

# Review of Certification in Building a Successful Sonographer Program in China

Hannah Mason, MA, PMP<sup>a</sup>, Karen Caruth, MBA<sup>a</sup>, Qiang Lu, MD<sup>b</sup>, Dale R. Cyr, MBA, CAE<sup>a,\*</sup>

<sup>a</sup> American Registry for Diagnostic Medical Sonography, Inteleos, Rockville, MD, USA; <sup>b</sup> Department of medical ultrasound, West China Hospital of Sichuan University, Chengdu, China

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**Abstract:** By working with local medical ultrasound experts, American Registry for Diagnostic Medical Sonography (ARDMS) of Inteleos, a non-profit certification organization, is striving to create global standards and international certifications in the field of diagnostic ultrasound that will improve clinical practice and patient safety. Through eligibility and application requirements, building a proper assessment, and determining continuing education requirements, standards are a critical part of Inteleos' test development process. Since 2005, Inteleos/ARDMS has been working with Chinese physicians and professional societies to facilitate and promote certification and credentialing programs. Through the Registered Physician in Vascular Interpretation (RPVI-China) assessment, applicants can earn the internationally-recognized certificates in vascular ultrasound in China. Along with certification for Physicians, China's growing population and the related burden on its healthcare system as well as the rapid increases in ultrasound use could contribute to the ideal situation for building a sonographer profession in China. Through a pilot education and certification program for Chinese sonographers, Inteleos will work with Chinese universities and collaborators to build and expand the sonographer profession in China in order to reduce workload on physicians, reduce wait times, decrease hospital costs, and provide consistently better care for their population.

**Key words:** Certification; Credentialing; Ultrasound education; Sonographer

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The field of ultrasound is rapidly expanding and it is important that the healthcare workforce is ready to safely use the machines. Availability does not equal ability. How can we trust that healthcare practitioners who will use ultrasound will be proficient in their practice? By working with local subject matter experts, organizations such as Inteleos, a non-profit certification organization, are striving to create global standards in healthcare that will improve patient safety.

Inteleos is a global non-profit healthcare certification organization, that meets personnel accreditation standards by the International Standards Organization (ISO) and develops and delivers more than 30,000 ultrasound and medical imaging assessments each year. Inteleos creates standards of proficiency in medical imaging, such as ultrasound, nuclear cardiology, and cardiac computed tomography and has over 115,000

certified healthcare professionals in 70 countries.

## Importance of Standards in the Creation of International Assessments

Standards increase quality, safety, and efficiency and benefit virtually every industry. The International Organization for Standardization (ISO) creates documents that give world-class specifications for products, services, and systems, to ensure quality, safety, and efficiency [1]. ISO has published more than 22,701 international standards that impact people around the globe [2]. When there are standards in place, you can be sure the product or process in question is safe and efficient. Inteleos credentialing programs are independently accredited by achieving the ISO 17024 standards for personnel certification [3].

\* Corresponding Author: Inteleos, 1401 Rockville Pike, Suite 600, Rockville, MD 20852, USA  
e-mail: dale.cyr@inteleos.org

## Inteleos Assessments

### Existing Assessments (Examinations)

- Sonography Principles and Instrumentation
- Abdomen Ultrasound
- Adult Echocardiography
- Breast Ultrasound
- Cardiac Computed Tomography Physician Examination
- Fetal Echocardiography
- Musculoskeletal Sonography Physician Examination
- Musculoskeletal Sonographer Examination
- Nuclear Cardiology Physician Examination
- Obstetrics and Gynecology
- Pediatric Sonography
- Pediatric Echocardiography
- Physicians' Vascular Interpretation
- Vascular Technology

### Globally Based Physician Assessment Programs:

- Abdomen - Latin America
- Obstetrics and Gynecology - Latin America
- Physicians Vascular Interpretation - China

### Point-Of-Care Ultrasound (POCUS) Academy

- Multi-disciplinary certificate assessments
- Launched April 2017

### In-Progress Certification programs:

- Midwife Sonography Certificate - United States
- Accredited Vascular Scientist (AVS) - Great Britain

### Future Councils:

- Advanced Care Provider Ultrasound Assessment



**Figure 1** Outlines the assessments currently offered through Inteleos. For more information on how to apply, please visit our website at [www.Inteleos.org](http://www.Inteleos.org).

### Certification Process

Creating, maintaining, and documenting standards of proficiency is more than an examination. Internationally accredited by ISO, Inteleos conducts approved test development activities which include: determining appropriate eligibility to sit the exam, building an examination that accurately reflects the scope of practice, assuring the examinations are valid and reliable, and addressing continued competency for lifelong learning.

When building an ultrasound assessment, anywhere in the world, one of the most important steps is to partner with local subject matter experts (SMEs). Having a strong base of reliable, local subject matter experts is a critical component to building and maintaining the right exam for the practice, as local, on-the-ground practitioners have the best understanding of their specific practices.

