



# PET-CT Site Planning Guide

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# PET-CT Host Site Planning Guide

This site planning guide is an introductory overview of the Mobile PET-CT service and the hosting requirements.

We work with all host sites to determine site-specific requirements and specifications.

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# About us

## Mobile Imaging Limited

Mobile Imaging is a joint venture between Mobile Health Group and New Zealand Radiology Group. Together we are uniquely placed to provide a mobile PET-CT service for Aotearoa New Zealand.

## Mobile Health Group

Mobile Health established the Mobile Lithotripsy Unit in 1995. This unit, which was rebuilt in 2020, uses shock wave lithotripsy to provide non-invasive kidney stone treatment for patients at both public and private hospitals throughout the country. The mobile service efficiently shares a large CAPEX item between many locations, reducing waste and saving money for the health system.

In 2002 Mobile Health launched a Mobile Surgical Unit - Te Waka Hauora, to provide low-risk elective day surgery predominantly to 25 rural towns throughout rural New Zealand. This publically funded service reduces difficult travel for many patients and provides equity of access to the rural sector. A second mobile surgical unit is currently under design and is expected to be on the road in January 2027.

*During the last 30 years, the two services have treated more than 50,000 patients.*

## New Zealand Radiology Group (NZRG)

Allevia Radiology is an industry-leading provider of diagnostic imaging services with locations throughout New Zealand. Allevia Radiology has pioneered many significant advancements in radiology, including being the first practice to install an MRI scanner, to offer 3T bore imaging, and to offer private mammography services. Allevia has also led the way in molecular imaging with a dedicated PET-CT facility at the Epsom, Auckland site.



## Pioneering advancements in imaging

Healthcare providers use advanced imaging to help diagnose, locate and assess a disease in patients more effectively.

PET-CT can very accurately detect the early stages of the disease and can be used to monitor the disease and determine the effectiveness of different treatment plans.

## Equity of access

While PET-CT imaging is becoming increasingly available in large urban locations, it is unlikely that a permanent fixed installation will be viable outside these main population areas.

Many patients with cancer find travelling for treatment and imaging challenging, especially when long distances or overnight accommodation is required. Having to travel while unwell adds a further barrier to receiving the best possible care, and for those unable or unwilling to travel, there is a significant adverse impact on treatment and outcomes.

***The Mobile PET-CT is working towards making advanced PET-CT scanning accessible to all.***



# Imaging we offer

Several types of imaging will be offered on the Mobile PET-CT unit:

## PET-CT scan

Positron Emission Tomography (PET) is an imaging procedure that uses small amounts of radioactive tracers to help diagnose, locate and assess a disease. It can be used to study specific areas or the whole body. The functional PET images are fused with high-definition anatomical CT images, after which the scan is called a PET-CT scan.

Several types of radiotracers will be used for different scans:

## PSMA PET-CT accurately detects prostate cancer spread

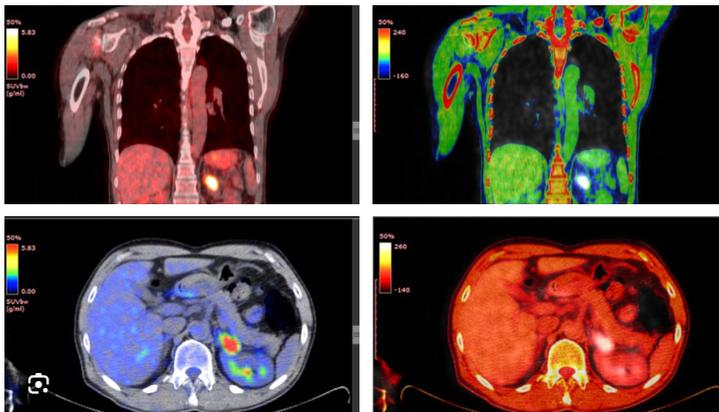
When a patient is injected with small amounts of a radioactive tracer called Gallium 68-PSMA, the PET-CT scan, is able to accurately identify active prostate cancer cells.

