NHS
United Lincolnshire Hospitals
NHS Trust

The future of nuclear medicine in Lincolnshire's hospitals

Public consultation document

OUTSTANDING CARE *personally* DELIVERED

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What is nuclear medicine?

Nuclear medicine is a specialist imaging technique involving the administration of radioactive substances (called radiopharmaceuticals) in the diagnosis and treatment of disease. The technique enables assessment of the function of organs, whereas most conventional imaging modalities (e.g. X-ray) look at anatomy.

The majority of radiopharmaceuticals used for these tests are made daily in an aseptic facility known as a radiopharmacy.

There are over 20 different tests that nuclear medicine can perform and they look at conditions as diverse as Parkinson's disease to delayed gastric emptying. In United Lincolnshire Hospitals NHS Trust (ULHT) hospitals, the most common tests performed are bone scans and heart scans.

After administration of the radiopharmaceutical, patients must wait for a time for the radiopharmaceutical to distribute in their bodies before the images are then taken on a specialist camera called a gamma camera. This camera detects the radiation emitted from the patient to enable the organ of interest to be investigated. A gamma camera is similar in size to a CT scanner.

Due to the fact nuclear medicine involves radiation, the technique is highly regulated and all staff have to undergo extensive specialist training. This is to ensure the risk to the patient from the radiation is outweighed by the benefits of having the procedure.

In addition, a clinician is required to oversee the service and hold an ARSAC (Administration of radioactive substances advisory committee) licence (Practitioner Licence). This licence lists the different diagnostic tests that can be performed under the Practitioner. Only tests that the clinician has proven training and experience in are listed on this licence to ensure the test is diagnostic and the impact on the patient management is optimised. Each site also has an ARSAC licence which requires a Medical Physics Expert (MPE) to oversee the service at that site (site licence), this also lists the tests that can be performed at that site.

Background to the nuclear medicine service at ULHT

Nuclear medicine services are provided at Grantham and District Hospital, Lincoln County Hospital and Pilgrim Hospital, Boston. The imaging is performed at all three sites, using five gamma cameras.

There is also a relatively new £1 million radiopharmacy that produces the radiopharmaceuticals, based at Lincoln County Hospital. This radiopharmacy also provides radiopharmaceuticals for Grantham and Pilgrim hospitals, which are transported there on a daily basis.

The tables below show the current configuration of the nuclear medicine service in ULHT and the number of studies that are performed:

Current configuration of the service			
Sites	**Lincoln**	**Grantham**	**Pilgrim**
Number of gamma cameras	2	1	2
Age of cameras (years)	10,12	16	11,11
Annual Number of patients (2019-2020)*	1771	680	792
Annual number of studies*	2114	886	955
Radiopharmacy on site (needed daily to produce drugs for the scan)	Yes (installed 2019)	No (from LCH)	No (from LCH)

* N.B. Patient numbers are different to number of studies as some tests require two visits

The below tables show staffing and the geographical demand on the service:

Base of current staffing (Whole time equivalents WTE)			
Sites	**Lincoln**	**Grantham**	**Boston**
Technologists	5.65	1.6	2.8
Clinical Scientists Provide support for the 3 sites.	2.8 (1.0 WTE Medical Physics expert)	0	0
Clinical imaging assistants	1.8 (also helps admin)+ 1 apprentice	1 currently vacant	0
Nurses	2.0	0	1.0
Admin	0.8	0	1.06
Total	**14.05**	**2.6**	**4.86**

This table shows the postcodes of patients who use the nuclear medicine service.

Geographical patient demand for nuclear medicine				
Postcode	**LN**	**NG**	**PH**	**Other**
Patients	1540	685	894	124
Percentage	47%	21%	28%	4%

Challenges faced by nuclear medicine nationally

Due to the fact, that nuclear medicine is a very specialist service, there are a number of challenges it faces nationally, in particular with workforce. The following table shows some of these challenges.

