing, may do one or more of the following:*¹²

Next are listed eleven issues that the board may investigate. Each of these issues will now be considered.

*(a) evaluate the risk to the physical and psychological health and safety of the public from incompetent, unethical or impaired practice of the profession*¹³

¹⁰ S.A. 1999, c.H-5.5.

¹¹ S.A. 1999, c.H-5.5.

¹² S.A. 1999, c.H-5.5.

¹³ S.A. 1999, c.H-5.5.

Due to the high level of knowledge and skill needed to perform an ultrasound examination in a competent manner, there is a very high risk of harm to the public from incompetent, unethical or impaired practice of the profession of sonography. There are many instances where the ability of the sonographer to perform an ultrasound examination results in a change in patient management. At times this management is life saving surgery.

While performing an ultrasound examination the sonographer will view a multitude of moving images. The sonographer will draw upon a knowledge base of human anatomy, physiology, pathology and physics in order to decide which of the moving images best depict the presence or absence of pathology. These will be the images that are stored as a permanent record of the ultrasound exam and presented to the reporting physician. The reporting physician depends on the sonographer to make these decisions. These images will be the only record of what was seen by the sonographer during the course of the examination.

There are many ways that a sonographer may fail to provide images that are of diagnostic quality. These range from failure to use the correct transducers and equipment settings to failure to perform the correct ultrasound examination. Competent sonographers are needed to aid in the diagnosis of any pathology. For example, gallstones are a common pathology that often is diagnosed by ultrasound. It is possible to acquire images of a gallbladder but not the stone. If the images are acquired at the wrong angle, then the reporting physician cannot know that gallstones are present. Gallstones are not considered to be a life threatening pathology even if there is a missed diagnosis. However, a missed diagnosis can result in delayed treatment leading to more severe complications.

There are many other types of common pathologies that are far more difficult to identify using ultrasound. For instance, cardiac ultrasound is a non-invasive test often used to assess for the presence of valvular disease such as narrowing of the valves (stenosis) or leaking of the valves (regurgitation). Cardiac sonographers document images, measurements of blood flow, perform calculations and analysis to quantify the severity of the valvular disease. Two examples are aortic valve stenosis and mitral valve regurgitation. In both of these cases physicians will make clinical decisions to operate on the patient based solely on the results of the cardiac ultrasound. Cardiac ultrasound in these two particular cases is the only test used to diagnose and document the severity of the valve disease. Patients with these conditions may be asymptomatic but decisions to operate will be based on the images, measurements and analysis acquired by the cardiac sonographer to document how narrowed the aortic valve is or how much the mitral valve leaks. So it is critical to have cardiac sonographers that are competent as the acquisition of the images and accuracy of data acquired is very operator dependent. If the imaging and analysis does not accurately document the severity of these two diseases then the patient may not be referred for surgery, this could potentially be fatal. In addition if there is a delay in being

referred for surgery because of an underestimation of the disease there may be a lower chance of optimal surgical outcomes or higher surgical risk.

It is commonly known that ultrasound technology is used to screen for congenital abnormalities during pregnancy. The ultrasound examination is generally an event that women and families look forward to with excitement. By far, the majority of pregnancies end in a healthy delivery. However, many fetal abnormalities can be detected through ultrasound examination. As in other types of ultrasound examinations, some abnormalities are readily apparent on ultrasound, such as severe spina bifida. Others, like congenital heart defects, are more subtle. Well trained and competent sonographers are needed to document, with the correct scanning technique, images that are diagnostic of both severe and subtle congenital abnormalities. Identification of any abnormality can alter the management of the pregnancy, identify need for further testing, and alter method for delivery. In addition to examination of the fetus, ultrasound examinations are used to screen for placental and maternal abnormalities.

Other types of pathology that are diagnosed solely with ultrasound are ectopic pregnancy, carotid artery stenosis, congenital heart disease, aortic aneurysm just to name a few. All these pathologies require intervention and many of the treatments are required immediately.

Perhaps more importantly, competent sonographers are needed to provide images that adequately display normal anatomy and absence of pathology. The other side to missing pathology is creating pathology falsely. In the same way that a sonographer may miss a gallstone by not using the correct angle to image it, a sonographer can mimic pathology by not using the correct angle or imaging technique. An example where this can easily happen is in the pelvis where sections of the colon may appear very similar to an ovarian tumor. Once again, the reporting physician relies on the sonographer to accurately represent the presence or absence of pathology. The false diagnosis of pathology can lead to unnecessary further testing and possibly surgery. Similarly, an ultrasound examination that has been performed improperly can lead to repeat ultrasound examinations. This is a waste of valuable resources. This may put undue stress on the patient who may worry unnecessarily.

