Evidence Brief: Echocardiography

Contents

Produced by the Knowledge Management team Evidence Briefs offer an overview of the published reports, research, and evidence on a workforce-related topic.

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- Complete Evidence Brief list – link for Workforce, Training and Education staff
- Complete Evidence Brief list – link for External staff

Key publications – the big picture

The UK Echocardiography Workforce
Author(s): Allison Leary and Geoff Punshon
Source: British Society of Echocardiography
Publication date: January 2023
The British Society of Echocardiography commissioned Professor Alison Leary, Chair of Workforce Modelling at London South Bank University, to carry out a further investigation into the challenges and opportunities being faced by the echo workforce in 2022. Professor Leary ran a workshop with broad representation in terms of geography, experience and clinical setting. The results of the workshop fed into a survey which set out to better understand issues such as working conditions, opportunities for workload redistribution and demand for labour. Having compiled the data and working with the Workforce Committee, Professor Leary proposed that the best way she could assist our workforce was to write a policy paper outlining the issues and making specific recommendations to address them.

The Untold Heartbreak
Source: British Heart Foundation
Publication date: 2021
Covid-19 has had a devastating impact on cardiovascular care. Discover the full extent of this disruption and what needs to be done to build a stronger and more resilient cardiovascular health system that gives all heart patients the support they need.

Cardiology: GIRFT Programme National Specialist Report Free NHS Futures account required to view the report
Author(s): Clarke and Ray
Source: NHS England Getting It Right First Time (GIRFT)
Publication date: February 2021
See p. 21 Workforce, rostering, rotas and job planning
Workforce issues are a common theme across the NHS.* In cardiology, deep dives have uncovered high vacancy rates in a number of roles, notably in cardiac physiology, as well as variation in how the workforce is utilised and the extent to which extended roles have been adopted. In some cases, a perverse incentive in the form of competitive band inflation is acting as another barrier to staff retention. Increasing capacity where necessary, and training and upskilling are key to meeting growing demand and delivering care in the most efficient and cost-effective way. ACP roles offer the opportunity for healthcare professionals from a variety of backgrounds to acquire the skills and experience required to practice at an advanced level across traditional professional boundaries.12 We strongly encourage the development of ACP roles within cardiology services for nursing, pharmacy and other advanced roles. We support the concept of a mobile workforce through the implementation of ‘staff passports’. The ability to work across hospital sites facilitates delivery of network functions and also provides support in case of staff shortages. Examples are included throughout the report but include delivery of on-call rotas, weekend ward rounds, outpatient services and emergency temporary pacing.

Diagnostics: Recovery and renewal – Report of the independent Review of Diagnostics Services for NHS England
Source: NHS England
Publication date: October 2020
See p. 39 “The Cardiorespiratory diagnostics workforce”
5.19 The cardiorespiratory diagnostics workforce has until now largely been part of cardiology and respiratory services within

acute hospitals. In addition, some relatively simple diagnostic tests are undertaken in primary care. The numbers of people working in these areas is difficult to define as there is no national data collection. However, as with other diagnostic disciplines, it is clear that workforce capacity has not kept up with demand. This is particularly the case for echocardiography. 5.20 The establishment of community diagnostic hubs provides new opportunities to deliver high quality, efficient and patient-centred services for a range of patients with possible or known cardiac and respiratory conditions.
5.21 In addition to an increase in echocardiographers, new roles should be piloted, with expertise in a range of tests such as ECG, rhythm monitoring, spirometry and some other lung function tests. This will support the development of skills and different ways of working and encourage diversity in the diagnostic workforce.
5.22 Recommendation 15: The number of echocardiographers and clinical scientists supporting cardiac arrythmia diagnosis, pulmonary function testing, sleep studies and blood gas analysis should be expanded. Diagnostic professionals who can 'multitask' are required to deliver spirometry, issue sleep studies, ambulatory ECG and blood pressure monitoring, phlebotomy and point of care testing.

Securing the future workforce supply: sonography workforce review
Source: Centre for Workforce Intelligence
Publication date: March 2017
The Centre for Workforce Intelligence (CfWI) was commissioned by the Department of Health (DH) and Health Education England (HEE) to contribute qualitative and quantitative research, data analysis, and modelling to support HEE and NHS England in providing sufficient ultrasound practitioners to deliver diagnostic services across England. The research will inform short and long term workforce plans up to 2035.

See section 2.7.2 Echocardiographers
The majority of cardiac ultrasound examinations (echocardiography) are done by clinical physiologists, specifically cardiac physiologists. Some cardiac ultrasound examinations are done by specialist doctors and GPs. Those not medically qualified use the term echocardiographer or cardiac sonographer. Most echocardiographers work in cardiac departments i.e. not in radiology, imaging or obstetrics. Some work in silos in GP practices and some offer purely locum or freelance services. The British Society of Echocardiography (BSE) has indicated that the current workforce shortage in cardiac physiology services means there are insufficient numbers of echocardiographers to deliver a seven day a week diagnostic echocardiography service. This is documented in the joint Society for Cardiological Science and Technology (SCST) and British Cardiovascular Society (BCS) report Strategic Review of Cardiac Physiology Services (BSE, 2015) and in the CfWI healthcare scientists training capacity survey report (CfWI, 2015). It is further exacerbated by the currently low intake of Scientist Training Programme (STP) trainees (CfWI, 2015), which the BSE fears will result in further echocardiographer shortages and the inability to meet expected future demand. The BSE maintains that this will result in inadequately qualified staff being expected to deliver echocardiography, which will have a direct negative impact on patient care and put a greater burden on senior staff and cardiologists. The HEE are considering a review of the cardiology workforce in 2017. This would be the most opportune time to consider the issues facing echocardiography in terms of cardiac ultrasound provision.

Cardiac physiology workforce options analysis
Source: British Heart Rhythm Society
Publication date: May 2016
There is a major shortfall in the cardiac physiology workforce which threatens the ability to meet increasing demand and to

delivery of 7 day working. • Options are outlined in the document as to how this shortage might be overcome, with economic costings that take into account training and the health costs of a shortage of physiology staff. • While no single option is likely to meet the shortage in a timely manner, recommendations are made that include improved workforce planning, foreign recruitment, increased admissions to the Practitioner Training programme and a need to support departments in delivering postgraduate training.

The evolution of clinical science in cardiology: scientist-led services
Author(s): Oxley
Source: British Society of Echocardiography
Cardiac physiology as a profession was relatively unheard of when I started my career in 2001, despite our vital diagnostic services being an integral part of patient pathways.
Our work, at this time, was often overseen by cardiologists with reports being countersigned by them or other medical teams. The introduction of technician led exercise testing was really the starting point for the development of more autonomous practice across cardiac physiology. The developments that we have seen have been driven by service need, well supported by our medical colleagues and underpinned by improved access to education, training and accreditation in line with recommendations made in the BCS/ SCST strategic review of cardiac physiology services published in 2015. Modernising scientific careers has raised the profile of our profession by identifying cardiac physiology, and indeed other physiological sciences, as part of the wider healthcare science service giving us a bigger voice and more representation.

The Star for workforce redesign

More resources and tools are available in the Star

Statistics

You can find relevant statistics on the Health and Care Statistics Landscape under **“Health and Care”**

National Data Programme

Workforce, Training and Education staff can look at the National Data Warehouse (NDL) SharePoint site to find out more about datasets and Tableau products.

Published Peer Reviewed Research

Advanced Practice

Impact of Advanced Cardiac Sonographers on Exam Completeness in the Echocardiography Laboratory
Item Type: Journal Article
Authors: Guthrie, J. D. and Bierig, S. M.
Publication Date: 2024
Journal: Journal of Diagnostic Medical Sonography 40(1), pp. 72–77
Objective: Laboratory accreditation has been shown to impact variability and completeness. However, little data exist demonstrating the impact of personnel credentialing on completeness and efficiency. Therefore, the aim of this study was to evaluate exam completeness and efficiency among staff with an advanced cardiac sonographer (ACS) credential, Registered Diagnostic Cardiac Sonographer or Registered Cardiac Sonographer and noncredentialed staff. Material(s) and Method(s): Retrospective review of adult and pediatric echocardiograms at eight facilities in three states. Exam completeness was compared with Intersocietal Accreditation Commission (IAC) standards and completeness by pathology was compared with the American Society of Echocardiography (ASE) standards. Result(s): This study was based on the review of 1147 patient cases. Of the cases reviewed, 60.3% were performed by credentialed (non-ACS) sonographers, 28.3% were completed by credentialed ACS, and 11.3% by noncredentialed staff. The credentialed staff completed exams <= 12 hours. The exams were reviewed for compliance with IAC standards and completed by ACS staff: 80.0% in aortic stenosis and 55.6% in non-ACS staff. Those patient cases for mitral regurgitation (14/19) were 73.7% IAC compliant, cases completed by credentialed non-ACS (20/56) were 35.7% compliant, and those completed by noncredentialed sonographers (2/11) only 18.2% were compliant. Cases specific to patent ductus arteriosus were 92.1% compliant with IAC standards that were completed by ACS compared with 77.9% completed by non-ACS staff. Cases of pulmonary hypertension were also evaluated for IAC compliance and 61.8% met the standard with ASE versus 41.7% completed by non-ACS. Conclusion(s): Examinations performed by ACS are more often complete in important pathology. Examination efficiency is highest among credentialed sonographers.Copyright © The Author(s) 2023.