## FDG PET/CT

<sup>18</sup>F-FDG is used to investigate the whole body, specifically in the area of oncology (cancer). The role of this type of scan may be to stage and monitor the response to therapy of malignant disease.

## Gallium-68 Dotatate

Gallium-68 Dotatate is a cutting-edge diagnostic tool used for the evaluation of neuroendocrine tumours, a group of rare cancers that can be challenging to detect.



## CT scan

The CT (Computed Tomography) scanner uses computer processing and X-ray to produce detailed cross-sectional images of the body, including three-dimensional pictures. Unlike standard X-rays, CT scan show bones, soft tissue anatomy, blood vessels and air - all in very fine detail. A radiologist interprets these images. CT imaging is a highly advanced form of X-ray beam that shows the anatomical detail inside the body and detects alterations of structure caused by disease.



# About radiation

## Patient

The PET-CT scan is a safe and routine procedure. Millions of PET scans have been performed around the world without complications. The amount of radioactivity administered to a patient for a PET scan is small and will decay by the end of the day. However, because it takes a few hours to decay, they should minimise contact with others (especially tamariki/children and pregnant women) for up to 4 hours following their scan.

## Mobile PET-CT unit

The PET-CT unit has been designed and built in Europe to strict regulations, which ensure it is safe for patients, staff working onboard the unit and the facility where the unit is hosted. Lead shielding is strategically used throughout the unit to ensure no radiation is emitted outside the vehicle.

As a primarily precautionary measure a 3.5m exclusion zone on all four sides of the vehicle is preferred. This distance may be reduced on a case-by-case basis, depending on the onsite assessment.

## Toilet

After a patient is injected with the radiotracer, they wait for 60 minutes for it to be distributed through the body. Before they are scanned, they will go to a toilet where they will void a small amount of radioactive material.

Option 1: If a full flush permanent toilet is available with completely separate access, then this may be used by the PET-CT patients.

Option 2: If a suitable toilet is not available at the host facility, a lockable trailer-based portable toilet can be provided. This will generally be placed within the exclusion zone around the vehicle. The toilet will be delivered the day prior and will be collected the day following, which allows any radioactive tracer to decay to harmless levels.



# Semi-trailer unit

The Mobile PET-CT is a large and heavy vehicle consisting of a prime mover (truck) and a trailer unit. The facility can operate without the prime mover, which may be moved onsite where there are space limitations.

## Length

13.6m trailer only

17.5m total with prime mover

## Width

2.55m width sides closed

5.40m width with sides extended and stairs deployed

## Height & weight

4.2m height

44 tonnes weight

**Vehicle access:** Determining the best entry and egress path of the vehicle is done on a site-by-site basis. One of our experienced drivers will evaluate your site's plans and give feedback regarding access. Swept path analysis is available.

**Platform gradient:** All efforts should be made to ensure the parking site is as level as possible. The vehicle has been fitted with stabiliser/levellers, which will accommodate up to a 1:100 gradient or crossfall in the parking area. When fully deployed, each of the four 150mm diameter stabilisers is loaded up to 11,000kg. 500mm outrigger pads are utilised to spread the load further.

**Toilet:** A suitable toilet must be designated for use by patients following the injection of contrast. If a suitable toilet is not available, arrangements will be made for a transportable unit to be positioned onsite.



