



**Final Evaluation**  
**of the**  
**Northern Regional Accelerated Sonography Training Pilot**  
**2014 to 2016**

Dr Pauline Dickinson  
Dr Jeffery Adams  
SHORE & Whariki Research Centre, College of Health  
Massey University

Associate Professor Stephen Neville  
Department of Nursing, Auckland University of Technology

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## 1.0 Summary of key findings

The following outcomes for the 12-week intensive course were achieved to an excellent standard

- Trainees are well-grounded in the fundamentals of sonography
- The burden of clinical supervision in the workplace is removed without reducing quality
- Trainee sonographers demonstrate the four areas of competency: communication, clinical decision making, clinical scanning and professionalism
- Trainee sonographers are productive in the workplace
- Clinical supervisors' productivity is less compromised
- Sonography trainees are prepared for post-graduate education, although it is too early to know whether the course reduces the overall time from commencement of training to registration as a sonographer.
- Trainees were reported as being six to nine months ahead of where they would have been under previous training models

Critical success factors were:

- A well-designed curriculum with sound pedagogy
- An infrastructure to support trainee learning
- Small trainee numbers allowed for one-on-one learning opportunities and close supervision
- Transitioning of students back into the workplace both during and post the 12-week intensive course
- Scanning in a clinical setting
- Having sufficient volunteers for ultrasound scanning
- Offering a small financial incentive to volunteers ensured the 350 to 400 volunteers needed for scanning purposes was fulfilled

Lessons learnt were:

- The 12-week intensive course effectively prepares sonography trainees with the necessary skills and attributes that enable them to be in a "work ready" state i.e. demonstrating competence and being productive
- Staffing the course requires the support of workplaces to ensure close supervision support

## 2.0 Executive summary

The SHORE & Whariki Research Centre was contracted by the Ministry of Health, specifically Health Workforce New Zealand (HWNZ) to conduct a further process and outcome evaluation of the Northern Region's Sonography Training Initiative following the initial evaluation of the pilot in 2014/15. The evaluation was conducted over the period January 2015 to January 2016. HWNZ is responsible for assisting the health sector to increase sonography trainee numbers to meet increasing demand. A number of Northern region providers are supporting staff to undertake the 12-week course.

As part of the strategy to address the sonographer workforce shortage, a 12-week intensive sonography training course was established and implemented by the University of Auckland in Semester 2, 2014 and Semester 1 and 2, 2015 and Semester 1 2016. The course forms part of the University's Postgraduate Diploma in Health Sciences Ultrasound programme, which is accredited by the Medical Radiation Technologist Board of New Zealand (MRTB). Completion of the course is not a substitute for completing the whole Diploma or for meeting regulatory requirements for registration as a sonographer

Ultrasound imaging of common pathology relating to the abdomen, pelvis, thyroid and deep vein thrombosis is included in the course. This report outlines the evaluation approach, methods and process and outcome evaluation findings.

### The Evaluation

This was a process and outcome evaluation. The process evaluation focused on determining the quality of the 12-week sonography course (additional to the process evaluation of the pilot) and the outcome evaluation assessed the impacts that resulted from it. For the process and outcome evaluation data were collected from key informant interviews with clinical supervisors, managers and the education provider.

The questions below, which form the structure of the evaluation, were posed by HWNZ in the evaluation brief, after consultation with stakeholders.

### Evaluation results

#### *Process evaluation*

The evaluation included one process evaluation question.

Did the pilot delivery team learn from the early experience of the pilot and adapt accordingly?
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In 2015 the course was delivered in a very similar way to the pilot. Additions to the training model following the pilot were the inclusion of opportunities for students to be able to practice their scanning in a clinical setting and return to their workplaces during the semester break to observe department protocols and practise their skills.

### **Outcome evaluation**

The outcome evaluation results are presented under each question.

How successfully were the prioritised outcomes achieved?

The outcomes from the logic model and related criteria are presented in the table below.

<b>Outcomes and Criteria (see definitions following)</b>	<b>Poor</b>	<b>Good</b>	<b>Very good</b>	<b>Excellent</b>
<b>Outcome: Trainees are well-grounded in the fundamentals of sonography</b>				
Trainees have achieved competence in the topics listed in the course timetable				✓
Student results				✓
<b>Outcome: Clinical supervision burden in workplace reduced</b>				
Clinical supervision burden in the workplace				✓
<b>Outcome: Trainee sonographers demonstrate the four areas of competency</b>				
Workplace performance: successful attainment of the four competencies: communication; clinical decision making; clinical scanning; and professionalism				✓
<b>Outcome: Trainee sonographers are productive in the workplace</b>				
Aim for 40–45 minutes per scan				✓
Manage workload				✓
Having to rescan (“redos”)				✓
Quality/accuracy of scanning				✓
Converse with patients in an effective manner				✓
<b>Outcome: Clinical supervisors’ productivity is less compromised</b>				
Reduced level of intensive supervision				✓
Supervision not grounded in basics but shifting trainee forward				✓
More efficient use of supervisors’ time (may include more patients for clinical supervisors)				✓
<b>Outcome: Sonography trainees are prepared for post graduate education</b>				
Students successful in progressing through the programme				✓

### Outcome performance standards

Excellent	A clear example of very strong or exemplary performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Any gaps or weaknesses are not significant and are managed effectively.
Very good	Strong performance to in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. No significant gaps or weaknesses, and less significant gaps or weaknesses are mostly managed effectively.
Good	Acceptable or fair performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Some gaps or weaknesses. Meets minimum expectations/requirements.
Poor	Unacceptably weak performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Does not meet minimum expectations/requirements.

Outcome data were reviewed and discussed at a sense making session comprising the evaluators, a Northern Regional Alliance (NRA) representative and the education provider.

The 12-week intensive training model was rated excellent on all outcomes.

What are critical success factors and the key lessons learnt from the pilot?

Critical success factors identified show the 12-week intensive course is based on sound pedagogy. The small group size allows for one-on-one tuition and peer interactions which facilitate learning. The physical resources are 'state of the art' and enable students to practice their sonography skills firstly on a simulator and on members of the public who volunteer. Scanning practice in a clinical environment also contributed to developing sonographer skills. Students returned to the workplace mid-semester which gave them an additional opportunity to practise their skills. Students were reported as being six to nine months ahead of where they would have been under more traditional training models. The burden of clinical supervision in the early stages of training has been reduced.

Lessons learnt were that the 12-week intensive course prepares sonography trainees with the necessary skills and attributes that enable them to be in a "work ready" state i.e. demonstrating competence and being productive, staffing the course requires the support of workplaces to maintain 1:3 staff student ratio and offering a token financial incentive to volunteers ensured the 350 to 400 volunteers needed for scanning purposes were obtained.

What productivity gains, over what time, were gained by the employers of students in the pilot courses?

Employers of trainees noted an increase of productivity in the workplace and greater trainee independence on trainees return to the workplace. The supervision burden was reduced in two ways, one because the trainee was attending the 12-week intensive course and therefore did not require supervision during that time. The second was that on their return to the workplace they were reported as being six to nine months ahead of where they would have been under traditional training models.

Did the pilot represent value for money to Health Workforce New Zealand?

In consultation with Health Workforce New Zealand it was agreed a value for money assessment was not feasible given the scope of the evaluation and the availability of the required information.

What unintended outcomes, if any, arose from the pilot?

There was no evidence of any unintended outcomes arising from the pilot apart from cost of maintaining the volunteer system

Should the revised training programme be expanded, and if so, how?

The training produced 15 trainees who proved valuable in the workplace. However, it is not possible to determine if this is 15 more trainees than would have been trained otherwise. The 12-week intensive course provides an additional pathway into sonography which is useful and expanding beyond Auckland may be worth considering.

To inform the value of expanding the programme, it would be necessary to advise how many of the 15 people trained were additional to those that would have been trained anyway; what the additional cost was; and whether the cost is considered reasonable in comparison to other training pathways.

To what extent do employers confirm the value of the training model to their business such that they would continue to support it?