Education and Training

Serial image interpretation tasks improve accuracy and increase confidence in Level 1 echocardiography reporting: a pilot study
Item Type: Journal Article
Authors: Fisher, Richard;Zayan, Amal;Gosling, Jennifer;Ramos, Joao;Nasr, Mahmoud;Garry, David;Papachristidis, Alexandros;Caetano, Francisca and Hopkins, Philip
Publication Date: 2023
Journal: Echo Research and Practice 10(1), pp. 6
Abstract: BACKGROUND: Focused echocardiography is increasingly used in acute and emergency care, with point-of-care ultrasound integrated into several specialist training curricula (e.g. Emergency Medicine, Cardiology, Critical Care). Multiple accreditation pathways support development of this skill but there is scant empirical evidence to inform selection of teaching methods, accreditation requirements or quality assurance of education in focussed echocardiography. It has also been noted that access to in-person teaching can be a barrier to completing accreditation programmes, and that this may affect learners disproportionately depending on the location or nature of their institution. The purpose of the study was to determine whether serial image interpretation tasks as a distinct

learning tool improved novice echocardiographers' ability to accurately identify potentially life-threatening pathology from focused scans. We also aimed to describe the relationship between accuracy of reporting and participants' confidence in those reports, and to assess users' satisfaction with a learning pathway that could potentially be delivered remotely., METHODS: 27 participants from a variety of healthcare roles completed a program of remote lectures and 2 in-person study days. During the program they undertook 4 'packets' of 10 focused echocardiography reporting tasks (total = 40) based on images from a standardised dataset. Participants were randomized to view the scans in varying orders. Reporting accuracy was compared with consensus reports from a panel of expert echocardiographers, and participants self-reported confidence in their image interpretation and their satisfaction with the learning experience., RESULTS: There was a stepwise improvement in reporting accuracy with each set of images reported, from an average reporting score of 66% for the 1st packet to 78% for the 4th packet. Participants felt more confident in identifying common life-threatening pathologies as they reported more echocardiograms. The correlation between report accuracy and confidence in the report was weak and did not increase during the study (rs = 0.394 for the 1st packet, rs = 0.321 for the 4th packet). Attrition during the study related primarily to logistical issues. There were high levels of satisfaction amongst participants, with most reporting that they would use and / or recommend a similar teaching package to colleagues., CONCLUSIONS: Healthcare professionals undertaking remote training with recorded lectures, followed by multiple reporting tasks were capable of interpreting focused echocardiograms. Reporting accuracy and confidence in identifying life-threatening pathology increased with the number of scans interpreted. The correlation between accuracy and confidence for any given report was weak (and this relationship should be explored further given the potential safety considerations). All components of this package could be delivered via distance learning to enhance the flexibility of echocardiography education. Copyright © 2023. The Author(s).

The Challenges of Educating a Cardiac Sonography Workforce
Item Type: Journal Article
Authors: Hagen-Ansert, S. and Billick, K.
Publication Date: 2023
Journal: Journal of Diagnostic Medical Sonography 39(4), pp. 414–420
Abstract: Objective: Cardiac sonographers are challenged on a daily basis to provide excellent frontline care for a variety of patients. They face challenges of promoting quality over quantity and continued support for education and training efforts. Echocardiography requires an operator-dependent sonographer with independent judgement and critical thinking skills to obtain and integrate diagnostic information during the echo examination. The growth of echocardiographic procedures has increased the demand for qualified cardiac sonographers to cover the workload. Material(s) and Method(s): Occupational employment and wage statistics, educational opportunities, simulation labs and clinical sites, national registries, and ASE standards for a quality echo educational environment are discussed. Result(s): The national curriculum for echocardiography is extensive and requires adequate clinical hands-on training to promote an opportunity for the student to become a competent cardiac sonographer. Credentialing in echocardiography demonstrates to the patients, healthcare professionals, and employers of medical facilities that the cardiac sonographer is a dedicated professional in their respective field. Conclusion(s): Additional accredited cardiovascular programs with active credentialed clinical sites to fulfill this shortage. The skillset has increased with new procedures requiring training in advanced imaging techniques such as three-dimensional

imaging, strain, tissue Doppler, and contrast-enhanced imaging.Copyright © The Author(s) 2023.

Medical student medium-term skill retention following cardiac point-of-care ultrasound training based on the American Society of Echocardiography curriculum framework
Item Type: Journal Article
Authors: Jujo, Satoshi;Sakka, Brandan I.;Lee-Jayaram, Jannet;Kataoka, Akihisa;Izumo, Masaki;Kusunose, Kenya;Nakahira, Atsushi;Oikawa, Sayaka;Kataoka, Yuki and Berg, Benjamin W.
Publication Date: 2022
Journal: Cardiovascular Ultrasound 20(1), pp. 26
Abstract**:** BACKGROUND: No studies have demonstrated medium- or long-term skill retention of cardiac point-of-care ultrasound (POCUS) curriculum for medical student. Based on the American Society of Echocardiography (ASE) curriculum framework, we developed a blended-learning cardiac POCUS curriculum with competency evaluation. The objective of this study was to investigate the curriculum impact on image acquisition skill retention 8 weeks after initial training., METHODS: This study was a prospective, pre-post education intervention study for first- and second-year medical students, with blinded outcome assessment. The curriculum included a pre-training ASE online module and healthy volunteer hands-on training to obtain 5 views: parasternal long-axis (PLAX), parasternal short-axis (PSAX), apical 4-chamber (A4C), subcostal 4-chamber (S4C), and subcostal inferior vena cava (SIVC) views. Students took 5-view image acquisition skill tests at pre-, immediate post-, and 8-week post-training, using a healthy volunteer. Three blinded assessors rated the image quality using a validated 10-point maximum scoring system. Students used a hand-held ultrasound probe (Butterfly iQ)., RESULTS: Fifty-four students completed hands-on training, and pre- and immediate post-training skill tests. Twenty-seven students completed 8-week post-training skill tests. Skill test score improvement between pre- and 8-week post-training was 2.11 points (95% CI, 1.22-3.00; effect size, 1.13)., CONCLUSION: The cardiac POCUS curriculum demonstrated medium-term skill retention. The curriculum was sufficient for S4C and SIVC skill retention, but inadequate for PLAX, PSAX, and A4C. Therefore, instructional design modifications or re-training for PLAX, PSAX, and A4C are needed to make the curriculum more effective for clinically relevant skill retention. Copyright © 2022. The Author(s).

Cultivating Competency in Cardiac Sonography: Aligning Entrustable Professional Activities With Industry Expectations
Author(s): Perry et al.
Source: Heart, Lung and Circulation 33 pp. 1067-1073
Publication date: 2024
Background & Aim: Echocardiography education involves the teaching and assessment of multiple competencies to ensure work-ready graduates. To connect these competency standards to professional practice, it is important that the industry expectation around specific entrustable professional activities (EPAs) is determined. In Australia, echocardiography examinations are eligible for Medicare reimbursement when performed by sonographers listed on the Australian Sonographers Accreditation Registry (ASAR), either as an Accredited Medical Sonographer or as an Accredited Student Sonographer. A key criterion for acceptance onto the registry is the completion of, or active enrolment in, an accredited cardiac sonography course. Eligible courses apply for accreditation and are assessed by ASAR against their Standards for Accreditation of Sonographer Courses. This study sought to investigate the existing cardiac EPAs and provide insights into the industry's expectations for graduate cardiac sonographers in Australia. Methods: Using an anonymous online survey tool, an invitation to participate was circulated via professional sonography groups

and social media platforms. Accredited Medical Sonographers, Accredited Student Sonographers or interested stakeholders (academic, employer, medical specialist) working in Australia or New Zealand were invited to complete the survey. Survey questions were structured around the existing EPAs and knowledge items described in published sonography competency documents. Participants were asked if each individual EPA should be considered appropriate at the threshold of graduation, or at a higher level following a period of working in the profession. Results: There were 211 cardiac sonographers who completed the survey. The majority of respondents (148 of 211, 72.2%) indicated that the current EPAs should be updated. At 80% agreement, the following EPAs were considered essential for the graduate: left ventricular structure and function, right ventricular structure and function, atrial size, valvular disease, systemic hypertension, cardiomyopathies, diseases of the aorta, coronary artery disease, pulmonic hypertension, and basic congenital heart disease. This list is more extensive than the current ASAR-endorsed EPAs, and the findings in this research will guide the revision of current ASAR-endorsed EPAs for graduate-level cardiac sonography

Learning echocardiography in the workplace: a cognitive load perspective
Author(s): Blissett et al.
Source: Academic Medicine
Publication date: March 2021
Purpose: Although workplace learning environments provide authentic tasks to promote learning, elements of clinical settings may distract trainees and impede learning. The characteristics of workplace learning environments that require optimization are ill-defined. Applying principles of cognitive load theory (CLT) to optimize learning environments by managing intrinsic load (complexity of the task matched to learner knowledge and skill), minimizing extraneous load (any aspect that is not part of task completion), and increasing germane load (processing for storage in long-term memory) could be advantageous. The authors explored trainee perceptions of characteristics that helped or impaired learning from a cognitive load perspective. Echocardiography interpretation was used as a model. Method: The authors conducted semistructured interviews between December 2018 and March 2019 with a purposeful sample of 10 cardiology trainees at the University of California, San Francisco, School of Medicine until thematic sufficiency was achieved. Participants represented a range of training levels (3 fourth-year trainees, 2 fifth-year trainees, 3 sixth-year trainees, and 2 advanced echocardiography fellows) and career aspirations (4 desired careers in imaging). Two independent coders analyzed interview transcripts using template analysis. Codes were mapped to CLT subcomponents. Results: Trainees selected their own echocardiograms to interpret; if trainees' skill levels and the complexity of the selected echocardiograms were mismatched, excess intrinsic load could result. Needing to look up information essential for task completion, interruptions, reporting software, and time pressures were characteristics that contributed to extraneous load. Characteristics that related to increasing germane load included the shared physical space (facilitating reading echocardiograms with attendings and just-in-time guidance from near peers) and the availability of final reports to obtain feedback independent of teachers. Conclusions: As interpreted from a cognitive load perspective, findings highlight characteristics of workplace learning environments that could be optimized to improve learning. The findings have direct application to redesigning these learning environments.