Challenge	**Mitigations**
Shortage of trained Clinical Technologists since the end of the national training program (on Governmental Migration Advisor list).	Apprenticeship scheme, but this requires individual departments finding the wage for the trainee. Each apprenticeship course is three years long.
Shortage of ARSAC Practitioners, in addition to a national shortage of radiologists.	None, in fact it is getting harder to get these licences.
Shortage of trained Medical Physics Experts. (takes approximately 10 years to become a consultant Clinical Scientist).*	None.
Aged equipment with a requirement to replace 211 gamma cameras nationally in the next five years.**	None.
Problems with supply of radiopharmaceuticals and isotopes.	Companies supplying the material have altered their process of delivery with additional cost to the company.

(*British Nuclear Medicine Society (BNMS) Scientific Support for Nuclear Medicine guidance 2016)

(** Diagnostics: Recovery and Renewal paper Oct 2020 NHSE)

Challenges faced by the nuclear medicine service in Lincolnshire

When we look at the service in ULHT the challenges mirror those seen nationally:

Shortage of technologists: Lincolnshire has struggled to recruit and retain clinical technologists over the last five years, as can be seen in the table below. This has been impacted further by the national training scheme for nuclear medicine clinical technologists ceasing, meaning there is now a national shortage of trained specialists in the country. Attempts to recruit abroad have been protracted and unsuccessful in a couple of instances.

Sites	**LCH**	**GDH**	**PHB**
Technologists in post (WTE).	5.65*	2.6**	2.8
Number of staff that have left in the last 5 years.	3	4	3
Long standing staff >10 years	3	1.53	1
<5 years of retirement (60 years)	1	1	1

**runs the radiopharmacy (2 tech staff daily) and the imaging of the service.*

*** 1 of these posts converted to an apprentice to try to "grow our own" technologists.*

Shortage of ARSAC Practitioners: We have two part time radiologists in Lincolnshire who hold an ARSAC licence (full list of all tests performed in ULHT) and one full time radiologist with a licence (limited list of tests permitted). Due to the fact that one of the radiologists doesn't have a full licence, to access some tests patients must currently travel to a different site to their local hospital.

Shortage of trained Medical Physics Experts (MPE): Lincolnshire nuclear medicine service has 1.0 WTE Clinical Scientists who can act as MPEs (two staff members who also have other duties). There is a legal requirement to have a specific number of MPEs in every service where radiation is utilised. The ideal number is based on a number of factors including the number of investigations and cameras. Using European and national guidance of how many MPEs the department

should ideally have, we should have 2.44 WTE to be a well-led, progressive department.

Workload of service: Lincolnshire workload demand has been static in the last five years, but the mix of tests performed have altered. The workload demand is only enough for three cameras within the county, however there are currently five.

Aged gamma cameras: The five gamma cameras in Lincolnshire are all over 10 years old, which is the age where consideration of replacement is needed (Diagnostics: Recovery and Renewal paper Oct 2020 NHSE). The oldest camera is 16 years old (currently at Grantham).

Impact of other services: The development of the new Emergency Department at Pilgrim hospital will require the redevelopment of the building that currently houses the nuclear medicine department, and a new area will need to be identified and developed for the nuclear medicine service.

Case for change

Given the challenges faced by the Lincolnshire nuclear medicine service, it is important that we consider changing how we deliver the service to secure it for the patients of Lincolnshire for the future.

At present, the staff and services are spread thinly, meaning that even low levels of staff absence impacts on the amount of work the service can perform.

Delivering the service across three sites means that some staff do not get experience of the variety of studies/techniques performed (as not all the sites have a licence to perform all the tests/treatments). In addition, the junior staff at the smaller sites currently do not have much peer support, which means there is less opportunity for them to be involved in development and to raise suggestions for improvements of the service.

The lack of Medical Physics Experts (MPE) within the county means that optimisation of the service and the ability to introduce new services into the county is limited, as they must repeat work on three sites. This also affects the amount of audit and governance that can be performed.

The fact that all the gamma cameras in Lincolnshire are over 10 years old means they are prone to be unreliable and require repair, causing cancellation of patient studies and a potential waste of radiopharmaceuticals. Due to the fact all these

pieces of equipment are old the replacement parts and expert engineers are getting harder to obtain, and two of the five systems have been served/due to be served end of life notices, meaning if they break repairs may not be possible. This means the services provided become vulnerable with potential long downtimes for some of the cameras.

At present, the utilisation of the equipment is not optimised. The British Nuclear Medicine Society (BNMS) guidance is that it would be appropriate to perform approximately 1500 scans on each gamma camera. This means that, according to our level of demand, Lincolnshire should have three gamma cameras, whereas there are currently five.

