**Investment Case – Prioritisation Pro-Forma**

**This pro-forma is to be used for the prioritisation of 19/20 investment cases**

**Business Case Name: Ultrasound Scanner For Acute Medicine**

**Business Case Ref:**

**Division: Acute medicine and Emergency Care**

**Specialty: Acute Medicine**

**Divisional Contact:**

**Sign-offs required PRIOR TO**

**Investment Case**

**Detail**

**Overview**

The purpose of an Acute Medical Unit (AMU) and of an Ambulatory Emergency Care

(AEC) Unit is to rapidly assess patients, formulate a diagnosis and initiate treatment: by

doing that we improve outcomes, shorten hospital stay and avoid unnecessary admissions.

Having easy access to diagnostic equipment is essential to making fast and accurate

diagnoses. Moreover, ultrasound guidance greatly enhances safety and improves success

rates of invasive procedures, having become mandatory or recommended in many

instances. It is shortly to become a mandatory part of the AIM higher specialist curriculum.

Currently at the XXX Site there is no dedicated ultrasound scanner for rapid bedside

diagnostic and procedures supervision in the AMU or AEC Unit. This means that patients

are always referred to either radiology or other specialty teams for investigations and

invasive procedures, which results in longer length of stay (LOS) and increased costs.

**Objectives**

* Enhance the quality and efficiency of patient care through rapid bedside diagnoses and

early start of appropriate treatment.

* Improve safety and success rate of invasive diagnostic and therapeutic procedures.
* Improve patient flow, optimise admission avoidance and reduce inpatient length of stay.
* Reduce costs associated with diagnostics, specialty referrals and prolonged length of stay.
* Improve the training quality for junior doctors, as ultrasound is part of the acute medicine

curriculum.

* Align to the Trust Strategies including education and innovation, reduce waste and

Delay, and properly equipped.

* Fulfil the Trust Values including inspiring confidence in our care

**The issues:**

**Quality of Care and Patient Safety**

Many patients each day both in the Acute Medical Unit and in the Ambulatory

Emergency Care Unit need urgently either an ultrasound scan or echocardiogram to

aid in the differential diagnosis (confirm/exclude diagnoses) in order to establish the

correct treatment as soon as possible. Lack of a dedicated scanner in Acute

Medicine means these diagnostic tests can only be requested via Radiology and

Cardiology, with an inevitable delay (ranging between a few hours to a few days) in

reaching a definitive diagnosis and establishing the correct treatment.

Similarly, many patients in AMU and AEC require either a diagnostic or a

therapeutic procedure: ultrasound guidance both increases safety and improves

success rates for these procedures, so much that in many cases ultrasound

guidance is mandatory by Trust and/or National Guidelines. Lack of a dedicated

scanner in Acute Medicine means that these procedures can only be performed by

radiology or specialty teams, with an inevitable delay (ranging between a few hours

and a few days) in reaching a diagnosis or completing a therapeutic procedure.

The availability of performing bedside ultrasonography would allow the team to recognise life-threatening pathologies earlier in the patient journey, improving safety and quality of

care and expediting transfer to the correct service (for example cardiothoracic

surgery, vascular surgery, etc) for definitive treatment. In life-threatening acute

pathologies, timeliness is essential to improve outcomes.

Unavailability of bedside ultrasonography and limited availability of ultrasound

scanning capacity in radiology often leads to choosing a different imaging modality

(i.e. CT scanning) to expedite patient journeys and reach a diagnosis in a timely

fashion, but involving unnecessary exposure to radiation and intravenous contrast

with consequent risk of malignancies and of concerns around kidney injury. Conversely,

ultrasonography has established an enviable safety record.

High rate of failed Lumbar Puncture (LP): a recent audit showed a high number of

patients referred to the anaesthetic services for LP in theatres (in CEPOD list) as

they had failed LP attempts in the ward. Ultrasound guidance has shown to

increase success rate, and therefore reduce pain/harm from multiple attempts and

improve efficiency.

In case of peri-arrest and cardiac arrest bedside echocardiogram and chest

ultrasonography, allow identification of underlying pathology and early

establishment of appropriate treatment increasing likelihood of successful

resuscitation, as recommended by the Resuscitation Council UK (FEEL Course).