3-D Echocardiography Is Feasible and More Reproducible than 2-D Echocardiography for In-Training Echocardiographers in Follow-up of Patients with Heart Failure with Reduced Ejection Fraction.
Item Type: Journal Article

Authors: Baldea, Sorina Mihaila;Velcea, Andreea Elena;Rimbas, Roxana Cristina;Andronic, Anca;Matei, Lavinia;Calin, Simona Ionela;Muraru, Denisa;Badano, Luigi Paolo and Vinereanu, Dragos
Publication Date: 2021
Journal: Ultrasound in Medicine & Biology 47(3), pp. 499-510
Abstract: Left ventricular volumes (LVVs) and ejection fraction (LVEF) are key elements in the evaluation and follow-up of patients with heart failure with reduced ejection fraction (HFrEF). Therefore, a feasible and reproducible imaging method to be used by both experienced and in-training echocardiographers is mandatory. Our aim was to establish if, in a large echo lab, echocardiographers in-training provide feasible and more reproducible results for the evaluation of patients with HFrEF when using 3-dimensional echocardiography (3-DE) versus 2-dimensional echocardiography (2-DE). Sixty patients with HFrEF (46 males, age: 58 +/- 17 y) underwent standard transthoracic 2-D acquisitions and 3-D multibeat full volumes of the left ventricle. One expert user in echocardiography (expert) and three echocardiographers with different levels of training in 2-DE (beginner, medium and advanced) measured the 2-D LVVs and LVEFs on the same consecutive images of patients with HFrEF. Afterward, the expert performed a 1-mo training in 3-DE analysis of the users, and both the expert and trainees measured the 3-D LVVs and LVEF of the same patients. Measurements provided by the expert and all trainees in echo were compared. Six patients were excluded from the study because of poor image quality. The mean end-diastolic LVV of the remaining 54 patients was 214 +/- 75 mL with 2-DE and 233 +/- 77 mL with 3-DE. Mean LVEF was 35 +/- 10% with 2-DE and 33 +/- 10% with 3-DE. Our analysis revealed that, compared with the expert user, the trainees had acceptable reproducibility for the 2-DE measurements, according to their level of expertise in 2-DE (intra-class coefficients [ICCs] ranging from 0.75 to 0.94). However, after the short training in 3-DE, they provided feasible and more reproducible measurements of the 3-D LVVs and LVEF (ICCs ranging from 0.89-0.97) than they had with 2-DE. 3-DE is a feasible, rapidly learned and more reproducible method for the assessment of LVVs and LVEF than 2-DE, regardless of the basic level of expertise in 2-DE of the trainees in echocardiography. In echo labs with a wide range of staff experience, 3-DE might be a more accurate method for the follow-up of patients with HFrEF. Copyright © 2020 The Authors. Published by Elsevier Inc. All rights reserved.

Conference abstract: 'Shocking' communication skills – communication skills training for cardiac physiologists deactivating ICDS$ Abstract all available
Item Type: Conference Proceeding
Authors: Curtis, M., Evans, S. and Clayton, B.
Publication Date: 2017
Publication Details: BMJ Supportive and Palliative Care.
Conference: APM ASP Conference. Belfast United Kingdom.
7(Supplement 1) (pp A43); BMJ Publishing Group,
Abstract: Background Studies have highlighted a strikingly low rate of preparatory conversations regarding the deactivation of patients' implantable cardiac defibrillators (ICDs) at the end of life. Rates of implantation of ICDs have increased, indicating that managing ICDs at the end of life will become a more common occurrence. Cardiac Physiologists carry out the deactivation of ICDs, yet locally in Devon, Cardiac Physiologists have highlighted that they have no training of how to communicate with patients when deactivating their ICDs. Aims To improve end of life communication skills for Cardiac Physiologists. Methods A joint educational programme was developed to improve end of life communication skills for Cardiac Physiologists and increase the ICD-related knowledge base of Palliative Care teams. Interactive role-play sessions were developed based on examples of challenging or common communication scenarios provided by the Cardiac Physiologists prior to the session.

Feedback was collected immediately after the session and then 4 months later to assess the impact on their actual practice. Results Immediate feedback stated the training had been very useful. Further results regarding how well the Physiologists have put the learning into practice will be available in the near future. The majority of Palliative Care attendees admitted to little understanding of cardiac devices before the study day compared to a good understanding afterwards. Conclusions Cardiac Physiologists are a group of the non-cancer workforce who are potentially neglected with regards to end of life communication skills training. We would encourage other services around the country to provide this training to improve the end of life care for patients with ICDs. Interactive role play appears to have been a successful method to provide this training. The joint educational programme between Cardiology and Palliative Care facilitated learning from shared differing experiences and helped develop relationships between the teams.

Evaluation of Computer-Based Training for Health Workers in Echocardiography for RHD.
Item Type: Journal Article
Authors: Engelman, Daniel;Okello, Emmy;Beaton, Andrea;Selnow, Gary;Remenyi, Bo;Watson, Caroline;Longenecker, Chris T.;Sable, Craig and Steer, Andrew C.
Publication Date: 2017
Journal: Global Heart 12(1), pp. 17-23.e8
Abstract: BACKGROUND: The implementation of screening for rheumatic heart disease at a population-scale would require a considerable increase in human resources. Training nonexpert staff in echocardiography requires appropriate methods and materials. OBJECTIVES: This pre/post study aims to measure the change in the knowledge and confidence of a group of health workers after a computer-assisted training intervention in basic echocardiography for rheumatic heart disease. METHODS: A syllabus of self-guided, computer-based modules to train nonexpert health workers in basic echocardiography for rheumatic heart disease was developed. Thirty-eight health workers from Uganda participated in the training. Using a pre/post design, identical test instruments were administered before and after the training intervention, assessing the knowledge (using multiple-choice questions) and confidence (using Likert scale questions) in clinical science and echocardiography. RESULTS: The mean total score on knowledge tests rose from 44.8% to 85.4% (mean difference: 40.6%, 95% confidence interval [CI]: 35.4% to 45.8%), with strong evidence for an increase in scores across all knowledge theme areas (p

The pediatric echocardiography Boot Camp: Four-year experience and impact on clinical performance. Abstract only*
Item Type: Journal Article
Authors: Maskatia, Shiraz A.;Cabrera, Antonio G.;Morris, Shaine A. and Altman, Carolyn A.
Publication Date: Oct ,2017
Journal: Echocardiography 34(10), pp. 1486-1494
Abstract: BACKGROUND: We previously reported on the short-term impact of an echocardiography "Boot Camp" on a single class of cardiology fellows (CF). The impact of the Boot Camp on performance throughout fellowship is unknown. METHODS: We enrolled four classes of CFs and two classes of cardiac ICU fellows (CVs) prospectively into the Boot Camp and compared CFs to a historical cohort. Experience with echocardiography was surveyed. Outcome measures included written pre- and post-Camp exams, a performance based test (PBT), self-efficacy assessments, numbers of echocardiograms performed, and echocardiogram quality during the last 3 months of fellowship. RESULTS: A total of 25 CFs and 7 CVs participated in the Boot Camp from July 2012-July 2015. Median experience score was

13/40 (4-23). Median self-efficacy improved from 22/147 (range 21-45) to 90/147 (range 49-133) (P=st (37.7+/-12.2 vs 28.2+/-12.1, P=.15), 2nd (71.3+/-24.4 vs 47.6+/-16.0, P=.044), and third year of fellowship (130.4+/-44.0 vs 100.0+/-29.3, P=.230), and on average achieved 150 total echocardiograms in the 4.8th quarter compared to the 7.8th quarter in controls, P=.053. 2D quality scores were higher and shortening fraction more often obtained in echocardiograms performed by Boot Camp CFs compared to controls. CONCLUSIONS: The pediatric echocardiography Boot Camp improved self-efficacy, acquisition, and retention of echocardiography skills and knowledge, and increased echocardiogram performance. Observed differences between Boot Camp and control CFs appear to wane across fellowship. Copyright © 2017, Wiley Periodicals, Inc.

Extended Roles

Ultrasound-Enhancing Agent and IV Administration in Cardiac Sonography: How Sonographers Play a Key Role in Positively Affecting Key Performance Indicators Abstract only*
Item Type: Journal Article
Authors: Kallstrom, E.
Publication Date: 2024
Journal: Journal of Diagnostic Medical Sonography 40(4), pp. 419–423

Abstract: As the health system in the United States continuously searches for ways to reduce costs and improve the health care experience, cardiac sonographers are uniquely positioned to add to this initiative. Tasked with providing high-quality imaging studies in outpatient and inpatient areas, the scope of practice for sonographers continues to evolve. To ensure quality imaging, ultrasound-enhancing agents (UEAs) are needed in patients with suboptimal images to improve delineation of left ventricular endocardial borders. This process involves intravenous (IV) access and occurs in both patients in ambulatory clinics and hospitals. Historically, health care professionals delegated to perform these duties have been nursing, radiology, and nuclear medicine staff. Because these professionals have their own job responsibilities, the potential to complete a transthoracic echocardiogram (TTE) with UEA, in a timely fashion, may be compromised. Expanding the practice of cardiac sonographers to include these duties should be supported to facilitate uninterrupted patient care, efficiency, and stakeholder satisfaction.Copyright © The Author(s) 2024.

Clinical-scientist-led transoesophageal echocardiography (TOE): using extended roles to improve the service
Item Type: Journal Article
Authors: Kaye, Nikki;Purdon, Michael;Schofield, Rebecca;Antonacci, Grazia and Proudlove, Nathan
Publication Date: 2023
Journal: BMJ Open Quality 12(3)
Abstract: At the North West Anglia NHS Foundation Trust, we perform transoesophageal echocardiography (TOE), a semi-invasive diagnostic test using ultrasound for high-quality heart imaging. TOE allows accurate diagnosis of serious heart problems to support high-quality clinical decision-making about treatment pathways. The procedure can be lengthy and is traditionally performed by a consultant cardiologist, who typically has multiple commitments. This constrains patient access to TOE, leading to waits from referral to test, delaying treatment decisions. In this quality improvement project, we improved access by redesigning workforce roles. The clinical scientist, who had been supporting the consultant during TOE clinics, took on performing the procedure as the main operator. We used the Model for Improvement to develop this clinical-scientist-led service-delivery model, and then test and refine it. This increased capacity and frequency of TOE clinics, reducing waits and releasing around 2 days per month of consultant time.Over

five plan-do-study-act cycles, we tested six changes/refinements. Our targets were to reduce the maximum waiting time for TOE to 3 working days for inpatients and to 14 working days for outpatients. We succeeded, achieving reductions in mean waiting times from 7.7 days to 3.0 days for inpatients and from 33.2 days to 8.3 days for outpatients.TOE requires intubation; when this fails, TOE is abandoned. We believe light (rather than heavy) sedation is helpful for this intubation. We reduced sedation levels (from a median of 3 mg of midazolam to 1.5 mg) and, as a secondary outcome of this project, reduced the intubation failure rate from 13% to 0% (over 32 postchange patients). Following this project, our TOE service is usually performed by a clinical scientist in echocardiography who has British Society of Echocardiography TOE accreditation and advanced training. We have sustained the improved performance and demonstrated the value of enhanced roles for clinical scientists.