Across the range of managers of sonography services from both the public and private sectors interviewed, all agreed that there was a need to train more sonographers to meet the Northern region's demand for their services. The value to business identified from the pilot included: trainees already being familiar with ultrasound equipment; trainees showing greater independence on their return to their workplaces; reducing the burden of supervision; and more formal consistent teaching. One criticism from a manager of a clinical setting was that trainees in the 12-week intensive model has lesser skills in comparison with the Diploma of Medical Ultrasound (DMU). However, this could be because those in the DMU had received two to three years training. The same manager also questioned the cost of the model incorporating the 12-week intensive course. No other manager shared this view.

With the cessation of HWNZ funding in Semester 1 2016, both public and private providers have committed to continue their support for the course after the conclusion of the pilot period.

### 3.0 Introduction

The SHORE & Whariki Research Centre was contracted by the Ministry of Health, specifically Health Workforce New Zealand (HWNZ), to conduct a further process and outcome evaluation of the Northern Region's Sonography Training Initiative post the pilot phase in 2014. The evaluation was conducted over the period January 2015 to January 2016. HWNZ is responsible for assisting the health sector to increase sonography trainee numbers to meet increasing demand. A number of Northern region providers are utilising a new training model, piloted in Semester 1, 2014 and repeated in Semester 1 and 2, 2015 to assist in overcoming a serious shortfall of sonographers in the area.

Previous sonography training models are seen by some providers to be compromised because of the supervision capacity required. However most private providers are now doing sonography training despite the impact upon their business models. The current sonographer training model has been designed to assist with reducing the clinical supervision load required in the early stages of training and create more "work ready" trainee sonographers during a time of sonographer workforce shortage. The model is based on a 12-week intensive course for six new sonographer trainees. This 12-week course, has been implemented over four semesters (2014-2016) with three semesters being included in the evaluation, forms part of the University of Auckland's Postgraduate Diploma Health Sciences Ultrasound programme.

The intensive nature of the course aims to create a clinical environment for the trainee sonographers, using ultrasound equipment, simulation and volunteer models. Trainees then continue on to complete their Postgraduate Diploma in Health Sciences in Ultrasound through the University of Auckland whilst in employment. At the commencement of their training, all trainees will be employed as trainee sonographers and registered with the Medical Radiation Technologists Board as trainee sonographers.

The first 12-week course was offered in the second academic semester of 2014, commencing July 2014. The course was offered again in Semester 1 and 2, 2015 and Semester 1 2016.

This report outlines the evaluation approach, methods and process and outcome evaluation findings.

## 4.0 Description of the 12-week intensive course

In September 2012, key sonography stakeholders from Northland, Auckland, Counties-Manukau, and Waitemata District Health Boards (DHBs) and Northern Region private sonography providers formed a working group to address the severe shortage of sonographers in both the Auckland metropolitan region and New Zealand wide.

As part of the strategy to address the sonographer workforce shortage, a proposal was subsequently submitted to the Health Workforce New Zealand seeking funding for the delivery of a 12-week intensive ultrasound course with a classroom focus and using tutors from the sonography workforce. This is a different approach to previous training models. As clinical training in sonography is highly labour intensive requiring close supervision, a staff-student ratio of 1:3 was one of the key features of the proposed 12-week intensive course. In January 2014, the Northern Regional Alliance (NRA) an alliance of the northern region DHBs was awarded the contract by HWNZ to run a 2-year pilot project with the University of Auckland sub-contracted to deliver the 12-week intensive course. The NRA had project management responsibility for the two-year pilot.

The University of Auckland provided academic leadership for the design and delivery of this new intensive course, while the clinical stakeholders supported the course by providing senior practitioners to assist in the clinical supervision of sonography trainees. This intensive course forms part of the University Postgraduate Diploma in Health Sciences Ultrasound programme, which is accredited by the Medical Radiation Technologist Board of New Zealand (MRTB).

The 12-week intensive course was implemented in Semester 2, 2014 Semester 1 and 2, 2015 and Semester 1 2016. The course aims to develop the clinical competence expected of a trainee sonographer during the initial phase of clinical training. In consultation with the clinical stakeholders, it was determined that ultrasound imaging of common pathology relating to the abdomen, pelvis, thyroid and deep vein thrombosis would be included in the course.

The University academic team assumed responsibility for the design of the curriculum. Students are required to integrate physical principles of ultrasound, pathology and sonography imaging techniques to clinical practice. They are also required to demonstrate the appropriate level of clinical decision-making skills, professionalism and communication competency expected of a postgraduate sonography trainee in the first three months of training. The course emphasises the synthesis of theory and clinical practice with the aim of developing a reflective sonography trainee who is well grounded in the fundamentals of sonography and is prepared to perform ultrasound scanning under supervision.

### Learning outcomes

1. Identify normal anatomy and critically analyse normal variants of ultrasound imaging of the abdomen, pelvis, thyroid, and deep vein thrombosis (DVT)
2. Critically discuss and adopt appropriate scanning techniques with the aim of optimising the use of sonographic equipment for ultrasound imaging

3. Make informed clinical judgements with regard to the selection of appropriate scanning techniques and technical parameters for ultrasound imaging of the abdomen, pelvis, thyroid, transvaginal and DVT
4. Critically evaluate common pathology in ultrasound imaging of the above regions
5. Apply an evidence-based approach to clinical decision making and problem solving
6. Demonstrate professionalism and appropriate level of communication competency with patients during sonography imaging
7. Demonstrate clinical competence of trainee sonographer in performing basic ultrasound examinations of the pelvis, abdomen, thyroid and DVT
8. Develop critical awareness of one's development as a trainee sonographer by critically reflecting on the first 12 weeks of the learning journey

### **Course delivery**

The course is delivered at the University of Auckland's Grafton campus with daily tutorial and practical scanning sessions. Full-time daily campus attendance is compulsory as students are required to participate in all learning sessions. Content materials are delivered online via the University's CECIL e-Learning system and incorporate the use of videos, webpages and links to the library.

### **Workload and contact hours**

The expected workload for the course is approximately 150 hours, broken down as follows:

- Set readings, including resources provided on CECIL e.g., Podcasts, web-links (20 hours)
- Tutorial and laboratory participation (70 hours)
- Assignments and self-directed learning (60 hours)

As this is a clinical course, students are also expected to accumulate practical scanning hours well beyond the 150 contact hours over the course of their training as part of meeting the Medical Radiation Technologists Board's accreditation requirements.

### **Assessments**

An aggregated mark of 50% or more is required to successfully pass the course. Assessment of clinical competence is embedded in the course. Students must pass both academic and clinical components.

### **Learning and teaching resources that support the course**

#### ***Infrastructure: Ultrasound department***

The ultrasound department:

- is located within the Centre for Advanced MRI (CAMRI) (Centre for Advanced MRI) with a reception area, as CAMRI performs both research and clinical MRI scans

- is designed with the aim of meeting teaching, clinical and research functions
- consists of three ultrasound rooms which have been set up to function as an ultrasound department in Radiology

Students are therefore taught and expected to practise the standard protocols and approaches they would adopt in the clinical workplace.

#### ***Infrastructure: Ultrasound equipment***

All equipment is new, and was purchased and installed in the ultrasound department prior to the start of Semester 2, 2014:

- Siemens Acuson S3000 ultrasound system
- Siemens Acuson SC2000 ultrasound cardiac system
- Siemens Acuson Freestyle ultrasound system (portable ultrasound system)
- MedaPhor ultrasound ScanTrainer Simulators
  - two transabdominal ultrasound simulators
  - two transvaginal ultrasound simulators

#### ***Infrastructure: on campus facilities***

- Tutorials are conducted in rooms located at Grafton campus
- Anatomy and Pathology learning: Students have access to the Human Anatomy Lab and the Medical Sciences Learning Centre (MSLC)
- The MSLC is a purpose built centre designed specifically for undergraduate, graduate and postgraduate education in anatomy, radiology and pathology
- Students also have access to the standard resources and support available to all UoA students including library and learning centre support.