Intra-cavity ultrasound transducers are widely used by sonographers. These transducers are inserted into either the vagina or rectum. Obviously, patients are very vulnerable when having these types of examinations performed. It is common practice not to have chaperone present during these examinations and this places the sonographer in a position of utmost trust.

Sonographers have access to portions of patient medical records. This is necessary in order for the sonographer to compare prior diagnostic imaging tests. Patients are frequently sent for ultrasound exams to follow up on previously diagnosed conditions and the sonographer must

familiarize him or herself with the previous images. Sonographers may also have access to other areas of the patient medical record for similar reasons. With this privilege comes the responsibility of protecting patients' privacy. Any information accessed must not be shared beyond the circle of those directly involved in the management of the patient's care. In addition to this, sonographers also have the responsibility of never accessing information that pertains to other patients, or areas of the patient's files that do not have direct bearing on the examination the sonographer is performing.

Sonographers must apply prudent care during ultrasound examinations to ensure that patients are not subjected to harm. Potential sources of harm during an ultrasound examination can come from too much pressure applied to the ultrasound transducer during the exam, use of higher power settings than needed to acquire images that are of diagnostic quality, and increased dwell time. Areas of the body such as the neck and scrotum are particularly sensitive to pressure. Also, infants and small children generally require less pressure during ultrasound exams in order to acquire diagnostic images. Although the application of ultrasound to the human body has never been proven to cause ill effects, sonographers use their judgment to select the lowest possible power settings during ultrasound exams. Sonographers are also aware of dwell time and limit the time spent examining any particular structure from one angle. This is particularly important during first trimester transvaginal imaging as the embryo is particularly vulnerable at this stage.

*(b) ascertain what constitutes the practice of the profession, whether persons practicing the profession should be authorized to provide restricted activities and the conditions, if any, that should apply to the practice of the profession or the provision of restricted activities*¹⁴

The practice of sonography constitutes the application of a high frequency pulsed ultrasound beam to the human body in order to examine the internal organs and vessels. The beam is generally applied by moving a transducer across the surface of the body. There are also endocavity transducers that can be inserted into the vagina or rectum. The sonographer acquires and saves images during the course of the examination. These images along with written documentation are presented to the reporting physician.

The performance of ultrasound examinations requires a vast knowledge of human anatomy, physiology, pathology and physics. In addition to the knowledge base that is required, there is high level of psychomotor skill involved that is unique to the profession.

¹⁴ S.A. 1999, c.H-5.5.

An ultrasound examination generally begins with taking a relevant history from the patient. This can provide critical information leading to a correct diagnosis. During the course of an ultrasound examination a sonographer will apply the ultrasound transducer to the patient's skin. The sonographer will make many adjustments to the angle of the ultrasound transducer as well increasing and decreasing the pressure of the transducer on the patient. While performing the scan the sonographer will view moving images on the monitor of the ultrasound equipment. The sonographer will make numerous adjustments to the equipment in order to optimize the quality of the image.

It is important to note at this point that no other health profession educational program prepares an individual to be a competent sonographer, with the exception of some residencies in medicine, such as radiology, obstetrics, gynecology and cardiology.

Section 27(2) of the Regulated Health Professions Act of Ontario¹⁵ lists a number of "controlled acts" that are to be carried out only by regulated health professionals. In this list there are two activities that sonographers perform.

The first is to place endocavity transducers in the vagina to examine the female pelvis and in the rectum to examine the prostate. These are certainly restricted activities, as they involve insertion of the ultrasound transducer beyond the labia majora and beyond the anal verge as per the activities set forth as controlled acts.

The second is the application of energy prescribed. Diagnostic medical ultrasound examinations are prescribed by physicians and midwives. Ultrasound is a type of energy requiring prudent use. Health Canada describes the safety concerns of ultrasound as being destructive heating and/or interaction effects with microscopic bubbles in the body. Competent sonographers practice the principle of As Low As Reasonably Achievable (ALARA) by selecting appropriate power settings and limiting the time spent applying the ultrasound beam to any one structure.

The practice of the profession should be restricted to the application of ultrasound for diagnostic medical purposes only. There are businesses that use diagnostic ultrasound equipment to provide pregnant women with keepsake videos and images. These images are not created during a prescribed diagnostic medical ultrasound examination. They are for entertainment purposes only and serve no diagnostic purpose. Some of these businesses claim to hire only "registered diagnostic medical sonographers". This claim may give false reassurance that a diagnostic ultrasound exam was performed.

¹⁵ S.O. 1991, c. 18.