#### *Eligibility and Application requirements*

It is important that Inteleos establish appropriate eligibility criteria that meets local or regional practitioner education and training environments. Because there is no global standard of ultrasound practices, it is important that Inteleos analyze practice patterns, conduct market research and utilize input from SMEs and local regulatory groups to determine appropriate eligibility requirements. Eligibility requirements primarily include educational parameters along with documented clinical experience.

### *Building a proper assessment*

When building an assessment, it is important to ensure that certified individuals meet a standard of proficiency, which establishes the knowledge, skills and abilities (SKAs) need to perform practice activities at a competent level. However, because the nuances of practice may vary from location to location; the assessment must be broad enough to establish a standard of proficiency, but customized enough to ensure that it is appropriate to local practice. For this reason, it is critically important to analyze local practice patterns. SMEs and Inteleos' professional staff assure all examinations meet rigorous psychometric standards of fairness, validity and reliability.

### *Continuing education*

Through continual education, certificants can maintain life-long proficiency in the areas for which they have demonstrated proficiencies. Through Continuing Medical Education requirements, Inteleos is able to ensure certificants' continued engagement within the medical community and lifelong learning. (Table 1)

### **Population and Healthcare Status in China**

China currently has a population of 1.41 billion [4]. As with many countries around the world, there are variances of health outcomes in China, due to many factors, one of which is socioeconomic inequalities [5]. Of note, China is one of the most populated as well as

one of the fastest aging countries in the world, giving rise to unique demands on its healthcare community.

China has a high rate of non-communicable diseases (NCDs), including cardiovascular and respiratory diseases, cancer, and diabetes. Cancer is the leading cause of death in China, with 4.3 million cases diagnosed and 2.8 million of them causing death in 2015 [6]. This data has led the Chinese Ministry of Health to start a collaboration with the World Health Organization (WHO) to fight cancer in China. A specific example is breast cancer has been on the rise in mainland China, with 260,00 new cases reported in 2015, largely due to the following factors: late child-bearing, heavy workloads, smoking, and sedentary lifestyles [7].

### **Healthcare Workforce in China**

In 2015 there were around 189,000 general practitioners. The government aims to have 300,000 by 2020. Given China's population growth, even an increase such as that for general practitioners would still result in a decrease in per capita physicians country-wide (to 0.2 family doctors for every 1,000 people, compared with 0.14 today - see table below). That is far fewer than in many Western countries and can result in delayed treatment due to healthcare workforce shortages [8].

China is anticipated to experience a very rapid growth of ultrasound use due to growing awareness, high patient/physician ratio, increasing healthcare expenditures, and the government's focus on improving health in the developing economies [9]. Equipment manufacturers are capitalizing on this anticipated growth in China - revenue for ultrasound equipment in China was to top \$1.5 billion by 2017, up a sizable 65 percent from \$908.8 million in 2012 [10]. A combination of new government investment, diversifying clinical use, and changing product mix of ultrasound equipment is set to drive strong future growth of the ultrasound equipment industry in China [11]. The growth sector includes smaller private hospitals, corporations that have bought imaging centers, government hospitals, and imaging centers in rural places that are funded through the state or through state partnerships with the private sector [12].

The increase in ultrasound equipment sales, however, will not ease the strain on the existing healthcare workforce in China. China estimates that it currently has 200,000 ultrasound physicians, and patients may have a wait time of up to one month for a routine ultrasound scan. Increasing the availability of equipment will not increase the number of proficient users; and therefore, China is exploring the addition of the sonographer profession to supplement and complement the ultrasound physician practice.

Introducing Sonographers to the healthcare workforce

in China is an effective way to address the workforce shortage, patient access to ultrasound care, as the demand of ultrasound services continues to grow.

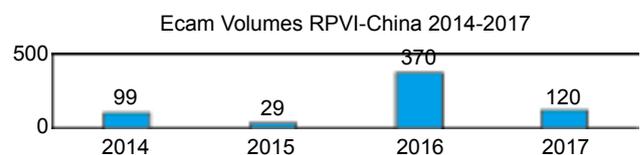
Helping China build a turnkey sonographer-physician practice model and assure the creation of Chinese sonographer standards of practice will help build capacity, reduce patient wait times, and provide quality care for their population through certified individuals who are meeting international standards.

## **Inteleos History of Ultrasound Assessments in China**

### **Physician Community: Registered Physician in Vascular Interpretation in China (RPVI-China) Assessment**

Inteleos, through the American Registry for Diagnostic Medical Sonography (ARDMS) and the Alliance for Physician Certification and Advancement (APCA), has been working with Chinese ultrasound doctors to establish standards of proficiency since 2005. Through the Registered Physician in Vascular Interpretation (RPVI-China) assessment, applicants can earn the highest attainable standard in vascular ultrasound in China.