#### ***Human volunteers***

- Ethics approval was obtained prior to the start of the semester for students to scan human volunteers as part of student learning activities
- CAMRI already has a volunteer system set up for MRI volunteers and the ultrasound volunteers were administered by CAMRI reception staff
- Volunteers were drawn from the UoA staff and student population

#### ***Academic staffing support***

The course is supported by a team of sonography and Medical Imaging staff members. The team includes:

- Lead sonographer: course coordinator responsible for the course delivery and assessments
- Tutor sonographers: on loan from their employers assist the Lead Sonographer by providing supervision of student clinical scanning and also assist in student assessments
- Sonography staff online: responsible for online content delivery of clinical ultrasound and physic content of the course

- Medical Imaging staff online: responsible for online content delivery around professionalism, communication and clinical decision making:
- Medical Imaging staff: assisted in the re-formatting of online course layout
- Medical Imaging staff: a physics staff member conducts weekly physics tutorials to assist students in understanding and applying physics principles to student clinical practice
- Medical Imaging staff: support and mentor on campus sonography staff members

### ***Support requirements***

Upon completion of the 12-week intensive course, all students continue to enrol in subsequent courses in the Postgraduate Diploma Health Sciences Ultrasound programme. Students are required to regularly complete and submit assessments pertaining to their clinical requirements, which means that their progress throughout the programme is monitored. It has not been possible to conduct regular phone calls with students due to their heavy commitment to scanning and to course work.

Should there be any issues pertaining to student learning (clinical and online), processes are in place to support both the student and the supervisor(s). This information is documented and forms part of the student's record. There are prompt responses by the education provider to any 'red flags' observed.

## 5.0 The Evaluation

### Evaluation Approach and Design

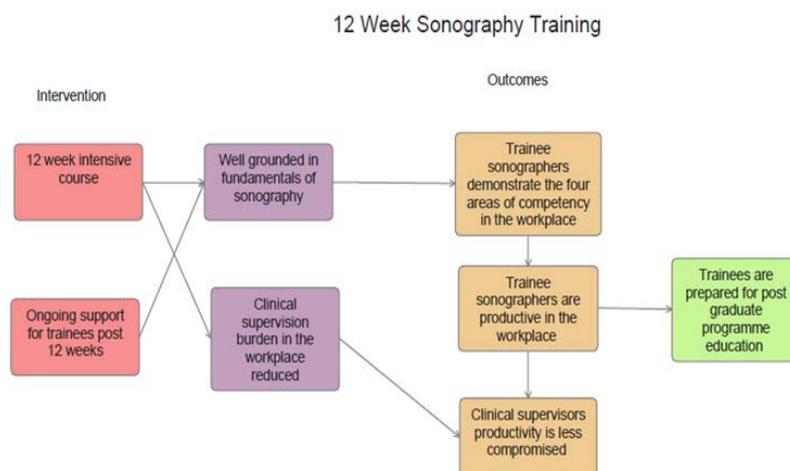
This evaluation was informed by an integrated approach to evaluation (Dickinson, Adams, Asiasiga, & Borell, 2015), which draws on programme theory-driven (Donaldson, 2007), valuing (Davidson, 2005) and utilisation focused (Patton, 1997) approaches to evaluation.

Programme theory-driven evaluation is concerned with the explanation of the way in which a programme is expected to achieve its desired outcomes. For the 12-week sonography course this is depicted in the form of a logic model (Figure 1). The linkages and relationships between components within the model delineate the assumptions and theories of change that underpin the programme. This logic model was developed the evaluators, and representatives from the NRA, a DHB, Health Workforce New Zealand, and the education provider.

Valuing is based on Scriven's (1991) general logic of evaluation which involves determining the merit or worth of an evaluand (project, programme, policy to be evaluated). Four steps comprise this general logic: (1) establish criteria of merit (aspects of an evaluation that define whether it is good or bad and whether it is valuable or not valuable), (2) construct standards, (3) measure performance and compare with standards, and (4) synthesise and integrate data on performance into a judgment of merit or worth.

The utility of an evaluation is dependent on the participation of intended users, based on the assumption that their engagement and active participation can lead to more willingness to implement the evaluation findings and recommendations (Cousins & Whitmore, 1998).

**Figure 1: Sonography 12-week training Logic Model**



This is a process and outcome evaluation. The process evaluation focused on determining the quality of the 12-week sonography course as conducted in Semester 1 and 2, 2015 and the outcome evaluation assessed the impacts that resulted from it.

### **Criteria and standards setting**

Criteria and performance standards were set for the pilot phase and these were deemed suitable for the current evaluation. These criteria and standards help determine the merit and worth of the 12-week intensive course.

### **Evaluation participants**

<b>Providers</b>	<b>Number of interviewees</b>
Education provider (including university tutors)	N= 4
Clinical supervisors / Managers of clinical settings- Public sector	N=8
Clinical supervisors / Managers of clinical settings- Private sector	N=8

### **Ethical review of the evaluation**

This evaluation project was reviewed and approved by the Massey University Human Ethics Committee.

### **Process Evaluation**

The process evaluation was conducted to determine what has been learnt from the pilot phase and what changes had occurred to the training programme.

#### **Process evaluation question**

Did the pilot delivery team learn from the early experience of the pilot and adapt accordingly?

#### **Process evaluation data collection**

*Key informant interviews with education provider (including university tutors) (N=4)*

The key informant interviews were semi-structured discussions which aimed to collect relevant data about the learnings and changes that had occurred during implementation of the Sonography Training Model in 2015.

### **Process evaluation data analysis**

The interviews were conducted by telephone and face-to-face and recorded and transcribed. Additional information was provided by email. All transcripts were read and analysed by members of the evaluation team. The analysis was focused on data relevant to the evaluation criteria and data obtained in the interviews not relevant to the criteria are not presented in this report. A general inductive analytic approach was used (Thomas, 2006). This allowed the raw data to be summarised and linked closely to the evaluation questions and criteria.

### **Outcome Evaluation**

The outcome evaluation conducted was a systematic collection of information about the short, intermediate and long-term outcomes of the 12-week intensive course.

#### **Outcome evaluation questions**

- How successfully were the prioritised outcomes achieved?
- What are the key lessons and critical success factors learnt from the pilot?
- What productivity gains, over what time, were there for the employers of students in the pilot courses?
- What unintended outcomes, if any, arose from the pilot?
- Did the pilot represent value for money to HWNZ?
- Should the revised training programme be expanded, and if so, how?
- To what extent do employers confirm the value of the training model to their business such that they would continue to support it?

#### **Outcome data collection**

*Key informant interviews Clinical supervisors / Managers of clinical settings (N=16), Education provider (including university tutors) (N=4)*

The key informant interviews were semi-structured discussions that collected relevant data about the experiences of clinical supervisors/managers of clinical settings and the education provider with the Sonography Training Model. These interviews gathered information about the success of the training and its impact on productivity. In addition, the data collection aimed to identify any unexpected outcomes arising from the training.

#### **Outcome evaluation data analysis**

The interviews were conducted by telephone, recorded and transcribed. All transcripts were read and analysed by members of the evaluation team. The analysis was focused on data that were relevant to the evaluation criteria and not all data provided are presented in this report. A general inductive analytic approach was used (Thomas, 2006). This allowed the raw data to be summarised and linked closely to the evaluation questions and criteria.

## **Sense making workshop**

A sense making workshop was held with representatives from Northern Regional Alliance, Health Workforce New Zealand, and SHORE & Whariki evaluators to review the evaluation results and discuss how well the 12-week intensive course had performed in terms of the quality of the intervention and how successfully identified outcomes had been achieved.

## 6.0 Evaluation Results

The evaluation questions provide the structure for reporting the evaluation results. Relevant data collected during the evaluation are presented in this section and used to provide 'direct answers' to the evaluation questions.

### Process evaluation

Did the pilot delivery team learn from the early experience of the pilot and adapt accordingly?
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In 2015 the course was delivered in a very similar way as the pilot. One key addition to the training model was the inclusion of opportunities for students to practice their scanning on 'real' patients in the hospital setting.

*The new addition to what they had previously done was when the students went to visit Greenlane Clinical Centre and being able to apply what they had learned in a clinical setting, prior to coming back into their workplaces is really good as well. (Education provider/tutor)*

*I got feedback from the radiologists that they thought they [the students] were very good at expressing ultrasound terminology in relation to their findings. When they were working with real patients the radiologist identified that for the stage they were at they thought they were very good at getting across to the radiologist basically what they thought was going on with the patient. (Education provider/tutor)*

Some additional assessment was added to the course and as well as the emphasis on abdominal scanning, there was also a focus on DVT (Deep Vein Thrombosis) scanning. One university tutor considered the workload for students was high.