*(c) evaluate and make recommendations on the services normally provided by a person practicing the profession, including the complexity of the services and how they are carried out*¹⁶

Sonographers perform many different types of diagnostic ultrasound examinations. These include examination of: the abdomen, fetus, female and male reproductive organs, vascular system, heart, musculoskeletal system, neonatal brain and spinal cord, and small parts which include the thyroid and breast.

The Canadian Association of Registered Diagnostic Ultrasound Professionals is responsible for the National Competency Profiles (NCP) of generalist sonographers, cardiac sonographers and vascular sonographers. These profiles include not only the skills necessary to competently acquire a diagnostic ultrasound image, but also: communication, professional responsibilities, patient assessment and care, critical thinking and problem solving, workplace health and safety skills.

The National Competency Profiles are used in the Canadian Medical Association Accreditation Process for education programs in diagnostic medical sonography. The list of skills in the NCP is not brief. These competencies are not covered in any other health profession education program. Sonographers possess specialized knowledge and skills that are unique to the profession. The National Competency Profile can be seen at: <http://www.cardup.org/rsc.php?pg=npc>

The services of sonographers are generally carried out in a hospital or clinic setting. The sonographer works independently and in conjunction with a physician, usually a radiologist, obstetrician/gynecologist or cardiologist.

*(d) consider whether the services normally provided by persons practicing the profession are regulated by an enactment*¹⁷

There are currently no enactments that regulate the services of diagnostic medical ultrasound professionals.

*(e) consider whether the profession is a distinct and identifiable profession*¹⁸

¹⁶ S.A. 1999, c.H-5.5.

¹⁷ S.A. 1999, c.H-5.5.

¹⁸ S.A. 1999, c.H-5.5.

On a worldwide level, the World Health Organization (WHO) recognized the need for adequate training in the profession of diagnostic medical sonography. In its Technical Report Series titled Training in Diagnostic Ultrasound: Essentials, Principles and Standards, WHO defined the term “sonographer”¹⁹ as well as provided an outlined curriculum.

The Canadian Association of Diagnostic Ultrasound Professionals (CARDUP) maintains the National Competency Profiles as well as administering competency testing and knowledge based exams. This is a national association that issues certifies competency at an entry to practice level. There are nine CMA Accredited schools across Canada. Additionally, the Canadian Society of Diagnostic Medical Sonographers promotes the profession of sonography and provides professional liability insurance.

At a provincial level the Nova Scotia Society of Diagnostic Medical Sonographers promotes the profession by hosting an annual educational seminar. This seminar provides sonographers with continuing education needed to maintain current knowledge in the field.

The Health Science Partnership program at Dalhousie University in Nova Scotia offers a baccalaureate degree of Health Science in Diagnostic Medical Ultrasound Technology and a diploma in Diagnostic Medical Ultrasound Technology. This degree program is available to sonographers with a diploma through a post diploma program. The post diploma program is geared for sonographers who have been practising the profession for a minimum of five years and who are interested in studying on a part time basis.

The various unions to which sonographers belong recognize the profession as separate and distinct by writing into their contracts separate pay scales for the profession. The hospitals and institutions that bargain with these unions, therefore, also recognize the profession as separate and distinct.

(f) consider whether the proposed protected title is appropriately descriptive and whether it is likely to cause public confusion²⁰

The proposed protected titles are “registered ultrasound professional”, “diagnostic ultrasound technologist”, “registered diagnostic ultrasound professional”, “registered ultrasound technologist”, and “registered sonographer” and any derivations. This will be inclusive of the subspecialties of generalist sonographers, cardiac sonographers and vascular sonographers. The

¹⁹ World Health Organization, Technical Report Series (1998) World Health Organization 75 at 21.

²⁰ S.A. 1999, c.H-5.5.

list of proposed protected titles is long due to the fact that sonographers have been known by different titles in different regions. The list needs to be inclusive in order for the public to recognize the title that has been used in their region. This wide variety of titles can be seen in the various union contracts across the province.

The inclusion of the term “diagnostic” differentiates the use of ultrasound for diagnostic purposes from ultrasound used for therapeutic purposes. This would not affect the use of ultrasound as a therapeutic measure used by physiotherapists and chiropractors.

(g) consider the potential costs and benefits of regulating the profession, including the expected effect on the practitioner availability and on education and training programs, the expected effect on the enhancement of quality of service and the expected effect on prices, access and service efficiency²¹

It is not expected that regulation of the profession would have any effect on practitioner availability or education and training programs. There would be no infringement of the Canadian Agreement on Internal Trade because the proposed regulation would recognize the credentials issued by the Canadian Association of Registered Diagnostic Ultrasound Professionals. CMA Accredited education programs are already using the National Competency Profiles to define their curriculums. There is a provision for foreign trained individuals in the proposed Regulations under section 6.