Patient experience

The nuclear medicine service carries out a patient experience survey every two years, to help understand patient opinions for the service and where improvements can be made.

Results of these surveys from 2020 and 2018 show that, at present, patients are overwhelmingly complimentary about the service that they receive.

In the most recent survey (2020) the service performed exceptionally well in terms of patients being seen quickly (the majority within a month of referral), staff being polite, helpful and reassuring and cleanliness and the quality of the waiting areas.

Overall, all patients surveyed would recommend the service to their friends or family. It showed that patients are satisfied with the service that they receive in the nuclear medicine department at present in all aspects.

Options appraisal

We believe that the safest way to provide a sustainable, long-term service to the patients of Lincolnshire is to reduce the number of sites that the nuclear medicine service is provided from. This will reduce the redundancy of equipment and create a greater capacity to replace aged equipment.

As mentioned before, the patient demand and the centralised radiopharmacy at Lincoln means there would be no real option to close the service from this site. We recommend that Lincoln remains as either the single site providing nuclear medicine, or operating alongside a second site in the county.

A full options appraisal has been performed to determine the preferred site(s) for the centralisation of the nuclear medicine service in Lincolnshire, taking into account a range of factors including input from the ULHT Patient Panel, as described below.

Below you can see the options that were reviewed. Closing Lincoln was not considered as an option, as the radiopharmacy has recently been built there and this cannot be moved.

	Option
1	Centralise to Lincoln and Pilgrim
2	Centralise to Lincoln and Grantham
3	Centralise to just Lincoln
4	“Hub and spoke” with staff based at Lincoln and running a 2 day a week service at Pilgrim, and close Grantham
5	“Hub and spoke” with staff based at Lincoln and running a 2 day a week service at Grantham, and close Pilgrim
6	“Hub and spoke” with staff based at Lincoln and running a 2 day a week service at Grantham and 3 days a week at Pilgrim

A round table discussion was performed which included staff from nuclear medicine, the diagnostics lead and the Managing Director of the Clinical Support Services division. The weighting score that was used can be seen in the table below.

Factor	Weighting (%)
Patient Experience	25
Quality of Service	25
Robustness of Service	20
Cost/Efficiency	20
Long term Sustainability	10

The hub and spoke options scored highly on patient experience but were low scoring for all other factors. The option that gave the most robust (staff, equipment), efficient, service and ensure responsiveness for urgent patient requests was option three (centralise service at Lincoln).

Patient Panel involvement in developing proposed options for future service model

The ULHT Patient Panel met on Tuesday 19 October 2021 to discuss the challenges facing the nuclear medicine service, and were asked to consider a range of factors to help in determining the proposed options for the future of the service. These were:

- Best use of staff/ ability to develop staff
- Ease of access for patients
- Proximity to facilities and co-dependent services
- Most efficient use of equipment
- Risk of test cancellation
- Cost effectiveness
- Robustness of service

Overall, the panel accepted the need to change the service and consolidate it to fewer sites. There was largely an acceptance that Lincoln should be the main site for centralisation. Some had the view that there should be a second 'hub', with opinion split between whether this should be at Pilgrim or Grantham hospitals.

The overwhelming message from the Patient Panel was a request that the Trust take seriously the concern that patients may struggle to reach their appointments if the service was centralised, and an ask for mitigating actions to be put in place to improve access if the service were to be centralised.

Considering the second site

Below is a comprehensive appraisal of the options for a second site that would provide a service alongside Lincoln hospital, based on a range of factors. **Green** is defined as the optimum, or least disruptive option, with **red** being the least beneficial option.

Patient Experience:

- **Patient travel:** Having **Grantham** as the second site would mean 28% of patients would have to travel further for their tests, based on the postcodes of current referrals. If **Pilgrim** was the second site, 21% would need to travel further. However, both options would mean inconvenience for some patients and concern has been raised about difficulty with access to transport.

- **Test cancellation risk:** The radiopharmaceuticals are made in Lincoln daily. Having the second site at **Pilgrim** would have the highest risk of cancellation due to the poor transport infrastructure in Lincolnshire which can introduce delays. There is a risk that the service at **Grantham** would be affected, but this is smaller than at Pilgrim due to closer proximity to Lincoln.

