

NHS GRAMPIAN
Infrastructure Investment

Board Meeting 06 08 20 Open Session Item 6

1. Actions Recommended

The Board is asked to approve the following recommendations:

Ligature Reduction

1. Approve a budget not to exceed £5.73 million in order to deliver the works programme at Muick and Davan Wards in Royal Cornhill Hospital (RCH) and delegate authority to the Board Chair and Chief Executive to agree a target price with Kier, the appointed Principal Supply Chain Partner (PSCP) or main contractor for this stage of the project.
2. Authorise the Director of Finance to vary the scope of the additional programme of non-invasive ligature reduction measures to include Ward 4 at Dr Gray's Hospital. Total costs to be contained within the previously approved budget of £1.6m.

In considering the above, the Board is asked to note the following:

- The works planned within Muick and Davan wards will complete the programme of works agreed with the HSE in relation to the six Mental Health Acute Admission wards at Royal Cornhill Hospital (Huntly, Fraser, Dunnottar, Fyvie, Muick and Davan).
- The costs associated with including additional work at Ward 4, Dr Gray's Hospital in the Notice of Contravention (NOC) programme of non-invasive works will be contained within the previously approved budget of £1.6m.

Radiotherapy

1. Note the equipment replacement strategy for the Radiotherapy service and delegate authority to the Director of Finance to procure replacement equipment for the Radiotherapy service as appropriate conditional upon agreement and funding to be made available through the National Radiotherapy Programme; and
2. Note the national commitment to provide capital funding for the development of MRI guided Radiotherapy and the intention to present a business case including detail of the associated service redesign, staffing and revenue implications for consideration at a future Board meeting.

3. Strategic Context

The Infrastructure Investment Plan, approved by the Board in April 2019, sets out an ambitious programme of investment in infrastructure linked to NHS Grampian's clinical strategy and supporting the strategic theme of delivering high quality care in the right place through providing safer, effective and sustainable services.

The matters outlined for Board approval in this paper relate to planned investment in infrastructure, consistent with our strategic themes that will deliver the following benefits:

- improvements in patient experience and environment (person centred),
- improved access, quality and efficiency of key diagnostic processes (effective), and
- reduction in the level of backlog risks and enhance statutory compliance (safe).

4. Key matters relevant to recommendation

3.1 Ligature Reduction

In June 2017, the Board received an improvement notice from the Health and Safety Executive (HSE) requiring action to reduce the environmental ligature risks within the in-patient wards at Royal Cornhill Hospital (RCH). In October 2017 the Board approved a programme of works aimed at reducing the risk of self-harm in the six Mental Health Acute Admission Wards at RCH (Huntly, Fraser, Dunnottar, Fyvie, Muick and Davan) and Ward 4 at Dr Gray's Hospital, being the areas assessed where the patient population is at highest risk.

3.1.1 Stage 1 - Upgrading of Huntly Ward

To maintain capacity for Acute Mental Health assessment and to minimise the impact on the service, it was agreed first to upgrade the empty Huntly Ward as an essential enabling step.

The scope of the agreed works programme was to remove identified ligature points including items such as bespoke designed ligature reduction beds, wardrobes and cabinets and installation of low risk electrical sockets and light fittings. Additional work was also required as a condition on the building warrant such as installation of additional fire precaution measures in the corridors and dining and dayroom areas of each ward and an upgrade to the main fire alarm panel for RCH.

This work was completed in September 2018 at a cost of £1.66 million and the finished ward, well received by staff and service users alike, is now recognised as an exemplar NHS Scotland facility by the HSE.

3.1.2 Stage 2: Fraser Ward

In June 2018, Kier Group were appointed as the main contractor to progress the programme within the remaining Acute Mental Health Assessment wards.

One of the key learning points from the Huntly ward was the need to minimise the impact of the noise and general disruption associated with the construction activity on patients occupying neighbouring wards. Accordingly, the future programme is organised to allow the construction works in future phases to be completed two wards at a time (top floor and bottom floor). The next step to progress the programme therefore was to complete the upgrade of Fraser Ward, which is located immediately below Huntly Ward.