The quality of service would be guaranteed as there would be a high standard of competency, professionalism and ethical practice maintained among Nova Scotian sonographers. Patients requiring these services would be assured in the knowledge that the person performing their examination was fully qualified to do so.

There should be no effect on the price of an ultrasound examination, as these prices already include two components: a workload measurement fee and a physician fee. Workload measurement fees are set nationally and therefore are the same across Canada.

²¹ S.A. 1999, c.H-5.5.

There is the potential to save valuable resources in the health care system by avoiding unnecessary repeat ultrasound examinations, unnecessary

(h) ascertain the qualifications and minimum standards of competence that are required for a person applying to practice the profession and how the continuing competence of practitioners is to be maintained, ascertain what education programs are available and evaluate the available education programs²²

The minimum qualifications to practice the profession of sonography are graduation from a CMA accredited school of ultrasound technology. In addition, the candidate needs to have passed the Canadian Association of Registered Ultrasound Professionals knowledge and competency exams. Continuing competence will be maintained by fulfilling the requirements of a professional development program.

There is one CMA Accredited school for diagnostic ultrasound technology in Nova Scotia, the health science program at Dalhousie University. There are eight other CMA Accredited diagnostic ultrasound technology schools across Canada. All these programs fit the criteria for entry to practice as they are teaching curriculum that has been shaped by the National Competency Profiles.

Candidates who do not hold the Canadian Association of Registered Ultrasound Professionals credentials may apply to the Credentials Committee to have their education, training and work experience reviewed. The Credentials Committee can ask for a competency assessment.

(i) ascertain the ability of the proposed college of the profession to carry out its powers and duties under this Act or consider whether they could be carried out by an existing college²³

Sonographers in Nova Scotia have chosen to merge with technologists of the Nova Scotia Association of Medical Radiation Technology (NSAMRT) to form a college. In this manner the cost of starting and operating a college will be achievable because the cost will be shared among a larger number of members. The similarities between the profession of sonography and the professions of radiological technology, nuclear medicine technology, magnetic resonance technology and radiation therapy are numerous. With the exception of radiation therapy, all the

²² S.A. 1999, c.H-5.5.

²³ S.A. 1999, c.H-5.5.

professions fit under the umbrella of medical imaging technology, so it makes sense to form a college that encompasses all these technologies.

(j) Evaluate the effect, if any, that there would be on any agreements on trade and mobility to which Canada or Alberta is a signatory if the profession would become a regulated profession²⁴

As stated previously, there would be no effect on trade and mobility. The Canadian Agreement on Internal Trade would not be infringed upon as the Canadian Association of Registered Diagnostic Ultrasound Professionals (CARDUP) is the national organization that certifies sonographers. CARDUP also maintains the National Competency Profiles that all accredited schools use to define their curriculum. In this way, any sonographer in Canada who is CARDUP registered would be eligible to join the proposed college.

(k) On the request of the Minister, consider any other matters²⁵

The regulation of ultrasound equipment under the Food and Drugs Act²⁶ will now be considered as this may have some bearing on whether the profession of diagnostic medical ultrasound should be regulated. As the name of the profession implies, the whole purpose of the profession is to aid in diagnosis. Under the Food and Drugs Act, a medical device needs to be regulated. A medical device is anything that aids in diagnosis and prevention of diseases or ailments, diagnosis of pregnancy or is used in providing care during pregnancy. Diagnostic medical ultrasound equipment falls into the category of a medical device. So, if the equipment used by sonographers in the practice of diagnostic medical ultrasound is regulated, then those using the equipment should also be regulated.

CONCLUSION

The regulation of diagnostic medical ultrasound would benefit Nova Scotians. A guaranteed high level of competency, professionalism and ethical practice would be established and met by all

²⁴ S.A. 1999, c.H-5.5.

²⁵ S.A. 1999, c.H-5.5.

²⁶ Food and Drugs Act. R.S., c.F-27, s.1.

diagnostic medical ultrasound professionals, thus ensuring that the quality of ultrasound examination provided to patients is optimal. Patients could rest assured that the person performing their examination was qualified to do so, and that if that person failed to provide the minimum level of care the patient would have appropriate channels for complaint.

Physicians referring patients for ultrasound examinations would be assured that the patient was getting the appropriate level of service required. Hospitals and institutions would be protected in that they could not hire anyone without the proper credentials to perform ultrasound examinations in their institutions thus reducing the potential for liability cases.

There would be a minimal effect, if any, on the current level of efficiency provided by the institutions that offer the service.

The benefit of regulating diagnostic medical ultrasound outweighs the cost involved. The risk of physical, mental, and emotional harm to the health, safety and well being of the public is substantial if the sonographer is practising in an incompetent, unethical or impaired manner.