*You know I think it's just a lot of work for them ... they have quite a heavy workload in that course ... they have quite a lot of different things they have to do you know, learn theory, write assignments, things like that. (Education provider/tutor)*

During the mid-semester break students returned to their workplaces which had not happened during the pilot phase in 2014.

*The aim of the mid-semester break was to enable students to visit their ultrasound departments to observe ultrasound scanning, understand department protocols and if the situation permits, perform basic ultrasound scanning under supervision ... [on return to the university] students are expected to reflect on their learning experiences and share these with their peers and tutors. (Education provider/tutor)*

The 12-week course generated a significant workload for the lead tutor who had been managing this on her own. In order to address this, the education provider was looking at appointing another tutor:

*I think they are looking at employing another sonographer who's going to help [lead tutor] with some of the academic side of it. [Lead tutor] has a huge amount of work with the courses which I didn't realise. (Education provider/tutor)*

Securing sufficient numbers of the general public to volunteer to attend the University for trainees to practice scanning was a struggle during the initial pilot in 2014 given that 380 to 420 volunteers were scanned over 12 weeks. To address this, volunteers were offered a token financial incentive.

*In Semester One, we introduced token reimbursement for each volunteer. Since then we have had a constant flow of human volunteers throughout the semester. (Education provider/tutor)*

## Outcome evaluation

How successfully were the prioritised outcomes achieved?
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### Outcome: Trainees are well-grounded in the fundamentals of sonography

The 12-week intensive course was expected to produce trainees who were well-grounded in the fundamentals of sonography. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved were:

Outcome	Evaluation criteria	Data source
Trainees are well-grounded in the fundamentals of sonography	<ul style="list-style-type: none"> <li>• Trainees have achieved "competence" in the topics listed in the course timetable</li> <li>• Trainee results</li> </ul>	Education provider / tutor

*Criterion: Trainees have achieved "competence" in the topics listed in the course timetable*

The university clinical tutors considered all trainees were well-grounded in the fundamentals of sonography and were well-prepared for going back into the workplace:

*Compared to going in from scratch ... they understand the request forms and they understand how the machine works which is very important ... they've got this good grounding and they've had a chance to talk to all the volunteers, you know a lot of strangers coming through and having to develop their patient care skills (Education provider. (Education provider/tutor)*

*I think they're well ahead of where they would have been if they'd just been back in their workplaces, doing things the normal way, they can all scan a simple abdomen*

*within the 45 minutes, they've all got a reasonable idea of what they should be doing, when they're with a female pelvic scan as well, they can go and talk to a radiologist and describe their findings and I think one of the really important things also is that they know their limits. (Education provider/tutor)*

One tutor reported the amount of time spent on scanning in the course enabled trainees to return to the workplace feeling more confident:

*How many hours would those guys have in a week ... they've got several hours a day, at least four days a week ... you're getting so much more. (Education provider/tutor)*

*They can immediately be confident and be able to get a patient in a room and do a scan and then of course have it all checked by somebody. (Education provider/tutor)*

*Criterion: Trainee results*

Competence and grounding in the fundamentals of sonography was formally assessed by The University of Auckland. All 15 trainees met or exceeded the minimum competency requirement to pass CLINIMAG 709. Students who exceeded demonstrated more independent learning whereas those who met minimum competency requirements needed more one-on-one support during the 12-week intensive course.

**Outcome: Clinical supervision burden in workplace reduced**

An outcome planned from the 12-week intensive course was a reduced burden for supervisors in the workplace. This was expected to occur as clinical supervisors in workplaces would no longer be providing introductory training and supervision for trainees as this training was now provided on the university course. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved were:

<b>Outcome</b>	<b>Evaluation</b> criterion	<b>Data source</b>
Clinical supervision burden in workplace reduced	Clinical supervision burden in workplace	<ul style="list-style-type: none"> <li>• Managers of clinical settings</li> <li>• Clinical supervisors</li> </ul>

*Criterion: Supervision burden in workplace*

The managers of clinical settings/clinical supervisors identified the 12-week intensive course reduced the burden for clinical supervision in the workplace while trainees were attending the course.

*... attendance at the intensive does take a burden away from the department. (Manager of clinical setting/clinical supervisor)*

*I think it [12-week intensive course] does relieve some of the initial intensive burden on the clinical site. (Manager of clinical setting/clinical supervisor)*

*I think so definitely, because we have nothing to do with them for the first 3 months. So yes that's definitely taken some of the work off us ... it certainly has eased the burden. (Manager of clinical setting/clinical supervisor)*

This lessening of the initial supervision burden was identified by some informants as contributing toward some productivity gains, as clinical supervisors did not need to provide training and support to trainees over this 12-week period. Under a different training module having trainees who had not been on the intensive course impacted negatively on productivity as the trained sonographer needed to attend to teaching responsibilities.

*... like I said it just takes away the burden and the other course probably affects productivity of the department as a whole because it means that a competent sonographer is now teaching and it takes away their productivity. (Manager of clinical setting/clinical supervisor)*

*... the only difference in productivity would be that the students would have to have a one on one with a sonographer for a period of 12 weeks before they became independent so it has impacted the productivity of the department, because it meant, because what we do is when we had students we literally gave them one hour bookings and blocked off bookings and the clinical tutor would be with them, literally holding their hand. With this fast track course it takes away that burden of teaching from scratch. (Manager of clinical setting/clinical supervisor)*

*Well I mean, our supervisors can scan at their normal scanning rates then for that 3 months [while student is away at the course], whereas they're at less than half with the initial trainees otherwise. (Manager of clinical setting/clinical supervisor)*

### **Outcome: Trainee sonographers demonstrate the four areas of competency in the workplace**

The outcome "Trainee sonographers demonstrate the four areas of competency in the workplace" was expected to occur from having trainees well-grounded in the fundamentals of sonography. The four areas of competency assessed are communication, clinical decision making, clinical scanning and professionalism. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved, were:

Outcomes	Evaluation criterion	Data source
Trainee sonographers demonstrate the four areas of competency in the workplace	Workplace performance: successful completion of holistic 'LEP' assessment across the first six weeks upon return to workplace; covering four competencies: <ul style="list-style-type: none"> <li>• Communication</li> <li>• Clinical decision making</li> <li>• Clinical scanning</li> <li>• Professionalism</li> </ul>	<ul style="list-style-type: none"> <li>• Individual evaluation of performance (through LEP)</li> <li>• Supervisors report</li> <li>• Clinical supervisors and Managers of clinical settings</li> </ul>

**Criterion: Workplace performance**

*LEP assessments*

Longitudinal Evaluation of Performance (LEP) is one of the numerous clinical assessments the University of Auckland adopts to measure and track student clinical learning and performance. Over the course of the programme 14 LEPs must be submitted. The Education provider advised LEPs were not able to be completed within six weeks of the trainees returning to their workplaces. This was in part due to the current shortage of sonographers as well as the timing of the six-week LEP which for Semester 2 students fell in mid-December.

*Clinical assessment is particularly problematic at the end of the year when departments are generally understaffed due to staff going on year-end holidays (December and January period). (Education provider/tutor)*

Because of these difficulties the standard clinical assessment cycles were adopted, rather than the six-week assessment.

*Given that we are unable to meet the 6 weeks requirement of this project, we therefore decided to revert back to our normal cycle of clinical assessments. This way, we avoid the situation of treating CLINIMAG 709 students differently from the rest of the ultrasound students who are not undertaking the on campus ultrasound intensive course. (Education provider/tutor)*

*Supervisor reports*

As of Semester 2, 2015 there were 15 ultrasound trainees undertaking the ultrasound intensive course. The education provider advised satisfactory process was reported by all supervisors.

*Based on the supervisor reports, all clinical supervisors are currently satisfied with student progress ... At this point ... there are no students on our radar that are not performing. They are all performing at the expected level of competency and are*

*therefore on track in terms of their progression and learning. (Education provider/tutor)*

#### *Clinical supervisors and Managers of clinical settings*

Across the interviews with clinical supervisors and managers of clinical settings it was consistently reported trainees in the three cohorts demonstrated competency in the workplace in each of the following four competencies after they had returned from the 12-week intensive course:

- *Communication*

All trainees were identified as having good communication skills.