Health and Wellbeing

Sonographers and Vascular Technologists Offer Potential Solutions to Promote the Health and Well-being of Their Workforce

Item Type: Journal Article

Authors: Parga, M. R.;Evans, K. D.;Sommerich, C. M. and Roll, S. C.

Publication Date: 2024

Journal: Journal of Diagnostic Medical Sonography 40(2), pp. 127–139

Abstract: Objective: Work-related injuries have a major effect on worker health and well-being. This is particularly true in sonography, where work-related musculoskeletal disorders (WRMSDs) are common. In response to the current challenge of understanding strategy implementation across social and organizational dimensions, this research captured sonographers', echocardiographers', and vascular technologists' perceptions of critical administrative, organizational, and general health and training challenges, and potential solutions for improving worker health and well-being. Material(s) and Method(s): A survey invitation was sent to the WRMSD Grand Challenge longitudinal study registry participants. Open-ended questions on the online questionnaire allowed respondents to share comments, ideas, or potential solutions to improve worker health and well-being regarding the administrative and organizational environment or through training and general health interventions. There were 377 free-text responses that were qualitatively analyzed using a grounded theory approach to generate overarching themes and identify emerging theory, supported by initial coding, focused coding, and reflexive memoing. A member check was conducted by interviewing four participants to refine and confirm the findings. Result(s): Five themes were identified: "Limits and Guidelines," "Injury Education," "Ergonomics Training Constraints," "Resources and Equipment," and "Individual Habits." Participant suggestions within these themes were categorized and mapped onto a sociotechnical systems model that was developed previously to study the healthcare system(s) in which sonography users work. This conceptual mapping revealed how these solutions were situated to impact different levels of the work environment. The themes and mapping supported an emerging grounded theory: Risk Reduction Relies on Proper Employee Representation. Conclusion(s): These qualitative findings align with contemporary guidelines and recommendations for mitigating injuries in sonographers, illuminating challenges and solutions targeting levels of influence beyond the staff sonographers' scope. The need for representation of sonographers at higher-level administrative levels has not heretofore been addressed by WRMSD guidelines.

Comparison of Radiation Exposure Among Interventional Echocardiographers, Interventional Cardiologists, and Sonographers During Percutaneous Structural Heart Interventions
Item Type: Journal Article
Authors: McNamara, David A.;Chopra, Rajus;Decker, Jeffrey M.;McNamara, Michael W.;VanOosterhout, Stacie M.;Berkompas, Duane C.;Dahu, Musa I.;Kenaan, Mohamad A.;Jawad, Wassim I.;Merhi, William M.;Parker, Jessica L. and Madder, Ryan D.
Publication Date: 2022
Journal: JAMA Network Open 5(7), pp. e2220597
Abstract: Importance: Transesophageal echocardiography during percutaneous left atrial appendage closure (LAAO) and transcatheter edge-to-edge mitral valve repair (TEER) require an interventional echocardiographer to stand near the radiation source and patient, the primary source of scatter radiation. Despite previous work demonstrating high radiation exposure for interventional cardiologists performing percutaneous coronary and structural heart interventions, similar data for interventional echocardiographers are lacking., Objective: To assess whether interventional echocardiographers are exposed to greater radiation doses than interventional cardiologists and sonographers during structural heart procedures., Design, Setting, and Participants: In this single-center cross-sectional study, radiation doses were collected from interventional echocardiographers, interventional cardiologists, and sonographers at a quaternary care center during 30 sequential LAAO and 30 sequential TEER procedures from July 1, 2016, to January 31, 2018. Participants and study personnel were blinded to radiation doses through data analysis (January 1, 2020, to October 12, 2021)., Exposures: Occupation defined as interventional echocardiographers, interventional cardiologists, and sonographers., Main Outcomes and Measures: Measured personal dose equivalents per case were recorded using real-time radiation dosimeters., Results: A total of 60 (30 TEER and 30 LAAO) procedures were performed in 60 patients (mean SD] age, 79 8] years; 32 53.3%] male) with a high cardiovascular risk factor burden. The median radiation dose per case was higher for interventional echocardiographers (10.6 muSv; IQR, 4.2-22.4 muSv) than for interventional cardiologists (2.1 muSv; IQR, 0.2-8.3 muSv; P < .001). During TEER, interventional echocardiographers received a median radiation dose of 10.5 muSv (IQR, 3.1-20.5 muSv), which was higher than the median radiation dose received by interventional cardiologists (0.9 muSv; IQR, 0.1-12.2 muSv; P < .001). During LAAO procedures, the median radiation dose was 10.6 muSv (IQR, 5.8-24.1 muSv) among interventional echocardiographers and 3.5 (IQR, 1.3-6.3 muSv) among interventional cardiologists (P < .001). Compared with interventional echocardiographers, sonographers exhibited low median radiation doses during both LAAO (0.2 muSv; IQR, 0.0-1.6 muSv; P < .001) and TEER (0.0 muSv; IQR, 0.0-0.1 muSv; P < .001)., Conclusions and Relevance: In this cross-sectional study, interventional echocardiographers were exposed to higher radiation doses than interventional cardiologists during LAAO and TEER procedures, whereas sonographers demonstrated comparatively lower radiation doses. Higher radiation doses indicate a previously underappreciated occupational risk faced by interventional echocardiographers, which has implications for the rapidly expanding structural heart team.

Radiation exposure of cardiac sonographers working in an academic noninvasive cardiovascular imaging laboratory.
Abstract only*
Item Type: Journal Article
Authors: Velez, Michael R.;Orsinelli, Maryellen H. and Orsinelli, David A.
Publication Date: 2018
Journal: Echocardiography 35(1), pp. 4-8

Abstract: BACKGROUND AND AIM: Exposure to workplace radiation among cardiac sonographers has been felt to be low, and patient-related sources have been considered negligible. Sonographers may be exposed to radiation from patient emitted sources as well as external sources in interventional laboratories. This study quantified radiation exposure to cardiac sonographers. METHODS: Cardiac sonographers, vascular imaging technologists, exercise physiologists, noninvasive nursing staff, and CT/MRI technologists were provided body dosimeter badges. Sonographers were provided dosimeter rings for their scanning hands. Radiation exposure was quantified from the dosimeter data, reported in millirems (mrem) for deep, eye, and shallow exposure, as well as shallow exposure data from the rings. Data were prospectively collected for 63 employees over a 12-month period and retrospectively analyzed. RESULTS: The mean annual deep body exposure in sonographers was 8.2 mrem/year, shallow exposure 9.8 mrem/year, eye exposure 8.5 mrem/year, and ring exposure 207 mrem/year. There was a significant difference between body and ring exposure (P = .0002). When comparing exposure data between the vascular imaging technologists, CT/MRI technologists, noninvasive nursing staff, and the cardiac sonographers, there were no statistical differences (P > .23). Exercise physiologists had significantly higher exposure compared to sonographers (P

Human Factors

From vision to reality: How human factors can inform the design of cardiac diagnostic services in community settings
Item Type: Journal Article
Authors: Sujan, M.;Crumpton, E.;Finch, V. and Combes, J.
Publication Date: 2024
Journal: Human Factors in Healthcare 5, pp. 100075
Abstract: Introduction: Expanding diagnostic capacity in healthcare systems requires new service delivery models like Community Diagnostic Centres (CDCs). Designing effective diagnostic services in the community requires attention to the practical realities of the work system in addition to the clinical vision. Method(s): This study applied a human factors approach through the Systems Engineering Initiative for Patient Safety (SEIPS) model to inform the design of community cardiac diagnostic services, focusing on workforce design and the potential role of cardiac physiologists. The study setting was a cardiology department at a community hospital. Data were collected through observations, interviews and focus groups. Data were analysed using SEIPS and Thematic Analysis. Result(s): The analysis revealed three overarching design considerations: (1) Promoting professional growth and autonomy for the cardiac workforce in the community. (2) Focusing on the needs of patients in the community, including accessibility and communication. (3) Facilitating communication across organisational boundaries, particularly between CDCs and General Practitioners (GPs). Conclusion(s): Human factors offers valuable insights to bridge the gap between clinical vision and practical implementation of CDCs. Addressing identified design considerations can ensure effective workforce models, patient-centred care, and seamless collaboration within the healthcare system. Implications for practice: Integrating human factors expertise into community diagnostic services design and implementation teams can contribute to patient-centred services and effective workflows. This requires access to specialised human factors expertise. Providers of diagnostic services could consider embedding human factors expertise into their settings and tap into existing educational human factors frameworks.