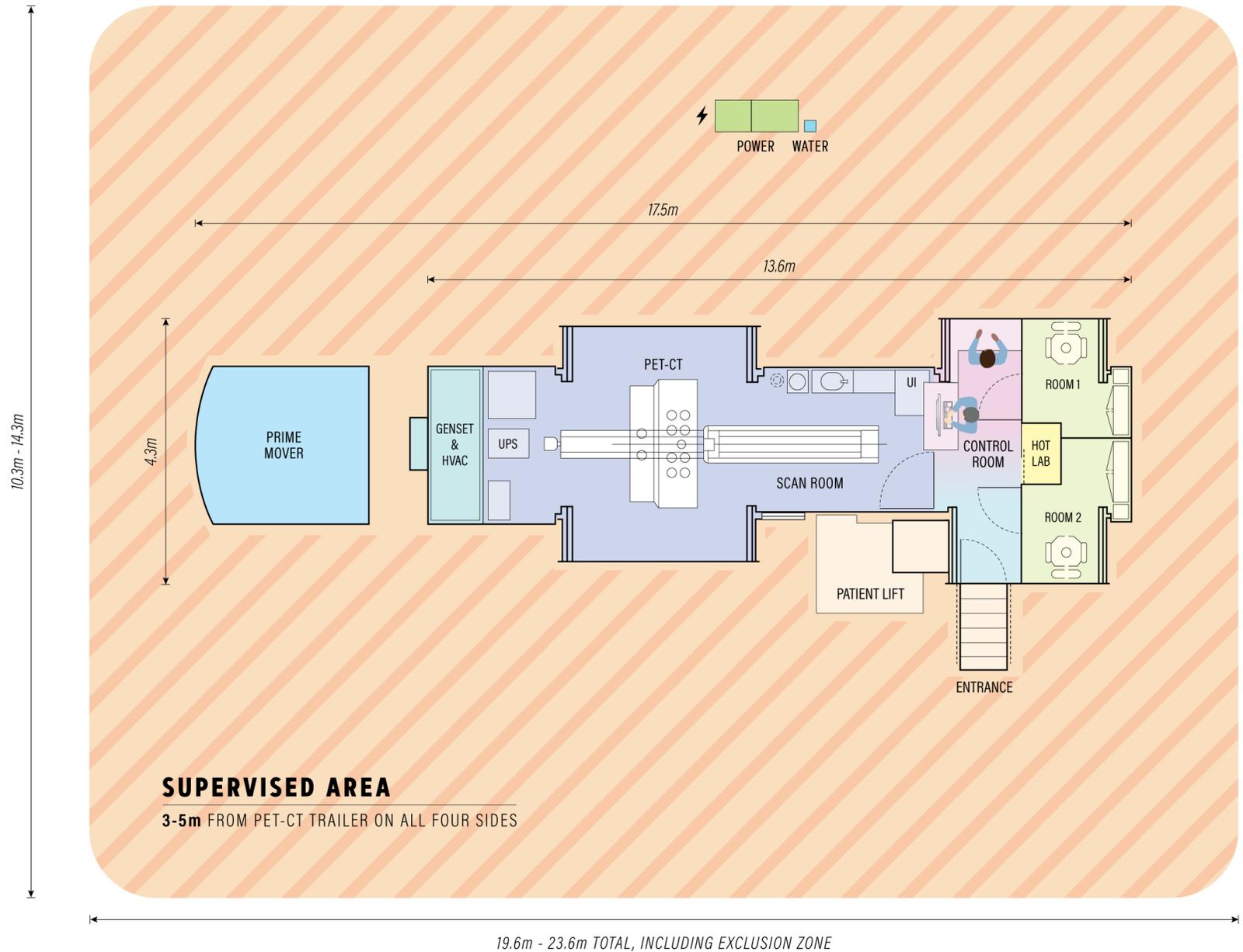
## Vehicle exclusion zone

When deployed and providing scanning services, there should be a **3-5m** safety exclusion zone on all four sides of the trailer.

This will be clearly marked with cones and cone bars.

**10.3m** width

**16.6m** long



# Hosting

## Arrival and setup

The hosting requirements will vary from site to site - these will be agreed upon in detail with each host site. A general guide is as follows:

- Before the vehicle arrives, the access and parking areas should be cleared and coned off if required.
- The unit will generally arrive the evening before scanning, although it takes an estimated 60 minutes for setup, so it may arrive on the day of scanning.
- The unit will generally leave in the evening following the list.
- If required, a portable toilet trailer will be delivered prior and will be collected the day following.
- A specialised trailer based generator is available while permanent power is provisioned

# Clinical

## Policies and procedures

Detailed policies and procedures are being developed to ensure the safe and efficient use of the PET-CT service. These will be shared with all host sites and will include the following:

- Policies
- Incidents
- Procedures
- Events
- Quality
- Medical doctor
- Risk

A medical doctor provided by the host facility, is required to be available onsite for any medical emergency response. Although this is extremely rare, provision for this situation is required and will be discussed with each host site.