*Her communication ... has always been, actually I believe one of her strengths because English is her second language, she works very hard on her communication ... And so I think you know her communication with patients and, she's asking the right questions of them to get the information if she requires (Manager of clinical setting/clinical supervisor)*

In several instances it was noted that this competency probably existed prior to trainees entering the programme.

An area noted by one clinical supervisors / manager of clinical settings where she felt there was room for improvement workplace performance related in trainees ability to present cases.

*Communication, especially when it comes to actually presenting cases. I actually think sometimes they could be, personally I think they could be a little bit better than maybe what they, you know just in the way that they present cases I think could be something that could be worked upon ... (Manager of clinical setting/clinical supervisor)*

#### *Clinical supervisors and managers of clinical settings*

- *Clinical decision making*

Clinical supervisors and managers of clinical settings reported trainees demonstrated clinical decision making competency. One way this was demonstrated was a trainee observing scanning and making suggestions to the supervisor.

*I worked with [trainee name] yesterday, which was a perfect opportunity to look at some stuff, and I have to say, I think her clinical decision making is absolutely on track, and she's working well within it. A couple of times she was actually observing me do something and she was making little suggestions, which is exactly what I was thinking so I was very impressed about that. (Manager of clinical setting/clinical supervisor)*

Another clinical supervisor/manager of clinical settings had observed that trainees acknowledged the limits of their competency and sought out supervisors if they were unsure about something and required help.

*They always introduce themselves as trainees and always ask for permission to scan the patients, and although sometimes they might be a bit nervous about trying something, you know they do identify to the patient that they are trainees and they have, a low threshold and so are more likely to come out and get help when they need it (Manager of clinical setting/clinical supervisor)*

- *Clinical scanning*

Clinical supervisors and managers of clinical settings reported trainees demonstrated competency in clinical scanning. One supervisor spoke about her observation that the trainee in her workplace was demonstrating improvement in her scanning (and other) competencies.

*Yeah I guess she's continuing to demonstrate good skills, you know in communication and decision making, and her scanning's continuing to improve so I think she's improving in all areas (Manager of clinical setting/clinical supervisor).*

*Well her scanning ability I think has actually been quite impressive. (Manager of clinical setting/clinical supervisor)*

- *Professionalism*

Trainees were generally identified as demonstrating professionalism. This was usually discussed in the way they interacted with patients.

*Yeah so, this is the same for both of the students, I see them engaging in conversations with other staff members, they're both curious to you know conditions that the patients may have, they ask questions that are sensible you know, and it's clear often that they have done some background reading, so they also both have a very nice manner with their patients, and I guess that sort of comes into professionalism as well as communication. (Manager of clinical setting/clinical supervisor)*

*I see in both students their professionalism and communication is very good. (Manager of clinical setting/clinical supervisor)*

It was noted that some of this professionalism may have been present before they started in the ultrasound programme.

*I think even before she started ultrasound, she has actually got a very professional manner and still has that same professional manner now (Manager of clinical setting/clinical supervisor).*

- *Limits on competency*

Several clinical supervisors and managers of clinical settings noted the focus on abdominal scanning as a limitation in relation to competency:

*I think they're doing quite well. My only concern was that for 3 months away she could only really do an abdominal scan and a renal scan. (Manager of clinical setting/clinical supervisor)*

While there was general agreement that students were competent in relation to this scope; a manager of a clinical setting/clinical supervisor suggested it would be ideal to include obstetrics scanning in the 12-week programme.

*So I would make the comment that when you're doing the 12 week course, they aren't given any obstetrics scanning, which I tell you what, if you could actually add some of that into it, it would be fantastic. But general-wise, she's actually doing really well, she is where we would expect her to be if we were teaching her right from the beginning. Actually she's above where we'd expect her to be really. (Manager of clinical setting/clinical supervisor)*

**Outcome: Trainee sonographers are productive in the workplace**

The outcome "Trainee sonographers are productive in the workplace" was expected to occur from having trainees demonstrating their competency in the workplace. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved were:

Outcomes	Evaluation criteria	Data source
Trainee sonographers are productive in the workplace	<ul style="list-style-type: none"> <li>• Aim for 40-45 minutes per scan</li> <li>• Manage workload</li> <li>• Quality/accuracy of scanning</li> <li>• Having to re-scan</li> <li>• Converse with patients in an effective manner</li> </ul>	<ul style="list-style-type: none"> <li>• Managers of clinical setting</li> <li>• Clinical supervisors</li> <li>• Sonography trainee</li> </ul>

**Criterion: Aim for 40-45 minutes per scan**

One tutor involved in the delivery of the 12-week intensive course reported that trainees were scanning well within the 45 minute timeframe before they returned to the workplace.

*So the students on that course all came out quite well I thought with their scanning, we had some students on the course scanning really well when they went back into their workplaces, well within the 45-minute timeframe. (Education provider/tutor)*

This observation was supported by managers of a clinical setting and clinical supervisors who noted that this was achieved for straight-forward scans (abdominal and renal).

*... in a straightforward patient [meeting 40-45 minutes per scan], then yes they are meeting that expectation, and they had to do that before they graduated from their paper. (Manager of clinical setting/clinical supervisor)*

*When she came back to the workforce she was able to scan an entire abdomen in a maximum of 45 minutes, which is excellent after 12 weeks, and I have to say with the other two students it was the same as well. (Manager of clinical setting/clinical supervisor)*

Some instances where this target might not have been met were noted. Not meeting this goal for more complex scans within the 45 minute target was considered acceptable.

*... she does all the pregnancies in under 45, she does an abdo in 45, a full abdo for a female, which includes the pelvis, that's still at 60 but that's not unreasonable. (Manager of clinical setting/clinical supervisor)*

This level of performance was viewed by a couple of managers of clinical settings / clinical supervisors to not be as productive as a qualified sonographer.

*... she is productive, her scanning times have improved and working toward the scanning speed of a qualified [sonographer], but it is not there yet ... she is between 50-75% as productive as a qualified sonographer. (Manager of clinical setting/clinical supervisor)*

*Still minimally productive, I'm not certain of how many studies that she would do but probably one per hour, so yeah very, very new in the whole ultrasound learning process. (Manager of clinical setting/clinical supervisor)*

**Criterion: Manage workload**

Managers of clinical settings and clinical supervisors generally thought workload issues were managed well by trainees. One thought that this was being achieved by trainees, even though it was difficult.

*I don't think it is easy for them [to manage their workload]. Student A she can manage, she manages her workload very, very well. Student B is the same, ... just gets on with it ... just running with it and doing really well, and for student C at the*

*moment, I think it's going well. So I think they are managing their workload but in saying that it is difficult. (Manager of clinical setting/clinical supervisor)*

One manager/supervisor noted that because of their way of scheduling scans the trainee might not be as conscious of pressures to complete scans in a timely manner.

*I think they do ok, I mean we might operate slightly differently in our practice, we don't book per person ... you know there's a line of people and you just pick up the next available so I guess to some extent they're not that mindful of time pressure ... yeah I think they do quite well with that [managing their workload]. (Manager of clinical setting/clinical supervisor)*

**Criterion: *Having to rescan (do "redos")***

The scans carried out by trainees were at a level commensurate with the requirements of the course and there were no reports of the need for rescanning patients.

**Criterion: *Quality/accuracy of scanning***

All tutors interviewed considered trainees were well-equipped to do accurate, quality scanning and this was enhanced by the academic knowledge they were also gaining from the course:

*They've come into the department with scanning skills and knowledge and overall they're scanning better because of the knowledge (Education provider/tutor).*

Clinical managers / supervisors reported trainees were performing quality scanning.

*The first student is very accurate and I think that is because she has scanned over 100 abdomens already" (Manager of clinical setting/clinical supervisor)*

*I actually think they're producing quite good quality scans. Yes, from what I've seen of both of them. I've actually been quite impressed with it. (Manager of clinical setting/clinical supervisor)*

It was also noted by several clinical managers / supervisors that the quality of work was consistent with the training that the trainees had received.