The RPVI-China assessment was developed in close partnership with the Chinese Ultrasound Doctors Association (CUDA), as well as other Chinese physician subject-matter experts. The RPVI-China certification exam assesses competency in the skills, knowledge and abilities of vascular ultrasound, for the sole purpose of further improving patient care and safety in China. With pilots beginning in 2008 and the assessment formally launched in 2014, now over 600 Chinese ultrasound doctors (Figure 2) have taken the assessment. Inteleos remains connected with the ultrasound doctors in China and engaged in discussions with the community regarding relevant future ultrasound assessments.



**Figure 2** Exam Volumes for RPVI-China 2014-2017

### **Sonographer Education and Certification Program – a Pilot**

In partnership with Jefferson University, in Philadelphia, USA, and the West China Medical School of Sichuan University, Inteleos has created a pilot education and certification program for Chinese sonographers. Helping China build a turnkey sonographer-physician

practice model and assuring the creation of Chinese sonographer standards of practice will help build capacity, reduce wait times, and provide consistently better care for their population. Jefferson University and Inteleos are in a unique position to help guide and expand the implementation of this emerging profession.

To meet the globally-recognized standard of care that United States sonographers have achieved, China has modeled its new sonographer programs to culminate in taking the ARDMS assessments. Sonographers who successfully pass the ARDMS assessments will receive the same credentials as sonographers practicing in the United States and will be globally recognized for their expertise in sonography.

Inteleos and Jefferson University have been working closely with West China Medical School of Sichuan University and are now expanding the outreach to other sonography programs including, Shanghai University of Medicine and Health Sciences and Hangzhou Medical College, in order to cultivate a community of trained sonographers in China. Through these programs, faculty from Jefferson University work with Chinese sonographer educational programs to assure standardized education and training is developed and maintained. Students are taught with a curriculum that contains the outline from Jefferson on sonography, but has additional courses typical for a Chinese University setting.

After completing their coursework and clinical hours, participating students are eligible to sit for ISO accredited certifications such as the Registered Diagnostic Medical Sonographer (RDMS), Registered Diagnostic Cardiac Sonographer (RDCS), Registered Vascular Technologist (RVT) and Registered Musculoskeletal Sonographer (RMSKS) credentials under international standards as the certifying body. Affiliated programs are eligible to apply for the ARDMS certifications.

Participating programs are not only eligible to sit for the ARDMS assessments, but are also engaged with Inteleos and Jefferson University's Sonographer Education Network. While beginning in China, this partnership model could be replicated on a global

basis, especially in developing ultrasound healthcare environments.

In summary, China's growing population and the related burden on its healthcare system, along with the rapid increases in ultrasound use, contribute to the ideal situation for the growth of a sonographer profession in China. Clinically proficient sonographers, adhering to globally-recognized standards of practice, can reduce workload on physicians while simultaneously increase the access to quality ultrasound care to patients and reduce costs to hospital systems. Through working with Jefferson, West China Medical School of Sichuan University, and other partners, Inteleos hopes to expand its partnership with the China medical community to build a world-class sonographer program to enhance patient care and safety in China.

### Conflict of Interest

The authors are employees of Inteleos: Hannah Mason, MA, PMP, Manager of Business Development, Inteleos, Karen Caruth, MBA, Chief Business Development Officer, Inteleos, and Dale R. Cyr, MBA, CAE, Executive Director and CEO, Inteleos.

### References

- [1] <https://www.iso.org/standards.html>
- [2] <https://www.iso.org/about-us.html>
- [3] <http://www.inteleos.org>
- [4] <http://www.worldometers.info/world-population/china-population/>
- [5] <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5214866/>
- [6] [http://en.nhfpc.gov.cn/2017-11/02/c\\_72597.htm](http://en.nhfpc.gov.cn/2017-11/02/c_72597.htm)
- [7] [http://en.nhfpc.gov.cn/2017-09/15/c\\_72528.htm](http://en.nhfpc.gov.cn/2017-09/15/c_72528.htm)
- [8] <https://www.economist.com/news/china/21721948-memories-barefoot-ones-put-some-people-seeing-them-china-needs-many-more-primary-care>
- [9] <http://health.economictimes.indiatimes.com/news/diagnostics/diagnostic-imaging-market-a-window-of-opportunity/46578863>
- [10] <http://news.ihsmarket.com/press-release/design-supply-chain-media/china-ultrasound-market-set-surge-more-60-percent-within-five>
- [11] <http://news.ihsmarket.com/press-release/design-supply-chain-media/china-ultrasound-market-set-surge-more-60-percent-within-five>
- [12] <http://www.auntminnie.com/index.aspx?sec=ser&sub=def&pag=dis&ItemID=110035>