# Patient Flow

## PET-CT patient flow

The PET-CT vehicle has extremely limited space, so the host facility will generally provide a reception area, a patient waiting area, and a private space for the pre-operative process.

When ready, each patient will be taken to the vehicle in a wheelchair.

- PET-CT patients will be injected with the radioactive tracer, after which they will sit quietly on the unit for 60 minutes.
- Immediately prior to scanning, the patient will be escorted to the designated toilet.
- The patient will then move through to the scan room for their PET-CT scan, which will take 15-20 minutes.
- Following the scan, patients will exit the vehicle return to the reception area or to transportation home.

Generally, two patients will be onboard the PET-CT unit at any one time, with a total of 10-12 patients per day.

A lift is provided for patient access onto the unit

## CT Patient Flow

If a patient is having a CT scan, they will follow a similar flow, but they will not require the tracer injection or waiting time. Instead, they will move directly to the scan room to have their CT scan.

# Electrical

The mobile PET-CT unit requires a large power supply with tight tolerances. Our electrical engineers will work with site electricians or facilities managers to determine the best electrical solution. The service pillar is pre-designed for ease of installation

**Power supply:** A 3-phase neutral and earth power connection needs to be provided from a MEN Main Hospital Distribution Board (i.e. neutral and earth bars linked). The maximum current draw is 100 amps per phase. However, this is a momentary draw, and the typical current draw is far lower.

## Total line impedance

The total line impedance to the PET-CT scanner needs to be under 150m-ohm. To ensure we meet this specification, please:

- measure the fault level at the hospital master switchboard (Zhv, Ztx and Zmains cable component).
- estimate the cable length (meters) from the master switchboard to the service pillar.

We will use this information and the impedance of the PET-CT unit cable to calculate the correct cable sizing from the master switchboard to the electrical service pillar.

### Power connection to PET-CT unit:

The PET-CT is equipped with a 18m cable connecting to the trailer unit's right side. Host sites are to provide an external power outlet within 15m of the centre right side of the trailer.

The outlet and protective devices are installed within a weatherproof outdoor cabinet.

## Electrical supply pillar

A lockable watertight, and durable electrical service pillar will be required to house the socket, MCCB and other electrical components. A sample design is enclosed; however, we strongly recommend that these are supplied from Mobile Imaging at cost to ensure conformity.

The PET-CT is equipped with a 18m cable that connects to the right side of the trailer unit. Host sites are to provide the electrical supply pillar within 18m of this position.

## Electrical supply socket

This is a 5-pin plus pilot socket (rated 125A). The socket is to have the earth and pilot pin electrically connected via a 500V 1 amp diode, as the vehicle incorporates a monitored-earth system (please refer to the drawing provided for diode mounting details).

## MCCB

Each hospital is to provide a 125 amp MCCB with adjustable ELCB to protect the unit's electrical lead. The enclosure should have shrouded terminals with the MCCB toggle and ELCB time and current settings being accessible within the enclosure. These units shall be mounted adjacent to the main socket and electrically connected such that the MCCB/ELCB is in circuit. The ELCB should be set as follows:

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I (residual current) = 100mA