*... she shows a high quality of scanning, she doesn't take shortcuts and she certainly does extra rather than less than required. She will extend an examination if she needs to and she does have a good recognition of her limitations" (Manager of clinical setting/clinical supervisor)*

*... there is a lot of feedback from our radiologists that the quality of her scans is ... is excellent for the stage that she is at, and she's working hard to constantly improve those (Manager of clinical setting/clinical supervisor)*

*You know again I think it's entry level quality, it's what you expect from students after that length of time training, you know they struggle with the things all students struggle with at that time, yeah I think, you know, the quality is as expected. (Manager of clinical setting/clinical supervisor)*

*I think it would be about where you would expect her to be after this long scanning [quality/accuracy of scanning]. (Manager of clinical setting/clinical supervisor)*

One clinical manager / supervisor noted that although the work was of high quality, this did not mean the trainees were capable of working independently.

*Student B I would say the same, can do an abdomen totally independently and would be very accurate and student C I think still needs support because I think, although she can scan an abdomen I think it's become, the pattern recognition for pathology still needs to be supported. (Manager of clinical setting/clinical supervisor)*

**Criterion: *Converse with patients in an effective manner***

All the reports from managers of clinical settings and clinical supervisors indicated trainees communicated effectively with patients.

*I think they're very good [ability to converse with patients in an effective manner], the intensive course has probably helped ... I think she is a good communicator and is very professional. (Manager of clinical setting/clinical supervisor)*

Effective communication was discussed by one manager / supervisor as obtaining the information the trainee required.

*... so I think you know her communication with patients ... she asks the right questions of them to get the information she requires. (Manager of clinical setting/clinical supervisor)*

Effective communication was also thought of by one manager / supervisor as a skill that might have been well developed prior to entering sonography training.

*I think it is the skills they already had [being able to converse with patients in an effective manner] so yeah ... they already had that, so there wasn't too much of actually teaching in that respect. (Manager of clinical setting/clinical supervisor)*

### **Productivity – other issues**

From a manager / supervisor's perspective the 12-week course was extremely practical, and led to trainees returning to the workplace better prepared and with a better understanding of the basics of sonography:

*I think it's right up there in terms of being a practical based course. From an employer's perspective having somebody who understands the practicalities of scanning who then comes into the workplace is much better than somebody who hasn't really picked up a probe at all ... they are much more mature in terms of their outlook and their performance when they come into the department and mature in the sense that they're not going right back to basics, they understand what an ultrasound is about, they understand they have to make decisions and work much more as a sole practitioner. (Manager of clinical setting/clinical supervisor)*

*When I compare them with the previous student that did the DMU before the intensive course they're more productive at each of their different levels. (Manager of clinical setting/clinical supervisor)*

It was noted however that productivity should be assessed in relation to their status as trainees who had received a specific scope of practice (abdominal and renal). Nonetheless, it was observed that the trainees were sufficiently productive and demonstrated a good work ethic.

*They're still trainees at the end of the day, but you can actually get them to go into a room and do a procedure and give a good attempt, which is quite productive. They seem to be quite enthusiastic to actually give it a go, you are not having to push them. (Manager of clinical setting/clinical supervisor)*

*Yes, it's productive in that she can do an abdominal and renal scan. But she can't do a pelvic scan, she can't do obstetrics, she can't even do a small part. So you know it's one small component of a whole lot of things that have to be taught. It is a start. She knows how to use a probe and she knows her way around a machine and she knows how to interact with patients. (Manager of clinical setting/clinical supervisor)*

### **Outcome: Clinical supervisors' productivity is less compromised**

The outcome "Clinical supervisors' productivity is less compromised" was expected to occur as a result of clinical supervisors having a reduced burden in the workplace and having trainees productive in the workplace. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved, were:

Outcomes	Evaluation criterion	Data source
Clinical supervisors productivity is less compromised	<ul style="list-style-type: none"> <li>• Reduced level of intensive supervision</li> <li>• Supervision not grounded in basics but shifting trainee forward</li> <li>• More efficient use of supervisors' time (may include more patients for clinical supervisors)</li> </ul>	<ul style="list-style-type: none"> <li>• Managers of clinical setting</li> <li>• Clinical supervisors</li> </ul>

**Criterion: *Reduced level of intensive supervision***

One university tutor commented that trainees from the 12-week course required less intensive supervision on returning to the workplace compared with a trainee being trained in the workplace:

*I mean initially because someone coming in to the department that hadn't done any scanning before they would have had to have one on one all the time for quite a while compared to someone who had done the course already, had done scanning ... so they would need less supervision and then now they're pretty much scanning independently. (Education provider/tutor)*

Managers of clinical settings and clinical supervisors reported trainees required less intensive supervision due to their level of competence and ability to perform scans.

*... If you have students familiar with an ultrasound machine they don't need such close supervision and if they can get scanning at a good speed, it does reduce the amount of supervision that's required. (Manager of clinical setting/clinical supervisor)*

*My understanding is that it has lessened that ... particularly because when with the other courses a student starts fresh in a department then they have to be supervised one on one, whereas if you've got students that are already familiar with an ultrasound machine, they don't need such close supervision and if they can get scanning at a good speed, it does reduce the amount of supervision that's required. (Manager of clinical setting/clinical supervisor)*

**Criterion: *Supervision not grounded in basics but shifting trainee forward***

There was some evidence that with supervisors not being required to provide training and support for fundamental skills to trainees, the training and support provided could focus on “shifting the trainee forward” through adding to their knowledge and practice base.

*I think it does push the trainee along, to be more proficient. (Manager of clinical setting/clinical supervisor)*

*... So from there they can, when they come back to us [after completing the 12 week intensive course] they can extend what they need to know. (Manager of clinical setting/clinical supervisor)*

**Criterion: More efficient use of supervisors' time (may include more patients for clinical supervisors)**

As described earlier all trainees have been assessed and competency and productivity gains in the workplace were noted. One outcome noted was that supervisors were freed to undertake their own scanning or (potentially) other activities, while a trainee was doing their scanning. In this instance efficient use of supervisor time was achieved, and support and supervision was also provided to the trainee in relation to their training needs.

*... [The student] can start scanning a patient, I can go and scan a patient and when I've finished my patient I can go and check her and see how she's going and finish up what she struggled with or just check her pictures. (Manager of clinical setting/clinical supervisor)*

One tutor who was seconded from the workplace part-time spoke of her experience of having students who had completed the 12-week course and how this impacted on her work:

*Some days I might have three students but it means I can leave a student to get on with a scan, go and check somebody out and then come back to them. So I'd either go and scan a patient or I'd be checking on a student. (Education provider/tutor)*

**Outcome: Sonographer trainees are prepared for post graduate programme education**

The outcome "Sonographer trainees are prepared for post graduate programme education" was expected to result from trainees being productive in the workplace. The criteria and data sources identified to guide the determination of the extent to which this outcome was achieved, were:

Outcomes	Evaluation criterion	Data source
Sonographer trainees are prepared for post graduate programme education	Trainees successful in progressing through the programme	<ul style="list-style-type: none"><li>• Student records</li><li>• Education provider</li></ul>

**Criterion: Trainees successful in progressing through the programme**

The education provider advised that of the 15 students who were enrolled in CLINIMAG 709, 14 students were on track to complete the ultrasound programme. These students have passed the courses they enrolled in each semester and they have also successfully met their clinical

requirements. One student has leave of absence (currently on maternity leave); while another student, due to personal circumstances, withdrew from the programme and returned overseas.

Of the six students enrolled in Semester 2, 2014 three will complete the programme within the 2-year period in Semester 1, 2016. The other three trainees are likely to complete in Semester 2, 2016 as they have yet to acquire sufficient cases in their clinical portfolio.

The education provider noted a trend to completing the programme in 2.5 rather than two years.