This work was completed in October 2019 at a cost of £2.5 million.

The experience of the Huntly ward upgrade provided valuable learning to inform the design and delivery of the future stages of the programme and a number of changes have been incorporated in the design for the next wards to be upgraded, including:

- Additional ensuite facilities – to improve patient experience following feedback from staff and services users on Huntly Ward.
- Interview rooms for clinical consultations & family visiting – essential to ensure privacy; and
- Informal staff rest areas – essential for wellbeing of staff.

3.1.3 Stage 3: Dunnottar, Fyvie

The Board approved Stage 3, Dunnottar and Fyvie wards, in August 2019 at an estimated cost of £5.1m. This work is now due to complete in September 2020, 8 weeks later than planned, due to the requirement to maintain social distancing on site as a result of the COVID-19 pandemic. Despite this extension to the programme, the final cost of this Stage is still forecast to be within the approved budget of £5.1 million.

3.1.4 Stage 4: Muick and Davan

A detailed design and target price of £5.73m is now available for the fourth and final stage, Muick and Davan wards, which is due to commence on site in late September 2020 with all work due to be complete by December 2021.

The increase in cost compared to the previous stage relates mainly to an overall increase in the length of the programme by 21 weeks, 14 weeks as a consequence of the requirement for social distancing on site in line with COVID 19 guidance and 7 weeks due to more onerous structural alterations necessary because of the configuration of these particular wards.

3.1.5 Additional Notice of Contravention (NOC) Work Programme

In May 2019 the HSE issued a Notice of Contravention at Royal Cornhill Hospital. This required the Board to demonstrate action to remove potential ligature points from other inpatient areas where there are high risk patients being accommodated, specifically the Intensive Psychiatric Care Unit, Crathes, Drum, Bracken, Muick, Skene, Eden and Forensic Acute Wards.

In August 2019, to address this additional requirement, the Board approved a budget of £1.6m for an additional works programme across these identified high risk areas at Royal Cornhill Hospital. Recognising the need to carry out any associated works in a live ward environment the scope of these additional works was designed to be non-invasive and minimise any disruption to patient care during the installation programme. The planned work included replacement of beds, where appropriate, with the bespoke designed ligature reduction beds, replacement of hardware e.g. door handles, locks, lamps, vents and other fittings with ligature reduction products and the sealing of frames, light switches, mirrors etc with anti-pick sealant.

The programme was progressing well until paused at the end of March 2020 at the outset of the COVID 19 pandemic and remains paused pending agreement to restart works across a live ward environment as part of the Board's re mobilisation planning.

3.1.6 Dr Gray's Hospital

With regard to Ward 4 at Dr Gray's Hospital, work to develop the available long term options for the service is also paused and will recommence in due course. Short term, a minimally invasive works programme has been designed, similar to the above NOC programme at Royal Cornhill Hospital that can be delivered safely in a live ward environment. It is anticipated that the cost of this work can be absorbed within the £1.6m budget previously approved by the Board for the NOC programme (above). Work can commence on site following agreement that it is safe to start work in a live ward environment.

3.2 Radiotherapy Equipment Replacement Programme

3.2.1 Introduction

The Radiotherapy Department is approaching a period in which a large portion of its existing treatment equipment will reach the end of its useful life and will require replacement. The following summary aims to explain the strategy to be adopted by the Radiotherapy service for the replacement of essential capital equipment over the next few years, with a focus on the introduction of new technology, in line with the Boards Clinical Strategy. It is anticipated that the required capital investment will be made available directly from the Scottish Government through the National radiotherapy replacement programme.