Learning from Covid-19

Echocardiography in the time of Covid-19: Ultrasound enhancing agents save time and augment diagnostic information
Item Type: Journal Article
Authors: Sperling, Dylan;Lai, Ashton C.;Bienstock, Solomon W.;Samtani, Rajeev;Beerkens, Frans;Satish, Mohanchandran;Pulaski, Matthew;Edens, Madison;Oates, Connor;Kocovic, Nikola;Buckley, Samantha;Giustino, Gennaro;Lerakis, Stamatios;Liao, Steve;Stern, Eric;Croft, Lori B. and Goldman, Martin E.
Publication Date: 2022
Journal: International Journal of Cardiology 346, pp. 100–102
Abstract: BACKGROUND: There are currently no clear guidelines regarding the use of ultrasound enhancing agents (UEAs) with transthoracic echocardiography (TTE) for patients hospitalized with Covid-19. We investigated whether the performance of TTE with UEAs provides more diagnostic information and allows for shorter acquisition time compared to unenhanced TTE imaging in this patient population., METHODS: We analyzed the TTEs of 107 hospitalized Covid-19 patients between April and June 2020 who were administered UEAs (Definity R, Lantheus). The time to acquire images with and without UEAs was calculated. A level III echocardiographer determined if new, clinically significant findings were visualized with the addition of UEAs., RESULTS: There was a mean of 11.84+/-3.59 UEA cineloops/study vs 20.74+/-8.10 non-UEA cineloops/study ($p < 0.0001$). Mean time to acquire UEA cineloop images was 72.28+/-28.18 s/study compared to 188.07+/-86.04 s/study for non-UEA cineloop images ($p < 0.0001$). Forty-eight patients (45%) had at least one new finding on UEA imaging, with a total of 62 new findings seen. New information gained with UEAs was more likely to be found in patients with acute respiratory distress syndrome (21 vs 9, $p < 0.001$) and in those on mechanical ventilation (21 vs 15, $p = 0.046$)., CONCLUSIONS: TTE with UEAs required less time and fewer cineloop images compared to non-UEA imaging in patients hospitalized with Covid-19. Additionally, Covid-19 patients with severe respiratory disease benefited most with regard to new diagnostic information. Health care personnel should consider early use of UEAs in select hospitalized Covid-19 patients in order to reduce exposure and optimize diagnostic yield.

Impact of the COVID-19 pandemic on cardiology fellow echocardiography education at a large academic center
Item Type: Journal Article
Authors: Varghese, Merilyn S.;Strom, Jordan B.;Kannam, Joseph P.;Fostello, Sarah E.;Riley, Marilyn F. and Manning, Warren J.
Publication Date: 2022
Journal: BMC Medical Education 22(1), pp. 863
Abstract: BACKGROUND: In response to COVID-19 pandemic state restrictions, our institution deferred elective procedures from 3/15/2020 to 6/13/2020, and removed cardiology fellows from the echocardiography rotation to staff clinical services. We assessed the impact of the COVID-19 pandemic on fellow education and echocardiography volumes., METHODS: Our institutional database was used to examine volumes of transthoracic (TTE), stress (SE), and transesophageal echocardiograms (TEE) from 7/1/2018 to 10/10/2020. Study volumes were compared in three intervals: pre-pandemic (7/1/2018- 3/14/2020), pandemic (3/15/2020-6/13/2020), and pandemic recovery (6/14/2020-10/10/2020). We examined weekly number of TTEs performed or interpreted by cardiology fellows during the study period, and compared these to the two previous academic years., RESULTS: Weekly TTE volume declined by 54% during the pandemic, and increased by 99% during pandemic recovery, ($p < 0.05$). SE and TEE revealed similar trends. A strong correlation between weekly TTE volume

and inpatient admissions was observed during the study period (rs=0.67, p < 0.05). Weekly fellow TTE scans declined by 78% during the pandemic, with a 380% increase during pandemic recovery (p < 0.05). Weekly fellow TTE interpretations declined by 56% during the pandemic, with a 76% increase during pandemic recovery (p < 0.05)., CONCLUSION: COVID restrictions between 3/15/2020- 6/14/2020 coincided with a marked decline in TTE, SE, and TEE volumes, with an increase similar to near pre-pandemic volumes during the pandemic recovery period. A similar decline with the onset of COVID restrictions, and increase to pre-restriction volumes thereafter was observed with fellow scans and interpretations, but total academic year fellow training volumes remained depressed. With the ongoing COVID-19 pandemic and rise of multiple variants, training programs may need to adjust fellows' clinical responsibilities so as to support achievement of echocardiography training certification. Copyright © 2022. The Author(s).

Exploring the impact of the Covid-19 pandemic on provision of cardiology services: a scoping review
Author(s): Yasmin et al.
Source: IMR Press 22(2)
Publication date: 2021
The coronavirus disease-19 (COVID-19) pandemic has forced hospitals to prioritize COVID-19 patients, restrict resources, and cancel all non-urgent elective cardiac procedures. Clinical visits have only been facilitated for emergency purposes. Fewer patients have been admitted to the hospital for both ST-segment elevation myocardial infarctions (STEMI) and non-ST segment elevation myocardial infarctions (NSTEMI) and a profound decrease in heart failure services has been reported. A similar reduction in the patient presentation is seen for ischemic heart disease, decompensated heart failure, and endocarditis. Cardiovascular services, including catheterization, primary percutaneous coronary intervention (PPCI), cardiac investigations such as electrocardiograms (ECGs), exercise tolerance test (ETT), dobutamine stress test, computed tomography (CT) angiography, transesophageal echocardiography (TOE) have been reported to have declined and performed on a priority basis. The long-term implications of this decline have been discussed with major concerns of severe cardiac complications and vulnerabilities in cardiac patients. The pandemic has also had psychological impacts on patients causing them to avoid seeking medical help. This review discusses the effects of the COVID-19 pandemic on the provision of various cardiology services and aims to provide strategies to restore cardiovascular services including structural changes in the hospital to make up for the reduced staff personnel, the use of personal protective equipment in healthcare workers, and provides alternatives for high-risk cardiac imaging, cardiac interventions, and procedures. Implementation of the triage system, risk assessment scores, and telemedicine services in patients and their adaptation to the cardiovascular department have been discussed.

The impact of the Covid-19 pandemic on cardiology services
Author(s): Bryant et al.
Source: BMJ OpenHeart 7:e001359
Publication date: July 2020
Objective The COVID-19 pandemic resulted in prioritisation of National Health Service (NHS) resources to cope with the surge in infected patients. However, there have been no studies in the UK looking at the effect of the COVID-19 work pattern on the provision of cardiology services. We aimed to assess the impact of the pandemic on cardiology services and clinical activity. Methods We analysed key performance indicators in cardiology services in a single centre in the UK in the periods prior to and during lockdown to assess reduction or changes in service provision. Results There has been a greater than 50% drop in

the number of patients presenting to cardiology and those diagnosed with myocardial infarction. All areas of cardiology service provision sustained significant reductions, which included outpatient clinics, investigations, procedures and cardiology community services such as heart failure and cardiac rehabilitation. Conclusions As ischaemic heart disease continues to be the leading cause of death nationally and globally, cardiology services need to prepare for a significant increase in workload in the recovery phase and develop new pathways to urgently help those adversely affected by the changes in service provision.

Echocardiography in Pandemic: Front-Line Perspective, Expanding Role of Ultrasound, and Ethics of Resource Allocation
Item Type: Journal Article
Authors: Drake, Daniel H.;De Bonis, Michele;Covella, Michele;Agricola, Eustachio;Zangrillo, Alberto;Zimmerman, Karen G. and Cobey, Frederick C.
Publication Date: Jun ,2020
Journal: Journal of the American Society of Echocardiography 33(6), pp. 683-689
Abstract: The grave clinical context of the coronavirus disease 2019 (COVID-19) pandemic must be understood. Italy is immersed in the COVID-19 pandemic. Most of the world will soon follow. The United States currently has the most documented cases of COVID-19 of any nation. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2)-associated acute cardiomyopathy is common in critical care patients and is associated with a high mortality rate. Patients with COVID-19 frequently require mechanical support for adequate oxygenation. A severe shortfall of ventilators is predicted. Of equal concern is the projected shortage of trained professionals required to care for patients on mechanical ventilation. Ultrasonography is proving to be a valuable tool for identifying the pulmonary manifestations and progression of COVID-19. Lung ultrasound also facilitates successful weaning from mechanical ventilation. Ultrasonography of the lung, pleura, and diaphragm are easily mastered by experienced echocardiographers. Echocardiography has an established role for optimal fluid management and recognition of cardiac disease, including SARS-CoV-2-associated acute cardiomyopathy. Cardiologists, anesthesiologists, sonographers, and all providers should be prepared to commit their full spectrum of skills to mitigate the consequences of the pandemic. We should also be prepared to collaborate and cross-train to expand professional services as necessary. During a declared health care crisis, providers must be familiar with the ethical principles, organizational structure, practical application, and gravity of limited resource allocation.

Review of the efforts of the Japanese Society of Echocardiography for coronavirus disease 2019 (COVID-19) during the initial outbreak in Japan
Item Type: Journal Article
Authors: Seo, Yoshihiro;Daimon, Masao;Yamada, Hirotsugu;Kagiyama, Nobuyuki;Ohta, Mitsuhiko;Izumi, Chisato;Yamamoto, Kazuhiro;Nakatani, Satoshi and member of the joint committee of the Education Committee, Public Relations Committee,Guidelines Committee of the Japanese Society of Echocardiography
Publication Date: 2020
Journal: Journal of Echocardiography 18(4), pp. 226-233
Abstract: Under the coronavirus disease 2019 (COVID-19) pandemic, the Japanese Society of Echocardiography (JSE) has been working to protect medical staff involved in echocardiographic examinations and to prevent secondary infections caused by the examinations since mid-March 2020. This review aims to describe the footprint of the JSE's responses, focusing on the 3 months in which the initial outbreak

of COVID-19 pandemic occurred in Japan. We summarized the six parts as follows: (1) the initial actions for COVID-19 of JSE, (2) JSE's actions for infection control-associated echocardiographic examinations, (3) statements from the American Society of Echocardiography during the COVID-19 pandemic and their Japanese translation by JSE, (4) making videos for explaining the practice of echocardiography during the COVID-19 pandemic, (5) attempts with the JSE members' opinions by the communication platform and surveys, and (6) efforts of final statement during the initial spread of COVID-19. We look forward that this review will help daily practices associated with echocardiography under the COVID-19 pandemic and in the future event of an unknown infectious disease pandemic.