- **Patient referral to report turnaround:** The radiopharmaceuticals have to be transported to the other sites after being made in Lincoln, meaning studies cannot start at **Pilgrim** or **Grantham** until typically 10.30am-11am. This means fewer tests can be carried out at the other sites per day. In addition, the radiopharmaceuticals decay by approximately 15% during the time it takes to

transport them. They typically expire eight hours post-production and can no longer be used. This impacts on Pilgrim more than Grantham as the travel time to Pilgrim is greater than to Grantham.

- **Patient test availability:** The number of tests available at **Grantham** is more than Pilgrim. The number of tests available at **Pilgrim** is reduced due to their limited licence, and a lot of work would need to be done to get the other tests added to the licence.

- **Therapies:** No therapies are performed at **Grantham,** but **Pilgrim** have a therapy service. If Grantham was the second site then all the therapy patients from Pilgrim would need to travel to Lincoln.

- **Clinical interdependency:** The majority of breast surgeries (59%) are carried out in Lincoln. The number of patients impacted would be lower if the second site was **Pilgrim** (33% of surgeries) compared to **Grantham** (8% of surgeries).

- **Inpatients:** The vast majority of nuclear medicine tests are performed as outpatient procedures. However, if performed as inpatients the most responsive site would be Lincoln as the radiopharmacy orders are more flexible and can be added later in the day, and if possible a second manufacture session can be undertaken to ensure patients have their test as soon as possible which would help with discharge. At the moment, **Grantham** and **Pilgrim** have to order preps the day before, so cannot always do same-day request to scan studies. However, the number of inpatients/urgent patients Pilgrim do see is much higher than Grantham, so there is a preference to having a service at Pilgrim over Grantham.

Staffing:

Staff base: As Grantham has 1.6WTE in post and Pilgrim has 4.86WTE in post, making **Pilgrim** the second site would cause fewer staff members to relocate/be displaced than making **Grantham** the second site.

Support from radiologist/ARSAC: **Pilgrim** have a full time ARSAC holder on site. **Grantham's** on site ARSAC holder is part time and is due to retire in 2023.

Medical Physics Experts: There is a legal requirement to have a certain number of these in all nuclear medicine departments to advise on quality control of equipment and images. The recommendations are based on different factors including the number of cameras and equipment the department has. If we reduced the service to three gamma cameras, the number of MPEs would be closer to that recommended by legislation. This would be the same if either **Pilgrim** or **Grantham** were picked as the second site.

Efficiency of the service:

Efficiency would be improved by closing either of the sites. There might be some improved efficiency if the second site was **Pilgrim** compared to **Grantham,** as there is a larger number of referrals so it would be easier to batch patients. This is because each specific test has a set radiopharmacy kit that needs to be made for it. For a number of reason departments will wait until there is a certain number of a set test ready to book. This always has to be balanced between ensuring the patient does not wait too long for the test. Therefore, if there are less referrals there is less chance to batch patients into a session.

Quality of building and compliance with current legislation:

If **Pilgrim** is chosen as the second site the department will be a new purpose-built building and will comply with all the relevant legislation, whereas this will be less easy to accommodate at **Grantham** where the department is already in a crowded area within the hospital with little scope for further expansion.

Robustness of the service:

This would be improved irrespective of the second site and would allow training of new staff more effectively at **Grantham** or **Pilgrim**.

Quality and governance:

This would be improved by reducing to two sites, as there would be more time to perform audits, as currently work is duplicated at different sites. The Lincoln site is already IS09000:2015 accredited and is it recommended that all radiation services should have such a governance accreditation. As regards a second site there is no difference between **Pilgrim** or **Grantham** as it is simply about reducing the sites rather than which one.

Summary

Consideration	**Preferred second site (if two site model)**
Patient experience	Pilgrim
Staffing	Pilgrim
Efficiency of service	Pilgrim
Building compliance with legislation	Pilgrim
Robustness of service	No preference
Quality and governance	No preference

The options

Running the nuclear medicine service at three sites is not sustainable, and centralising the service to either one or two sites would ensure a robust service for the people of Lincolnshire.