*Increasingly, most ultrasound students are taking 2.5 years to complete the ultrasound programme. This is because most clinical centres do not have the complete range of examinations and are required to roster students through different hospitals/radiology centres. (Education provider/tutor)*

The key criteria and outcomes for the logic model are presented below

Outcomes and Criteria	Poor	Good	Very good	Excellent
<b>Outcome: Trainees are well-grounded in the fundamentals of sonography</b>				
Trainees have achieved competence in the topics listed in the course timetable				✓
Student results				✓
<b>Outcome: Clinical supervision burden in workplace reduced</b>				
Clinical supervision burden in the workplace				✓
<b>Outcome: Trainee sonographers demonstrate the four areas of competency</b>				
Workplace performance: successful attainment of the four competencies: communication; clinical decision making; clinical scanning; and professionalism				✓
<b>Outcome: Trainee sonographers are productive in the workplace</b>				
Aim for 40–45 minutes per scan				✓
Manage workload				✓
Having to rescan (“redos”)				✓
Quality/accuracy of scanning				✓
Converse with patients in an effective manner				✓
<b>Outcome: Clinical supervisors’ productivity is less compromised</b>				
Reduced level of intensive supervision				✓
Supervision not grounded in basics but shifting trainee forward				✓
More efficient use of supervisors’ time (may include more patients for clinical supervisors)				✓
<b>Outcome: Sonography trainees are prepared for post graduate education</b>				
Students successful in progressing through the programme				✓

### **Outcome performance standards**

Excellent	A clear example of very strong or exemplary performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Any gaps or weaknesses are not significant and are managed effectively.
Very good	Strong performance to in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. No significant gaps or weaknesses, and less significant gaps or weaknesses are mostly managed effectively.
Good	Acceptable or fair performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Some gaps or weaknesses. Meets minimum expectations/requirements.
Poor	Unacceptably weak performance in relation to the achievement of intended outcomes resulting from the 12-week intensive training model. Does not meet minimum expectations/requirements.

Outcome data were reviewed and discussed at a sense making session comprising the evaluators, an NRA representative and the education provider. The 12-week intensive training model was rated excellent on all outcomes as there was very strong or exemplary performance in relation to the achievement of intended outcomes and there were no significant gaps or weaknesses

What are the critical success factors and key lessons learnt from the pilot?

There were a number of critical success factors and lessons learnt from the 12-week intensive course.

#### *Critical success factors*

A well-designed curriculum with sound pedagogy and an infrastructure which supports student learning were key success factors:

*The course is pedagogically sound with learning outcomes that not only prepare students to be work-ready but also grounded students in fundamentals that prepare them for the rest of their sonography career. The course is specifically designed to address the challenges sonography trainees encounter during the early stage of their training. (Education provider/tutor)*

*The ultrasound rooms are located within CAMRI and the ultrasound teaching is therefore well-supported with front desk reception to receive volunteers. We have state of the art ultrasound simulators and ultrasound machines located in a well-furnished ultrasound department (Education provider/tutor).*

The small numbers in the course meant that students had a positive learning experience, and were able to bond with their peers and support each other:

*They enjoyed being here. There were hardly any absences ... you know when you've got these little groups, they sort of bond and they go and have lunch together, they all help each other and they did say they really enjoyed the camaraderie of it, being together as a group ... on the last day they're all very happy and complimentary about the course and very excited to be going out to their placements. (Education provider/tutor)*

*There was quite a high ratio of tutor to student, so they did get a lot of one on one teaching, also the fact that they were small groups the students had actually formed really good relationships with the other students and I know they are still keeping in contact with each other and sort of using each other for support and some of them have formed study groups so they're all keeping in touch that way. (Education provider/tutor)*

Another success was that students were transitioning well on their return to their workplaces:

*The students themselves have come back to me and said that they're really glad that they did the course, they think it's made it much easier for them going back into their workplaces, they feel more useful and I've heard that from a few of the people that have actually sent students on the course ... they're much more useful than what they could have been normally you know at the three month mark. (Education provider/tutor)*

Introducing 'real' patients in the hospital setting was seen as key to enhancing students' scanning skills and preparing them for their transition to their workplaces. Image reading, which formed part of student learning activities, also assisted in contextualising student learning.

The small group size for teaching was also a critical success factor but could also be a challenge to the viability of the course long-term. Students are able to receive intensive supervision and were well prepared to go back into their workplaces. They were generally confident and independent and competency ratings were high. Trainee sonographers did contribute to workplace productivity.

Having sufficient volunteers for scanning purposes was identified as critical to the successful implementation of the 12-week intensive course. The provision of vouchers helped ensure volunteers were available:

*We started handing out vouchers which was great for the volunteers, so we didn't have many times where we were sitting waiting for volunteers – I think it definitely increased the number of volunteers we had. (Education provider/tutor)*

### *Lessons learnt*

This evaluation confirmed the 12-week education course prepares sonography trainees with the necessary skills and attributes that enable them to be in a “work ready” state (i.e. demonstrating competence and being productive) at a level that is largely satisfactory to workplaces clinical supervisors and managers. This appears to have contributed to strong support for this training module. Several clinical supervisors / managers reported they would recommend the 12-week option as a way of receiving appropriate education and preparation for ongoing sonography training.

*Yeah, I would certainly recommend if it was within their capabilities it's a really good place to start. (Manager of clinical setting/clinical supervisor)*

The intention at the start of the 12-week intensive and for the future was that there would be tutors willing, and consistently available in the sonography sector to support the course. However, this was not always the case which resulted in some confusion for students. One tutor considered it was important that the students were taught in the same way at the start of their training and having a range of tutors didn't support consistency:

*So they really need to be taught one way, and everybody stick to that one way and it's good to teach them how to do things differently but that comes further down the track ... you know when they're starting out they need that consistency and that's difficult when you've got lots of different people coming in so you know a different person every day of every week. (Education provider/tutor)*

The same tutor spoke of how this was managed in the course to ensure students were developing the same scanning skills:

*We've all basically trained in Auckland and we all sort of learn the same way, and the other tutor had a few different ideas but we didn't see any harm in that ... basically everyone learns to scan the same way. (Education provider/tutor)*

Staffing the course with second tutors was considered by some to be an ongoing concern, particularly given the current sonography shortage, that workplaces were not always able and willing or were not in a position to assist with this:

*Challenges have been staffing the second tutor positions, the first semester all our tutors were locums, we didn't have anybody from either the DHBs or private that came on board to help, so we had several locums, similar situation in semester two, we had a tutor for one day a week who was from a private provider ... even with the second person there as well in semester two we had several different people coming in and assisting, the consistency isn't there for the students, so everybody relates to them slightly differently and it confuses them. (Education provider/tutor)*

*I think the problem is that the way it was set up, so it was designed so that the second person would be coming in from outside of the university and it was kind of assumed I believe that everybody else would stick their hands up, to say that they would help out, that hasn't happened ... because you know they've got their own staffing issues back in their workplaces, so we've had some good support from some places, we've had no support from others apart from they wanted to send us their students, they're happy to send us students, they're not happy to help out in any other way (tutor). I mean the only other tricky thing is that like sometimes there's been several assistants, one day there was an assistant tutor from a private practice, I was there three days and then there's [name] teaching as well, so there's the possibility with several tutors that they get different information. (Education provider/tutor)*

What productivity gains, over what time, were gained by the employers of trainees in the pilot courses?

An expected outcome for employers of trainees from the 12-week intensive course was an increase in productivity within the workplace. Managers of services providing sonography had an expectation that graduates from the University of Auckland programme would be more productive in the workplace in comparison with those from other programmes.

*I think it increases the productivity of the person who is overseeing the student, because what can often happen is that, if the student is confident enough and the clinical tutor is confident enough in the student, the student can have their own list of patients and the supervising sonographer can also have a list and when the student is ready to have a scan checked they can ask the supervisor to come in and check it. Now if you're doing one on one supervision then the student sonographer and the overseeing sonographer have just one list and it's much more intensive that way, so the sooner you can get a student up to a normal scanning speed the better and so the productivity would increase sooner I believe. (Manager of clinical setting/clinical supervisor)*

*When I compare them with the previous student that did the DMU course before the intensive course was available they're more productive. They're more productive because they're more confident in the scanning that they're able to do and more productive in the way they fit into the team. They all seem to have greater confidence and that means that when they hit the clinical space they're not sort of starting right from zero, they know what an ultrasound machine is, they know what a patient is and the types of interactions they're likely to have with the patients. (Manager of clinical setting/clinical supervisor)*

One manager's experience of trainees returning to the workplace was extremely positive. He considered trainees understood what they needed to be doing and were more independent:

*They're doing well. We had training in the first cohort and the second cohort. Both have been performing very well when I think of that. I think from my perspective it has been successful in producing people that can hit the floor running when they get here and don't need as much intensive supervision...they seem to be more independent. Because they've learnt how to operate the machine and they understand some of the issues with dealing with patients and workflow and asking the right questions, they seem to be more independent than when they weren't going through the 12-week model. (Manager of clinical setting/clinical supervisor)*

As identified in the previous section there were distinct discrepancies between the views of managers in the public health sector and those of some managers interviewed who work in the private health sector.