New ways of working

The evolution from cardiac physiologists to clinical scientists in the UK: A guide to attaining equivalence.
Item Type: Journal Article
Authors: Campbell, B.;Robinson, S. and Rana, B.
Publication Date: 2019
Journal: Echo Research and Practice 6(4), pp. R99-R105
Abstract: At its inception, transthoracic echocardiography (TTE) was employed as a basic screening tool for the diagnosis of heart valve disease and as a crude indicator of left ventricular function. Since then, echocardiography has developed into a highly valued non-invasive imaging technique capable of providing extremely complex data for the diagnosis of even the subtlest cardiac pathologies. Its role is now pivotal in the diagnosis and monitoring of heart disease. With the evolution of advanced practice and devolving care, ordinarily performed by senior doctors, to the cardiac physiology workforce in the UK, significant benefits in terms of timely patient care and cost savings are possible. However, there needs to be appropriate level of accountability. This accountability is achieved in the UK with statutory regulation of healthcare professionals and is a crucial element in the patient protection system, particularly for professions in patient facing roles. However, statutory regulation for staff practising echocardiography is not currently mandatory in the UK, despite the level of responsibility and influence on patient care. Regulators protect the public against the risk of poor practice by setting agreed standards of practice and competence and registering those who are competent to practice. Regulators take action if professionals on their register do not meet their standards. The current cardiac physiology workforce can be recognised as registered clinical scientists using equivalence process through the Academy for Healthcare Science, and this review aims to describe the process in detail.

Conference abstract: Rapid access heart failure clinic: impact of a physiologist-delivered service in a uk district general hospital
Abstract all available
Item Type: Conference Proceeding
Authors: Sinclair, H., Ackrill, M., Holdsworth, H., Chase, C., Guillen, M., Bowman, L., Collins, L., Critoph, C.H. and Pine, A.C.J.
Publication Date: 2019
Publication Details: Heart. Conference: British Cardiovascular Society Annual Conference Digital Health Revolution. Manchester United Kingdom. 105(Supplement 6) (pp A74); BMJ Publishing Group,
Background National Institute of Clinical Excellence (NICE) Chronic Heart Failure Guideline NG106 recommends NTproBNP measurement in patients with suspected heart failure (HF). NTproBNP ≥400ng/L mandates referral to a rapid access HF clinic (RAHFC). Target wait is determined byNTproBNP concentration (400–2000ng/L 6 weeks and >2000ng/L within 2 weeks). In our institution, RAHFC referrals have doubled in a

year. There is little published national data regarding adherence to NICE waiting targets. Initial service evaluation found that only 47% of patients were seen within the target waiting time. However, many patients with lower range NT proBNP (<1000ng/L) had no significant cardiac pathology and were discharged. It was proposed this lower range NTproBNP population (400- 1000ng/l) could be safely managed in a cardiac physiologist-delivered RAHFC overseen by a HF specialist. Additonal benefits would be to upskill cardiac physiologists, free consultant time for more severe HF patients and improve waiting times. Aim To introduce a supervised cardiac physiologist-led HF clinic for patients with a NTproBNP ≥400ng/L but <1000ng/L and monitor outcomes. Method An electronic form was developed to guide clinical questioning and data collection. The clinic was initially run by 2 cardiac physiologists and a specialist HF fellow. All clinics were overseen by a consultant HF cardiologist. Demographics, NYHA class, NTproBNP concentration, waiting time, final diagnosis, further investigations and echo results were recorded. Outcomes at 3, 6 and 8 months were retrospectively assessed for safety. Results 34 patients were seen in the physiologist-delivered HF clinic between Jun'18 and Jan'19. The proportion seen within target waiting time rose from 47% to 70%. Mean age 81 and 50% female. Mean NTproBNP was 730ng/L. 26.5% (n=9) were diagnosed with HFPEF and 2.9% (n=1) HFREF. 32.4% (n=11) had AF or paroxysmal AF. In 41.2% (n=14) NTproBNP was felt to be a false positive. Diagnoses included: pulmonary hypertension (n=1), moderate and severe aortic stenosis (n= 2), moderate aortic regurgitation (n=1), bradyarrhythmia requiring pacing (n=1), hypertrophic cardiomyopathy (n=2), atrial tachycardia (n=1), ectopy (n=2). As cardiac physiologists gained experience, they began to review patients independently and time slots were reduced. No adverse events were recorded. Conclusion Demand for RAHFC is high and NICE waiting times are often difficult to meet with current service provision. A physiologist-delivered HF clinic proved safe, effective and dramatically reduced waiting times. There is a national shortage of cardiac physiologists, and staff retention and recruitment is difficult. Expanding the role and skill set of our cardiac physiologists has proved popular and good for staff morale. NTproBNP threshold mandating urgent referral to RAHFC for patients with AF and those of advanced age may require further research and consideration.

The rapid access chest pain clinic (RACPC) and the role of the cardiac physiologist Abstract only*
Item Type: Journal Article
Authors: Mathieson, Susan;Victor, Kelly;Jarrett-Smith, Lucy and Marber, Michael
Publication Date: 2017
Journal: British Journal of Cardiac Nursing 12(6), pp. 300-305
Abstract: Coronary heart disease (CHD) is one of the largest killers in the UK. Rapid access chest pain clinics (RACPCs) provide an effective and efficient method for the early diagnosis of patients with CHD. Currently, specialist nurses lead these services. However, there has been a shift, with the focus moving towards cardiac physiologists (CPs) and the role they have to play in delivering these services. The article reflects on the experiences and challenges of a CP's involvement in RACPC. Through these observations and learning points, we aim to encourage other CPs to implement comparable RACPC service delivery systems for the benefit of patients, the broader integrated workforce and the wider healthcare community.

Professional education, training and role of the cardiac sonographer in different countries
Item Type: Journal Article
Authors: Nicastro, I.;Barletta, V.;Conte, L.;Fabiani, I.;Morgantini, A.;Lastrucci, G. and Bello, V.
Publication Date: 2013
Journal: Journal of Cardiovascular Echography 23(1), pp. 18-23

Abstract: Performing a good echocardiographic examination requires intensive training and highly qualified technical staff personnel, which, in many countries, is represented by the Cardiac Sonographer. Being an operator-dependent diagnostic method, a long debate has been held to help identifying the most appropriate curriculum for the training of this professional profile. Although guidelines for the education of the Cardiac Sonographers have been suggested by the American Society of Echocardiography (ASE) several years ago and many scientific publications have given credibility, trust and enhance to this professional profile in Italy, this figure is not yet recognized by the National Health System. It is encouraging that in the last decade, national authorities, such as the SIEC (Societgr; Italiana di Ecografia Cardiovascolare), have expressed interest in recognizing the Cardiac Sonographers as professionals in our country. Per their guidelines, the Cardiocirculatory Physiopathology Cardiovascular Perfusion technicians (TFCPCs) seem to be, among the professionals, the most suitable, due to their educational training and the role they play. Taking inspiration from the positive experience of this professional figure in the USA and in the Anglo Saxon countries, it could aims to be a valid support in terms of cost and quality for the Italian health system.

Nursing

Targeted Neonatal Echocardiography Performed by Nurse Practitioners in the NICU: Attitudes and Perceptions of the Healthcare Team Abstract only*
Author(s): Larocque et al.
Source: Advanced in Neonatal Care 24(3)
Publication date: June 2024

Background: Targeted neonatal echocardiography (TNE) and hemodynamic consultation have typically been performed by physicians. The Stollery Children's Hospital neonatal intensive care unit (NICU) expanded their TNE training program to include neonatal nurse practitioners (NNPs), the first in North America. Purpose: This study examines the thoughts and perceptions of clinicians about the incorporation of NNPs providing TNE and hemodynamic consultation and investigates key facilitators and challenges for consideration when planning future training, expansion of service in Edmonton, or beyond. Methods: In this descriptive study using qualitative methodology, purposive sampling was used to invite NICU clinicians to participate. Using a semistructured topic guide, a focus group and 2 individual interviews were conducted. Results: Participants were supportive of NNPs. Advantages included increased access to service, acquisition and retention of skills, provision of patient-centered care, and leveraged interpersonal relationships in the decision-making process. Key aspects of program expansion included climate and culture of the NICU, presence of adequate patient volume, and resources to support training. Implications for practice and research: Support across disciplines and the collaborative working nature of the NICU are key factors in the success of the program's development and implementation. Benefits of having NNPs on the TNE team were clearly expressed. Benefits to the health system included rapid access to hemodynamic information allowing for care based on specific pathophysiology and additional local capacity to perform TNE and reducing demand on other trained providers. Additional research could consider parental views of NNPs performing TNE and hemodynamic consultation as well as the accuracy of diagnosis between the NNPs and physician group.

The involvement of nurses in clinical echocardiography.
Item Type: Journal Article
Authors: Chloubova, I.;Eisenberger, M.;Bulava, A.;Penicka, M. and Dieudonne, E.
Publication Date: 2015
Journal: Kontakt 17(4), pp. e206-e210
Abstract: Echocardiography is a basic examination in cardiology used to assess the anatomy and function of the heart. An echocardiography nurse is a health care specialist who is able to use echocardiographic equipment to obtain images of the heart. Standards for echocardiography personnel vary widely between countries. In the Czech Republic, there is no training program for nurses to carry out echocardiograms and the work is done almost exclusively by physicians. In many other countries, including the United Kingdom and the USA, specialist nurses carry out and report echocardiograms independently. In this article, we compare requirements for echocardiography nurses in different countries. Copyright © 2015 Faculty of Health and Social Studies of University of South Bohemia in Ceske Budejovice. Published by Elsevier Sp. z o. o. All rights reserved.

Rural and Remote

Outreach Echocardiography in South-Western Queensland-17 Years of Providing Quality Service to Rural and Remote and Indigenous Communities Abstract only*
Item Type: Journal Article
Authors: Rhodes, K. and Kennington, A.
Publication Date: 2024
Journal: Heart Lung and Circulation 33, pp. S153
Abstract: Introduction: The provision of a quality echocardiography service to patients in rural and remote communities in Queensland is challenging due to large distances and lack of a skilled and sustainable sonographer workforce. Aim(s): To provide a high quality, reliable and sustainable, patient-centred echocardiography service in the right place at the right time for Indigenous, rural and remote residents living within South-Western (SW) Qld. Background(s): A hub and spoke model of care was developed in 2007, allowing the utilisation of an experienced sonographer team and portable ultrasound machines from the tertiary hub site. The Echocardiography service is provided in conjunction with an outreach team, including a cardiologist, travelling to outreach locations from the central hub. Funding for the program is provided by Commonwealth and state governments at no expense to patients. Result(s): From 2007-2023, 6715 echocardiographs (TTEs) have been performed at 12 outreach sites. The service commenced visiting three communities in 2007 and has gradually expanded to the current 12 sites (58% visited monthly). 46% of TTEs were performed in the rural sector (Modified Monash Model Category) and 42% were performed in remote and very remote communities. This service has remained sustainable over the 17-year period of operation, with no cessation in clinics. Patient attendance has grown an average of 20% per year. Conclusion(s): The outreach service provides reliable, quality care by experienced cardiac sonographers to rural, remote and Indigenous communities in SW Qld, improving equity in access to services and minimising patient costs and need for travel.Copyright © 2024

Supply

Conference abstract: Maintaining the Cardiac Sonographer Pipeline: A Regional Approach to Trainee Cardiac Sonographer Recruitment and Training that Rationalises Use of Resource and Mitigates Impact on Echo Department Productivity Abstract all available
Item Type: Conference Proceeding
Authors: Walsh, H., Jones, L., Mok, J., Reffell, S., Julian, W., Bhana, N. and McKenzie, H.