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t (time) = 60mS

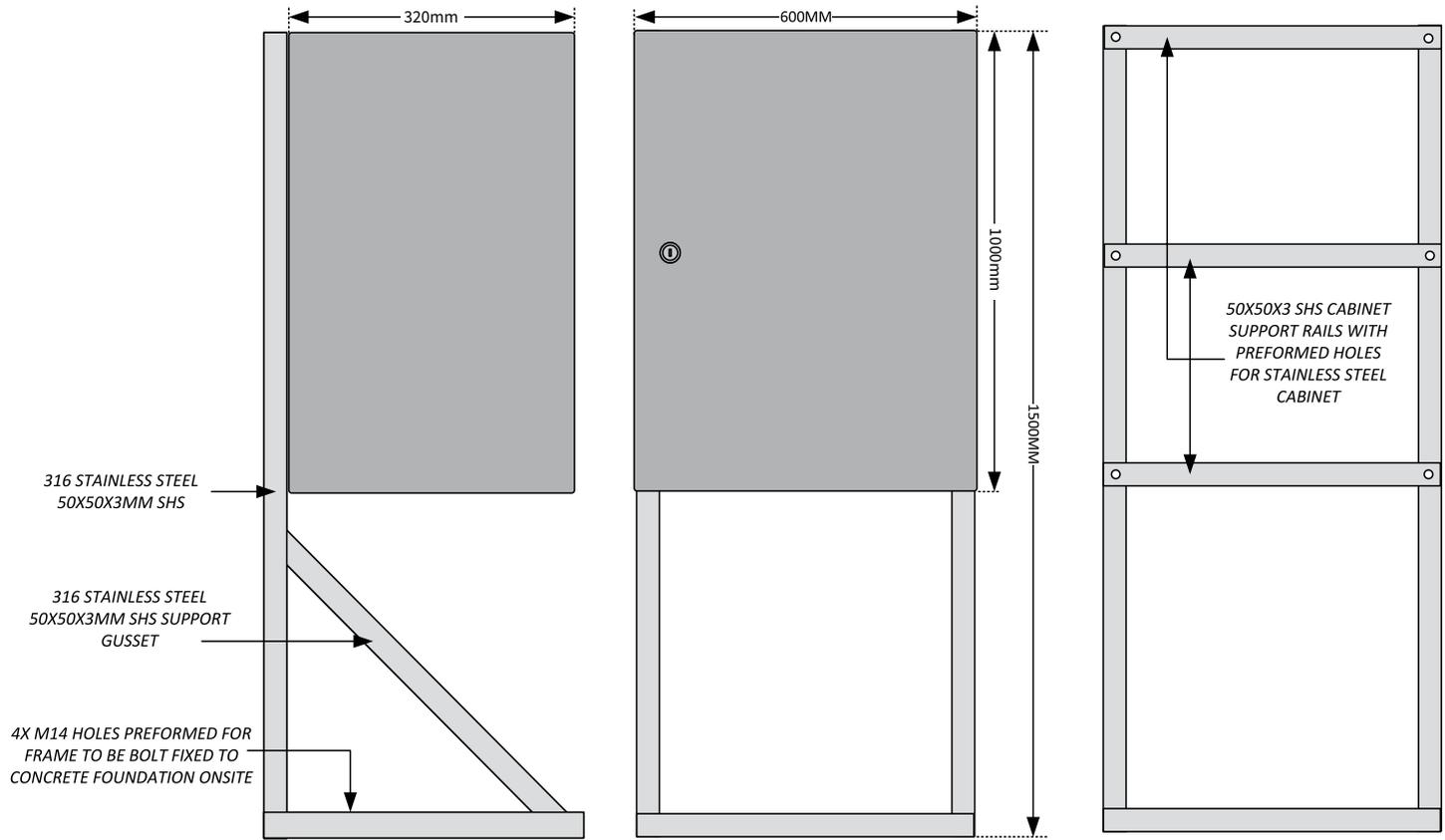
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**NOTE:** All electrical specifications are currently being established. While this is a useful guide in the interim, the final specifications will be available at a later date.

# Electrical: Site service pillar

## SERVICE PILLAR FRAME DETAILS

Q7423 Mobile Health Service Pillar 160A R1.vsd



## Other services



### Fresh water supply:

Cold water at mains pressure. The trailer is equipped with a 15m flexible hose with a screw connector. Hospitals are to provide a standard 20mm hose tap located within 15m of the trailer connection for the purposes of handwashing onboard the unit.



### Grey water waste:

The trailer has a small portable wastewater tank for disposal of wastewater. The hospital is to provide an open gully trap connected to the hospital foul sewer system within 15m of the trailer connection.



### Data connection:

The unit is equipped with cellular and satellite internet links, and Connected Health links. These are used to transmit the scan data offsite for interpretation.

A hospital LAN connection may be requested where cellular coverage may be limited. Our team can work with your IS department to facilitate connectivity.