**Efficiency (Patient flow, length of stay, admission avoidance)**

Patients in AMU can have to wait up to 48-72 h to have tests such as ultrasound

abdomen or echocardiogram and many discharges are delayed as a result, or

patients are allocated to the wrong specialty/destination ward on the basis of an

incorrect initial presumed diagnosis, therefore increasing their length of stay.

Patients in AEC often have to re-present on a different day to have an ultrasound based

test and, as a result, take up resources again to be reviewed (often by a

different doctor) on a different day, therefore reducing availability to accept/pull

more patients from ED and reducing overall AEC efficiency throughout the week.

Patients in AEC with significant, potentially life-threatening pathology in their

differential diagnoses, often require admission for safety reasons until a certain

diagnostic test can be performed to rule out that pathology, defeating the admission

avoidance purpose of an AEC service.

Limited resources in Radiology and Cardiology mean that some patient less at risk

are allocated a lower priority and often end up having to wait longer for the

diagnostic test.

Similarly, invasive procedures requiring ultrasound guidance such as chest

aspiration/drainage, intravenous line insertion, paracentesis (abdominal drainage)

are often delayed due to limited availability of specialty team time.

Currently specialty reviews often require diagnostic tests to be carried out to reach

a diagnosis and before definitive treatment is established: availability of a scanner

in the Unit would allow specialty teams to reach a diagnosis earlier while reviewing

a patient, for example performing a chest ultrasound without the need to book the

patient in the pleural clinic.

**Limited access to US and ECHO out of hours**

Patients that require US/echo out of hours have very limited access to these tests

due to reduced staffing overnight and during weekends.

Out of hours radiology support is limited only to plain X-rays and urgent CT scans.

**Training and Teaching, Staff Retention and Recruitment**

Difficulty to maintain up-to-date skills for AMU Consultant team as part of their

speciality skill, who are already fully accredited in BSE, FAMUS, FICE and FEEL,

due to no access to US scanner: this reflects in poor staff retention and challenges

in recruitment.

Ultrasonography is a recognized part of the Acute Medicine Curriculum, and will shortly become a mandatory part of training. Although we have the staff able to teach this skill, we are lacking in equipment. This reflects on a poorer educational experience for trainees compared to other Acute

Medicine rotations and overall poorer trainee feedback on HEE and GMC Surveys. Offering these training opportunities will improve junior clinician recruitment and retention.

**The benefits:**

* Improved Quality of Care: earlier definitive diagnoses, earlier referral/transfer to the right

specialty team, earlier establishment of correct treatment and improved survival in periarrest/

arrest scenarios.

* Improved Patient Safety: reduced risk of diagnostic delays, reduced risk of failure or harm

during diagnostic and therapeutic procedures.

* Improved Efficiency: reduction in patient length of stay and subsequent improvement in

patient flow, improved admission avoidance.

* Reduction in costs: reduction in referrals to radiology, cardiology and specialty teams for

diagnostic tests and diagnostic or therapeutic procedures.

* Trainee/staff members will benefit from formal ultrasound training with accreditations:

current provision of training in ultrasound-guided vascular access and FEEL Course will be

consolidated and expanded to include bedside ultrasonography skills in acute medicine (see

attached document).

* Having ultrasound-accredited Acute Medicine Team members may improve recruitment and

staff retention attracting candidates to the Unit.

* When a formal Departmental Echocardiography is still required, technicians could use the

machine on the Unit without the need to bring a scanner from the Clinical Measurement

department, which can be an infection control risk, and might allow them to improve

efficiency by reducing transport times or having to wait for a scanner to become available.

**Ultrasonography endorsement by National and International Medical societies in**

**support of the case**

Diagnostic ultrasound is recognized as a safe, effective, and highly flexible imaging modality

capable of providing clinically relevant information about most parts of the body in a rapid

and cost-effective fashion (WHO technical report, Geneva 1998).

The Resuscitation Council UK encourages the use of echocardiogram in any peri-arrest/

arrest situation as guidance to the differential diagnosis of the underlying cause. A

FEEL course is run annually in our hospital to assist with training in this field.