Publication Date: 2022
Publication Details: Heart Lung and Circulation. Conference: Cardiac Society of Australia and New Zealand Supplementary Meeting (New Zealand). Virtual, Online. 31(Supplement 2) (pp S24); Elsevier Ltd,
Abstract: Background: It is historically difficult to recruit trained Cardiac Sonographers within NZ and internationally. Northern Region district health boards (DHBs) have significant and on-going workforce shortages. Auckland metro district health boards (DHBs) have consistently used vacant qualified FTE to employ trainees and support them to obtain Cardiac Sonographer qualifications. The first few months of training require intensive one-on-one supervision. This reduces throughput as the supervisor is removed from the workforce. We sought to investigate how a combined approach to training, in the initial 6 weeks, would impact on trainees, trainers, and departments in terms of throughput. Method(s): Auckland Metro DHBs worked together, with NRA support, to plan and prepare a 6-week introduction program for trainees. Each DHB took responsibility for preparing and providing teaching materials for a 2-week block and planned to undertake the hands-on training for that period. They recruited and started 1 trainee each, concurrently. Result(s): COVID lockdown prevented trainees leaving their home DHB. They attended presentations by Zoom and provided constructive and generally positive feedback. The time commitment for each DHB and impact on throughput was reduced. Relationships between the DHBs and the trainees was enhanced. Conclusion(s): It is workable and advantageous for regional DHBs to work collaboratively when recruiting and training Cardiac Sonographers. This leads to economical use of time and resource, develops collegial relationships, and support networks for the trainees. With new technology, the reach of the teaching sessions could be expanded to include participants outside of the region.

Echocardiography service provision in New Zealand: the implications of capacity modelling for the cardiac sonographer workforce
Author(s): Buckley et al.
Source: NZMA Journal 129(1428)
Publication date: January 2016
AIM: Regional disparity in both utilisation and the cardiac sonographer workforce has previously been identified. We sought to model the capacity of the cardiac sonographer workforce at a national and District Health Board level to better understand these regional differences. METHOD: In 2013, surveys were distributed to 18 hospitals who employ cardiac sonographers (return rate 100%). Questions related to cardiac sonographer demographics, echo utilisation and workflow. Actual clinical capacity was calculated from scan duration and annual scan volumes. New Zealand national actual capacity was compared to predicted capacity from three international models. Potential clinical capacity was calculated from the workforce size in fulltime equivalent (FTE) and clinical availability. RESULTS: In New Zealand, scan duration and population-based clinical capacity varies between centres. The New Zealand capacity is similar to the UK 30:70 model, and consistently less than the US model for all scan types. There are marked regional differences in potential versus actual capacity, with 10/16 DHBs demonstrating excess potential capacity. CONCLUSION: There is regional disparity in the capacity of the cardiac sonographer workforce, which appears to be strongly related to scan duration. Workforce capacity modelling should be used with need and demand modelling to plan adequate levels of service provision.

Technology

Feasibility of Novel Robot-Assisted, Remotely-Performed Echocardiographic Examination Abstract only*
Item Type: Journal Article
Authors: Guppy-Coles, K.;Johnstone, M.;Armstrong, J.;Lo, A.;West, C.;Atherton, J. and Scott, A.
Publication Date: 2024
Journal: Heart Lung and Circulation 33, pp. S188
Abstract: Background: Echocardiography services outside metropolitan areas are limited. We sought to determine feasibility and efficiency of performing remotely-controlled, semi-automated Robot-assisted Echocardiographic examinations (RE) by cardiac sonographers as an avenue to provide specialist services to rural and remote areas. Method(s): Two cardiac sonographers undertook 6 hours virtual training, and 10 hours hands-on RE simulation training using a novel, semi-automated robotic arm system to remotely manipulate ultrasound probes to acquire echocardiographic images. Sonographers then performed remotely-performed RE examinations on consenting staff and patients. Cameras, probe pressure sensors and ultrasound remote hardware supported remote operation. Traditional Echocardiography (TE; probe manipulation by hand) was reference. Feasibility of RE was compared to TE; learning curve and efficiency were also investigated. Result(s): Total cohort was n=78 (age 51+/-15 yrs; 57% male; 63% patients). RE and TE were performed within 72 hrs. Average RE feasibility (%) as (a) 11 assessments and (b) 38 measures was (a) 92+/-9 and (b) 86+/-11, compared to TE (a) 99+/-1 and (b) 97+/-7. Learning curve averaged feasibility (1:1 block; assessments n=33:31) was 86+/-19 : 98+/-3 for assessment, and 77+/-11 : 92+/-7 for measurements (n=32:31). Averaged image acquisition efficiency (staff cohort;n=31) was poorer via RE than TE (47+/-9 to 19+/-2 minutes; p<0.0001). Average offline measurement efficiency was 13+/-7 minutes by RE; comparable (p=0.33) to TE (12+/-6 minutes). No learning curve on image acquisition efficiency was identified; 42+/-10 : 51+/-7 minutes (1:1; n=16:15; p=0.007). Conclusion(s): Remotely-performed, RE is feasible, with reasonable efficiency. Further investigation of performance as a remote service is warranted in larger populations.Copyright © 2024

Point-of-care AI-enhanced novice echocardiography for screening heart failure (PANES-HF)
Item Type: Journal Article
Authors: Huang, W.;Koh, T.;Tromp, J.;Chandramouli, C.;Ewe, S. H.;Ng, C. T.;Lee, A. S. Y.;Teo, L. L. Y.;Hummel, Y.;Huang, F. and Lam, C. S. P.
Publication Date: 2024
Journal: Scientific Reports 14(1), pp. 13503
Abstract: The increasing prevalence of heart failure (HF) in ageing populations drives demand for echocardiography (echo). There is a worldwide shortage of trained sonographers and long waiting times for expert echo. We hypothesised that artificial intelligence (AI)-enhanced point-of-care echo can enable HF screening by novices. The primary endpoint was the accuracy of AI-enhanced novice pathway in detecting reduced LV ejection fraction (LVEF) < 50%. Symptomatic patients with suspected HF (N = 100, mean age 61 +/- 15 years, 56% men) were prospectively recruited. Novices with no prior echo experience underwent 2-weeks' training to acquire echo images with AI guidance using the EchoNous Kosmos handheld echo, with AI-automated reporting by Us2.ai (AI-enhanced novice pathway). All patients also had standard echo by trained sonographers interpreted by cardiologists (reference standard). LVEF < 50% by reference standard was present in 27 patients. AI-enhanced novice pathway yielded interpretable results in 96 patients and took a mean of 12 min 51 s per study. The area under the curve (AUC) of the AI novice pathway was 0.880 (95% CI 0.802, 0.958). The sensitivity, specificity, positive predictive and

negative predictive values of the AI-enhanced novice pathway in detecting LVEF < 50% were 84.6%, 91.4%, 78.5% and 94.1% respectively. The median absolute deviation of the AI-novice pathway LVEF from the reference standard LVEF was 6.03%. AI-enhanced novice pathway holds potential to task shift echo beyond tertiary centres and improve the HF diagnostic workflow.

Transforming Echocardiography: The Role of Artificial Intelligence in Enhancing Diagnostic Accuracy and Accessibility
Item Type: Journal Article
Authors: Kusunose, K.
Publication Date: 2024
Journal: Internal Medicine (Tokyo, Japan)
Abstract: Artificial intelligence (AI) has shown transformative potential in various medical fields, including diagnostic imaging. Recent advances in AI-driven technologies have opened new avenues for improving echocardiographic practices. AI algorithms enhance the image quality, automate measurements, and assist in the diagnosis of cardiovascular diseases. These technologies reduce manual errors, increase consistency, and match the diagnostic performances of experienced echocardiographers. AI in tele-echocardiography offers significant benefits, particularly in rural and remote regions in Japan, where healthcare provider shortages and geographic isolation hinder access to advanced medical care. AI enhances accessibility, provides real-time remote analyses, supports continuous monitoring, and improves the quality and efficiency of remotely delivered cardiac care. However, addressing challenges related to data security, transparency, integration into clinical workflows, and ethical considerations is essential for the successful implementation of AI in echocardiography. On overcoming these challenges, AI will be able to revolutionize echocardiography and ensure timely and effective cardiac care for all patients in the future.

'The digital cardiologist': How technology is changing the paradigm of cardiology training
Author(s): Vandermolen
Source: Current Problems in Cardiology
Publication date: 11th September 2022
In the same way that the practice of cardiology has evolved over the years, so too has the way cardiology fellows in training (FITs) are trained. Propelled by recent advances in technology—catalysed by COVID-19—and the requirement to adapt age-old methods of both teaching and healthcare delivery, many aspects, or 'domains', of learning have changed. These include the environments in which FITs work (outpatient clinics, 'on-call' inpatient service) and procedures in which they need clinical competency. Further advances in virtual reality are also changing the way FITs learn and interact. The proliferation of technology into the cardiology curriculum has led to some describing the need for FITs to develop into 'digital cardiologists', namely those who comfortably use digital tools to aid clinical practice, teaching, and training whilst, at the same time, retain the ability for human analysis and nuanced assessment so important to patient-centred training and clinical care.