As a result of the above described options appraisal work, we are consulting with our staff, stakeholders and public on two possible options:

- Option 1: Centralisation of the service at Lincoln
- Option 2: Centralisation of the service at two sites - Lincoln and Pilgrim

The following risks and benefits have been identified for each option.

Option 1 - benefits
Most efficient use of batching kits and studies.
Most efficient use of the cameras and staff.
Robustness for continuity of service if poor weather/traffic problems.
Greater mix of scans and tasks for technologists, so should be more likely to keep staff interested and improve staff retention.
Improve monitoring of Governance (as on one site). LCH is already ISO9000:2015 accredited.
More capacity to introduce new techniques as Clinical Scientists and senior staff will have more time to do this.
Ensure that the service is only using the equipment it needs, negating the need to equip three sites at a cost of £650k per camera (plus approximately £50k per annum servicing) as well as the other equipment and consumables needed.
Ensuring a more responsive service to patients, as the radiopharmacy is on site so can help with discharge. Currently, Grantham and Pilgrim have to order preps the day before, so cannot always do same day request to scan studies.

New camera at Lincoln, meaning a reliable service and access to up to date technology that will aid diagnosis and turnaround of studies. In addition this should increase staff retention.

Risks of this option	**Notes/ mitigations**
Requirement for patients to travel for their scans leading to inconvenience to patients and could lead to some patients going out of county for the tests or not having the test.	Patients already travel for a variety of nuclear medicine tests due to equipment, lack of staffing at Pilgrim and legal requirements for performing the tests. There is also support with transport if required.
Need to transfer inpatients from Pilgrim to Lincoln.	Most nuclear medicine scans do not require the patient to be kept in for their test; those who require a test not performed at Pilgrim already are transferred between sites.
Possible impact on other services that rely on our service before breast surgery.	Will need working through with the teams.

Option 2 - benefits
Somewhat improved efficiency of batching kits and studies.
More efficient use of the cameras.
More capacity to introduce new techniques as Clinical Scientists and senior staff will have more time to do this.
Robustness of service if problem in Lincoln hospital (power outage, flood).
Ensure that the service is only using the equipment it needs, negating the need to equip three sites at a cost of £650k per camera (plus approximately £50k per annum servicing) as well as the other equipment and consumables needed.

Reduced impact on patients - fewer patients will need to travel further for their nuclear medicine tests.	
Reduced impact on staff - fewer members of staff will need to be relocated/displaced.	
Risks of this option	**Notes/ mitigations**
Requirement for some patients to travel for their scans leading to inconvenience to patients and could lead to some patients going out of county for the tests or not having the test.	Patients already travel for a variety of nuclear medicine tests due to equipment. There is also support with transport if required.
Need to transfer inpatients from Grantham to Lincoln or Pilgrim.	Most nuclear medicine scans do not require the patient to be kept in for their test and the number of Grantham inpatients is low.
Retention of some existing issues around effective use of resources and staffing.	Still an improvement on three site model.
Risk that cannot effectively staff 2 sites	Little to mitigate this.
Harder to ensure good governance as management not day to day on site.	Regular visits from Clinical scientists and teams meetings.

Have your say

We are carrying out a 14 week public consultation on the future on the nuclear medicine service, focussing in on the two options for the future of the service as outlined in this consultation paper.

We are seeking views from staff, patients and the public of Lincolnshire on the service and how it should be configured for the future.

This consultation will run from Monday 28 February 2022 to Monday 6 June 2022.

These are a number of ways to participate in this consultation, which include:

- Fill in our survey
- Come along to one of our virtual consultation events on Microsoft Teams, details below:
  - Tuesday 8 March- 6.30pm-7.30pm
  - Monday 28 March- 3pm-4pm
  - Wednesday 13 April- 6.30pm-7.30pm
  - Tuesday 3 May- 3pm-4pm
- Or come and see us at one of our face-to-face consultation events. Places must be booked in advance using the links below:
  - Spalding: Tuesday 10 May - 10.30am to 11.30am on the Boston College Spalding Campus.
  - Grantham: Monday 23 May 11am to 12pm. At the Jubliee Church Life Centre.
  - Skegness: Tuesday 31 May – 10 and 11am. At North Shore Hotel and Golf Club.

- Invite us to one of your meetings to discuss the service, by emailing communications@ulh.nhs.uk