Undoubted benefits of ultrasonography are detailed in Internationally validated protocols to

assess critically ill patients ie: BLUE protocol for lung ultrasound, POCUS point of care

ultrasound, FAST in patients with trauma and FALLS (Fluid Administration Limited by Lung

Sonography) protocol for the management of acute circulatory failure.

Both SAM (Society for Acute Medicine) and the Royal College of Physicians endorse

ultrasonography as part of the acute medical assessment.

In line with the national target for the development of basic ultrasound skills in Acute

Medicine Wards (Ultrasound training recommendation for medical and surgical specialties

by the Royal College of Radiology).

NICE guidelines advise US-guidance for invasive procedures such as insertion of central

lines, pleural and abdominal fluid drainage for increased patient safety.

Currently our Trust ICU guidance is suggesting the use of US to identify optimally the

Lumbar Puncture insertion point and increase the success rate of the procedure.

**Supporting evidence from XXX AMU**

During August 2019 the Clinical Measurements department received 100 requests for

Inpatient Echocardiograms from AMU and ED (not including AEC), an average of 3.36 a

day including weekends (see attached doc).

An audit of 48 ECHOs done by Acute physicians between 2014 to 2016 showed that prompt

ECHO completed on admission streamed efficiently patients to cardiology care in the PRUH or directly to another hospital (see attached doc).

Anaesthetic Department data shows that AMU had the highest number of LP requests to be

done in Theatres due to failed LP attempts. US availability on the ward will allow more LPs

to be successfully performed in AMU without the use of the limited resources on the

CEPOD list.

**Financial Implications/Considerations**

Upfront capital cost: £23,500.00 GBP (excluding VAT) for GE Venue Go 2.5, including 3

years’ Service (year 1 standard warranty, year 2 + 3 extended service coverage for the

console and 1 probe/year).

Consumables (already in stock in AMU and AEC):

- ECG electrodes FDK245 £7.53 for a box of 500

- Ultrasound gel FDK635 £30.07 for a box of 12

Maintenance provided by EBME covering all Trust GE ultrasound scanners following

manufacturer’s Warranty and Service cover.

Expected financial savings:

- reduction in length of stay for unplanned medical admissions

- improvement in patient flow, i.e. reduction in 4h and 12h ED breaches

- reduction in unplanned medical admissions from AEC

- reduction in requests to Radiology for ultrasound scans

- reduction in requests to Clinical Measurements for echocardiograms

- reduction in referrals to Respiratory for chest ultrasound

- reduction in referrals to Gastroenterology and radiology for abdominal paracentesis

- reduction in referrals to Anaesthetics for Lumbar Puncture under CEPOD list

**Alternatives:**

1) Current proposal: preferred option

2) Acquiring existing ultrasound scanner from Radiology following capital refresh.

Unfortunately, the scanners in use in radiology are not designed for bedside use: the time

required for those scanners to turn on is of several minutes (as they normally are switched

on-off only once a day), they usually need plugging in or have limited battery capacity, and

their bulky design makes them virtually impossible to be brought in patient rooms or

examination rooms at the bedside due to very limited space.

3) Borrowing scanners from other departments/Equipment Library. In order to maximise use

in the context of a busy and dynamic department we require predictability and immediate

availability of the equipment: the time required to fetch and return scanners and the

uncertainty about ready availability when needed would significantly impair the use.

4) Do nothing: remaining status quo

**Indicative revenue implications –**

Capital 23.5 Please refer to quote in Appendix 1

VAT 4.7

**TOTAL** 28.2

**Life of Asset** >10y

**Indicative workforce implications**

None anticipated

**Other support department / directorate implications**

*Please highlight impact on other departments / directorates to enable the business case to be delivered, and how this business case can demonstrate that any additional capacity requirements can be managed*

**Area impact**

**Y/N**

**Brief Description of impact and how this can be managed**

Radiology N Reduction in demand

Pathology N

Therapies N

Weekly theatre sessions required N Reduction in demand

Outpatient clinic requirements N

Critical Care bed capacity N

Medical Engineering and Physics N Included in EBME cover

Estates – e.g. energy

consumption, housekeeping /

catering requirements N

Other N Clinical Measurements: reduction in demand