Upskilling

Echo workforce development in the Fiji islands
Author(s): Anna Harris
Source: Australasian Journal of Ultrasound in Medicine 23(1) pp. 30-32
Publication date: February 2020
Echocardiography has a wide scope of practice and requires many years of training and experience for one to be proficient; however, contextualised echo may be taught for the purpose of screening for rheumatic heart disease (RHD). In recent experience in the Fiji Islands, an echo workforce training programme was implemented with the intention of teaching

general sonographers and physicians echo for the purpose of screening RHD with very positive results. This course was completed over three separate one week courses in a clinical setting.

Workforce

State of the art: A roadmap for the national echocardiography team 2023
Author(s): Claire Colebourn
Source: Future Healthcare Journal 11(1)
Publication date: March 2024
Over the past 30 years, echocardiography has carved a vital professional role within the care of millions of patients per year. Here, I examine the provision of this vital service through the lens of the people who provide it, focussing on the challenges and opportunities facing this unique workforce over the next 10 years.

Survey of echocardiography practice across five continents
Item Type: Journal Article
Authors: Sengupta, Shantanu P.;Coffey, Sean and Whalley, Gillian A.
Publication Date: 2023
Journal: Echocardiography (Mount Kisco, N.Y.) 40(4), pp. 335–342
Abstract: BACKGROUND AND AIM: The term echocardiography refers to a diverse range of cardiovascular ultrasound imaging methods, both inside and outside specialist cardiology practice. While guidelines exist, we hypothesized that there are significant worldwide differences in the way echocardiography is practiced. We surveyed echocardiography practitioners around the world to characterize the workforce and their practice., METHOD: Social media and word of mouth were used in an explosive sampling approach to recruit echo users, who then completed an online survey that included personal demographics and questions about their practice, their resources, and daily use of echocardiography., RESULTS: In total, 594 participants completed the survey: 54.9% sonographers; 30% cardiologists, with the remainder other physicians or trainees. Significant variation in the number of echoes performed and the time allocated to scanning was observed. There were also differences in the gathering of adjunct measures such as blood pressure and body size., CONCLUSION: There is wide variation in echocardiography practices across the world. Differences are likely to be both clinician- and healthcare system-driven. Guidelines for practice developed in well-resourced western countries and intended for use in cardiology-based echocardiography laboratories may not be applicable to other countries or indeed to new echo users. Copyright © 2023 The Authors. Echocardiography published by Wiley Periodicals LLC.

Regional differences in echocardiography provision in New Zealand--results from the 2013 SCANZ Workforce Survey.
Item Type: Journal Article
Authors: Buckley, Belinda A.;Poppe, Katrina;Farnworth, Mark J. and Whalley, Gillian
Publication Date: Jan 30 ,2015
Journal: New Zealand Medical Journal 128(1408), pp. 47-55
Abstract: UNLABELLED: Abstract AIM: Healthcare may be unevenly distributed based on geographic location. This study aimed to identify whether regional differences in echocardiography provision exist and, if so, to explore key causes. METHOD: In March 2013, 18 public hospitals with a sonographer-led echocardiography service were surveyed, all of which provided data. Questions related to characteristics of the sonographer workforce, echocardiogram volumes and workflows. Information on District Health Board (DHB) population was obtained from public access websites. Multivariable linear regression was performed using the following variables:

ethnicity, age, socioeconomic status, type of centre, sonographer full-time equivalent (FTE) and number/proportion of trainees to determine their potential contribution to echocardiogram volume. RESULTS: 1748 echocardiograms were performed per 100,000 population (mean) with significant differences seen amongst DHBs but not between tertiary surgical and regional centres (surgical median 1802, regional median 1658, p=0.18). Regional disparity in the population-based cardiac sonographer workforce size was observed and the number of scans performed per sonographer was higher in larger centres. In multivariable modelling, the DHB population-based scan volume was predicted by: socioeconomic status (top two quintiles of deprivation status increased scans by 75 per 100,000 population, p=0.02) and age (age 20 to 65 years increased scans by 131 per 100,000 population, p=0.06). CONCLUSION: Regional differences in echocardiography services in New Zealand exist as evidenced by marked regional disparity in both population-based echo volumes and cardiac sonographer workforce size.

Competency Frameworks

The UK Echocardiography Workforce
Author(s): Allison Leary and Geoff Punshon
Source: British Society of Echocardiography
Publication date: January 2023
See pp. 9-10 for A possible model for the whole echocardiography workforce across four pillars of practice and The proposed echocardiography career structure

Arrhythmia Nurse Specialist Competency Document
Source: British heart Rhythm Society and North London Cardiac Operational Delivery Network
Publication date: ?2023

The Arrhythmia Nurse Competency offers a comprehensive document for Arrhythmia Nurses and presents a wide range and scope of relevant competencies for nurses working in diverse areas and specialty services, within heart rhythm management. Within nursing, competencies remain an integral part of working practices, development and standardisation. This will help document where we are in terms of experience and skills.

Preceptorship and Capability Development Framework for Sonographers
Source: British Medical Ultrasound Society
Publication date: July 2022
It is anticipated that this document will be used to embed newly qualified sonographers more easily into their clinical teams, but also to provide a guide to more established sonographers about how they might progress through the career structure. This document attempts to draw the distinction between simple task-based competencies, through a deeper view of overall competence to a description of capability. While these terms are closely related, they are not always easy to differentiate from one another. They relate to moving from a predominantly task-based provision of a service (as may be expected from a newly qualified sonographer) to an increasingly holistic view of service provision. The experienced sonographer has greater ability to adapt to changing demands, prioritise effectively and use existing knowledge to manage in unfamiliar situations than their newly qualified colleague. The consultant sonographer usually has a very good idea of how their service is likely to need to evolve in the future and seeks to position it to ensure that it is ready for future demands which may be placed upon it. Task based competencies, wider competency and capability are all necessary within a well-functioning ultrasound unit but all require differing sets of knowledge, skills and experience.

Sonographer Career Framework
Source: HEE
Publication date: June 2022

Australian sonographer competency—A new framework
Author(s): Edwards et al.
Source: Sonography 9(3)
Publication date: April 2022
Sonographers possess a unique and complex body of knowledge and skills, providing real health benefits to the community. The value of competency frameworks rests on their capacity to support and facilitate professional practice in the interests of public safety. The commitment to act in the service of others carries with it a professional and ethical obligation to practice within the boundaries of accepted competency standards. The well-accepted Australasian Sonographers Association (ASA) competency standards for entry-level Australian sonographers were introduced a decade ago. At this time, ultrasound technology, its application and the sonographer's role as a critical interface to this technology continue to evolve. The article provides an overview of research used to develop a contemporary competency framework for sonographers. It describes each framework component and how these components have a potential role in sonographer education and clinical practice at different levels of expertise. Sonographer competencies were developed via a national collaborative research project led by a multi-institutional research team of academic and industry professionals. A Delphi study design elicited consensus on multiple competency characteristics from an expert panel of 55 sonographers. The expert panel contained representatives from all Australian states and territories and represented all domains of practice. The resulting project outcome consisted of a competency framework containing four significant components: sonographer competency standards, sonographer knowledge, sonographer attitudes and a holistic competency matrix.

Development of a professional competency framework for Australian sonographers—perspectives for developing competencies using a Delphi methodology
Author(s): Childs et al.
Source: International Journal for Quality in Healthcare 34(2)
Publication date: 2022
Background: Professional competencies are important for enhancing alignment between the needs of education, industry and health consumers, whilst describing public expectations around health professionals. The development of competency standards for the sonography profession defines the behaviours, skills and knowledge sonographers should demonstrate for each learning and experience level. Objective: The objective of this project was to develop a set of professional competency standards for the sonography profession which described in depth the behaviours, skills and knowledge sonographers should demonstrate across multiple learning and experience levels. Methods: Representatives of three Australian ultrasound professional associations and seven tertiary institutions involved in entry-level sonographer education in Australia formed a research team (RT). The RT recruited an expert panel that responded to six survey rounds. Using a Delphi methodology, the results and free-text comments from each previous round were fed back to participants in the subsequent survey rounds to achieve a consensus. Results: The project developed a professional competency framework for sonographers, which included four major domains: detailed competency standards, sonographer knowledge, sonographer attitudes and a holistic competency matrix [https://doi.org/10.6084/m9.figshare.17148035.v2.] Conclusion: The Delphi methodology is an effective way to develop professional competency standards. This paper describes the

methods and challenges in developing such standards for sonographers which could be translated to other health professionals.

Heart Failure competency framework for healthcare professionals
Source: British Society for Heart Failure
Publication date: 2021, Due for renewal 2025
The British Society for Heart Failure (BSH) believes that heart failure is one of the biggest societal issues in health care today and should be treated as a national priority. This cannot be achieved by specialists alone and we welcome the inclusion and support of wide-ranging healthcare professionals. Together we can make all the difference to outcomes for patients. Heart failure is becoming a pressing health priority across all four nations of the United Kingdom. It is as common as many cancers with comparable malignancy without treatment. Heart failure rarely exists in isolation and patients typically have complex multi-factorial needs. Those with the condition need holistic care provided by a range of health and social care professionals, both specialists and generalists and involving those working across all care settings. Collaborative care is a cornerstone of treatment strategies in all national and international heart failure guidelines. This framework sets out to equip all health professionals with the core competencies required to care for people with heart failure.

Heart Failure Specialist Nurse Competency Framework
Source: British Society for Heart Failure
Publication date: 2021
The competency framework serves to guide Heart Failure Specialist Nurses' (HFSNs) to develop the knowledge and clinical consultation skills required to work safely, competently and effectively manage adults with heart failure. The HFSN is the named professional co-ordinating the patient's care plan in partnership with the patient and is involved in collaborative care planning across all relevant health and social care sectors where appropriate.

Professional Competency Framework for Sonographers (Australia)
Source: Australia
Publication date: October 2021
The project developed a professional competency framework for sonographers, which included four major domains: detailed competency standards, sonographer knowledge, sonographer attitudes and a holistic competency matrix.

Echocardiography Lifelong Learning Competencies
Source: American College of Cardiology

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