### Telephone connection:

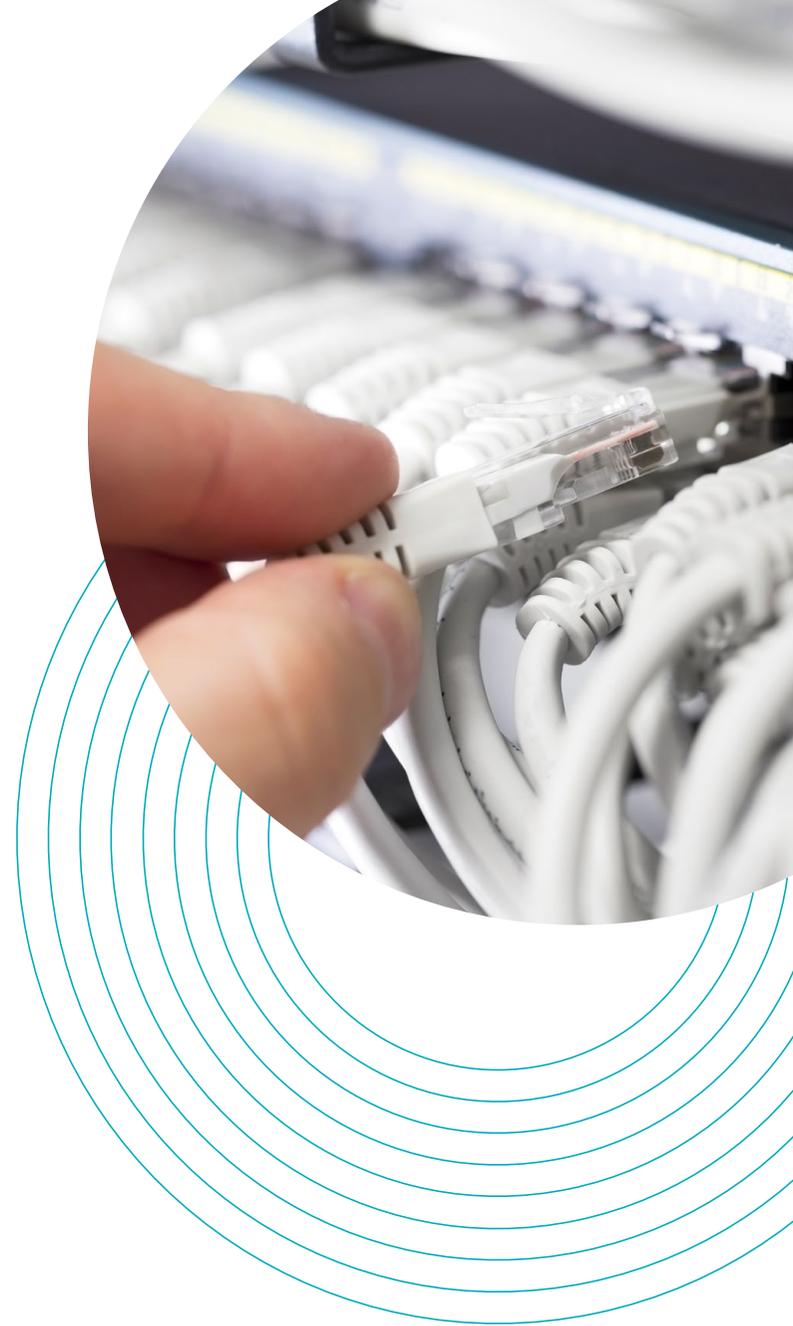
Staff on the unit use the onboard telephone system to communicate with the host hospital/ reception area during the day of scanning. Independent cellular voice links are available on the unit for external communication.

Hospitals are asked to provide an external weatherproof RJ45 outlet within 20m of the rear of the trailer, connected to the hospital's analogue phone system where available. If the hospital has only VOIP services onsite, then the outlet is to be connected to the hospital's LAN and a provisioned hospital VOIP phone is to be made available onboard the unit for the day.



### Security:

The unit is fully equipped with a camera security system and alarm.





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