*In terms of productivity the student [from the 12-week fast track programme] creates a burden on our organisation because of the fact that you have to have someone to supervise them when they could be scanning. So there is a huge commitment from our organisation to do this, because financially it does cost us quite a bit. (Manager of clinical setting/clinical supervisor)*

Other managers deemed trainees from the 12-week fast track sonography programme as being productive in particular areas, but not well rounded.

*Yes, it's productive in that the student can do an abdominal and a renal scan. But she can't do a pelvic scan. She hasn't done the whole abdomen properly, she's had a simulator. She can't do any obstetrics; she can't even do a small part. So you know it's one small component of a whole lot of things that have to be taught. It is a start. She knows how to use a probe and she knows her way around a machine and she knows how to interact with the patients. So all of those things are good things. (Manager of clinical setting/clinical supervisor)*

However, not all managers working in the private sector felt that there was a decrease in productivity in the workplace through having trainees engaged in the 12-week sonography programme. The following excerpt from a manager in the private sector correlates the absence of the student for 12 weeks while on the course to an increase in productivity by decreasing the burden on the other sonographers.

*Yes, I think so. I think so definitely, because we have nothing to do with them for the first 3 months. So yes that's definitely taken some of the work off us. Whether it actually gets your student further on than if you have been involved, I'm not sure. But it certainly has eased the burden. Because my thought was that the whole point of this programme was to get more sonographers training and through the system which it has. (Manager of clinical setting/clinical supervisor)*

Did the pilot represent value for money to HWNZ?

In consultation with Health Workforce New Zealand it was agreed a value for money assessment was not feasible given the scope of the evaluation and the availability of the required information.

What unintended outcomes, if any, arose from the pilot?

There was no evidence of any unintended outcomes arising from the pilot apart from cost of maintaining the volunteer system.

Should the revised training programme be expanded and if so, how?

The training produced 15 trainees who proved valuable in the workplace. However, it is not possible to determine if this is 15 more than would have been trained otherwise. While some informants identified there are other training pathways for sonography available for their organisations, they were also keen to support this model and the 12-week intensive component. Only one was not supportive of the training model.

The 12-week intensive course provides an additional pathway into sonography which is useful and expanding beyond Auckland may be worth considering. In the pilot phase report it was noted the current 12-week intensive course is regarded as only a viable option for those living in Auckland, or for those who could easily travel there (Dickinson, Adams & Neville (2015).

To inform the value of expanding the programme, it would be necessary to advise: how many of the 15 people trained were additional to those that would have been trained anyway; what the additional cost was; and whether that cost is considered reasonable in comparison to other training pathways. The desirability of having a range of training options available to suit the diverse needs of potential trainees was a strong theme in the pilot phase report (Dickinson, Adams & Neville, 2015), and to a lesser extent in the current evaluation.

To what extent do employers confirm the value of the training model to their business such that they would continue to support it?

Across the range managers of clinical settings/clinical supervisors from both the public and private sectors interviewed, all agreed that there was a need to train more sonographers to meet the Northern region's demand for their services. Nearly all identified their support for and the value of the 12-week sonography course.

*We selected this programme because we felt that at least 3 months intense training would mean that students would get a head start. For example, just picking up a transducer and knowing how to turn it in your hand, to correctly orientate it and all of those sorts of things. That the student would actually come to the site and have some of that basic knowledge I think it has to be positive and adds value. I think that any hands on intensive clinical training that you have, even if it's on volunteers has to be a bonus, it has to set you up to have a head start when you come into the clinical environment and have to pick up a transducer for the first time. If you've had lots of practice even on dummies and volunteers for 3 months, you've got to be more forward than if the first time you pick up a transducer is being observed by a sonographer on a real patient, and all the nervousness that the patient portrays let alone what you might be feeling as an individual trainee. So I believe it has to be a bonus which is why we selected the program. (Manager of clinical setting/clinical supervisor)*

The value of the fast track sonography programme is also clearly identified in the following excerpt from a manager from the public sector.

*It has [the 12-week fast track sonography programme] added value, particularly because when with the other courses a student starts fresh in a department then they have to be supervised one on one, whereas if you've got students that are already familiar with an ultrasound machine, they don't need such close supervision and if they can get scanning at a good speed, it does reduce the amount of supervision that's required. (Manager of clinical setting/clinical supervisor)*

While the following excerpt is not about managers, it provides a tutor's perspective as to the perceived value of the course particularly in the way trainees were performing when they returned to work:

*I have has some feedback from my work colleagues who work in the private sector and they have some students and have been pleased with how they have started off and pleased with how they're going, it's basically been word-of-mouth ... and I know from these two places, one's a big private practice is happy with how their students are going and also one of the hospital's has been very pleased ... they're really pleased she's able to just go in and start the scans herself ... it's all been positive. (Education provider/university tutor).*

The same tutor further reinforced the value of the 12-week course to workplaces:

*I think it's a really good course. I think it's great and it's just what the students need ... I sure there's not going to be any negative feedback about it ... because basically they want their students scanning as fast as possible, you know they want them earning money, the private ones, they want them scanning and it's in their interest ... this course is really beneficial (Education provider/university tutor).*

She also described the previous model of training sonographers which involved trainees learning on the job and how complicated this was:

*In New Zealand you basically got a training position and basically start work with the hospital and you're sent to watch people scan for a while, see what they do and try to pick it up, pick up the machine operation and what they're doing and then if they're not too busy they might let you scan when they finish scanning the patient, they might let you have a few minutes to scan yourself ... it's a very complicated job to learn and it takes months and months and months, even after a year of working full time and scanning full time, you still don't know much ... it could take you up to a year to be able to scan your own patient and in some places they're short of staff to supervise students. (Education provider/university tutor).*

In a similar vein another tutor described the 'traditional' way of training sonographers as variable in quality whereas the current 12-week model was more focused and consistent, thus supporting the notion of the value of the 12-week model to the workplace:

*Traditionally sonographers basically get trained by, you know they sit in a room with a sonographer for a few weeks and watch and they basically they get given their own patients and get told to go for it and the supervision is very variable, some of them get supervised reasonably well, other students basically don't get any feedback or any kind of supervision at all really, they basically just muddle along by themselves and never know whether they're doing things properly or not ... they don't get a lot of input so they have to teach themselves, that's how I learnt ... so this is the first formal kind of teaching that student sonographers in New Zealand have really had. (Education provider/university tutor).*

However, one manager thought the 12-week fast track sonography programme did not add value to their business.

*To be totally honest, the people on the Australian DMU programme are more skilled. It [the Diploma of Medical Ultrasound programme] seems to be a very comprehensive programme and they're much more advanced, from what I've been told by the radiologists and the senior sonographers and what I've witnessed and all the rest of it. I think they're just more aware and they have a better understanding and they're ready to get going straight away. Consequently, they add more value to our business. (Manager of clinical setting/clinical supervisor)*

The same manager identified in the excerpt above identifies the significant cost to their organisation of supporting trainees through the 12-week fast track programme, and questions the value of the programme in comparison to other ways of educating sonographers. This manager also cites a lack of consultation with private providers that may negatively impact the value they place on the 12-week programme.

*I mean seriously, we're talking \$100,000 plus a year for these people by the time we put all of what we're having to put in to it, we've worked it out, it's a substantial commitment. For us, it's like well if they're better at the DMU, then we're better to get them to the DMU. But from my perspective, I'm really pro New Zealand, so if we could get this to happen here and make it work, then I would like that. But I just don't know sometimes whether people, in the university sense, want to hear from a private provider, or whether they think they know better about how to do it and they just go off and do it. You know what I mean? It would be good to have consultation, just to see and take that on board. Because at the end of the day we're the ones that are paying the major costs in all of this, but yet we haven't been consulted.*  
*(Manager of clinical setting/clinical supervisor)*

#### Concluding comment

There is clear evidence that the 12-week intensive course has produced excellent results on all outcomes shown on the logic model. The curriculum is well-designed with sound pedagogy and there is an infrastructure well-suited to support trainee learning. Since the conclusion of the data gathering for this evaluation and prior to publication of this report employers have made a serious commitment to supporting the 12-week intensive course. No further HWNZ funding is available, so the full expense of providing the training will be borne by these employers.

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