3.2.2 The Radiotherapy Service

Approximately 50% of all cancer patients in the UK receive radiotherapy, either as an adjuvant therapy or as the primary treatment. Taking all the patients who are cured as a group, radiotherapy is the definitive treatment in approximately 40% of cases. In fact, radiotherapy is second only to surgery in terms of the percentage of patients who are cured. In addition to being an important curative modality, radiotherapy is also a vital palliative treatment method, suppressing symptoms, extending survival and maintaining quality of life for many patients. Each year, NHS Grampian treats approximately 1650 patients, delivering 1750 courses of radiotherapy in 22,500 individual treatment appointments. This represents 11% of the Scottish patient load.

Treatment planning for radiotherapy relies on the acquisition of three-dimensional patient images such as: x-ray computed tomography (CT); magnetic resonance imaging (MRI); and positron emission tomography (PET). Advanced computer systems are used to design the treatment and calculate the pattern of radiation absorption in the tissues (the radiation "dose" distribution), so that the radiation can be targeted at a tumour. Finally, treatment is delivered using either high-energy x-ray devices know as medical linear accelerators (Linacs) or using a high-activity radioactive source (a technique known as 'brachytherapy'). As with all technology, the equipment used for radiotherapy is advancing rapidly and departments must continuously adapt in order to maintain a modern standard of care.

3.2.2 Advances in Technology

The following summarises the requirements for replacement capital equipment over the coming years, with a focus on capacity and the introduction of new technology:-

a) MRI Guided Radiotherapy:

The design process for radiotherapy treatments (“treatment planning”) has evolved over a number of years, driven by the changing technology:

- **X-ray Simulator:** These are x-ray machines that mimic (i.e. “simulate”) the motions of a linac to allow the design of radiotherapy treatments. NHS Grampian has one of these devices, but this technology is rapidly vanishing from modern radiotherapy.
- **CT Simulator:** These are conventional CT scanners equipped with a flat-topped couch and external positioning lasers. They are used together with advanced software and IT systems to design radiotherapy treatments in a virtual computer simulation.
- **MRI Simulator:** These are conventional MRI scanners specially equipped for radiotherapy treatment planning. They are used in the same manner as CT Simulators, but offer far superior soft tissue visualisation. Just as CT Simulators have supplanted x-ray simulators, so MRI is likely to become the dominant technology in the next few years. For now, CT Simulators are generally used together with MRI Simulators, since CT images provide the tissue density information necessary for the calculation of radiation dose. However, two of the four main MRI manufacturers already offer software tools that allow “MRI-only” treatment planning, so the need for CT will diminish over time.

The Scottish Radiotherapy Technical Specification and Evaluation (TSE) committee identified MRI Simulators as a fast approaching development in radiotherapy some time ago. The capital funding to enable implementation has now been approved through the National Radiotherapy Capital Equipment Replacement Programme (CERP) for each of the 5 Health Boards that provide radiotherapy, including Grampian. In addition to the identified need for MRI in radiotherapy, NHS Grampian has identified a need to increase diagnostic MRI capacity across the organisation. In order to optimise clinical services, it makes sense for the Radiotherapy Strategy to harmonise with the wider plans for MRI. Importantly, an MRI Simulator can also be used as a conventional diagnostic scanner, so joint use of the device between radiology and radiotherapy is a practical option.

b) Adaptive Radiotherapy (ART):

Radiotherapy treatments are delivered in multiple radiation doses (or “fractions”) over many days. In conventional treatment, the radiotherapy plan is designed at the start of treatment and identical treatment fractions are delivered each day. In ‘online adaptive radiotherapy’ (ART), the treatment plan is adapted to changes in the tumour and patient geometry as the treatment progresses. ART is likely to become the standard of practice in the UK within the next few years.

Two new technologies exist to facilitate ART:

- **MRI Linacs:** these devices combine an MRI scanner with a linear accelerator in order to allow MRI images to be taken at the time of treatment. The technology is several times the cost of conventional linacs and the patient throughput is significantly lower (about 45 to 60 minutes per patient, compared with 13.5 minutes locally). This is unlikely to be a suitable technology for clinical use in NHS Grampian in the near future.
- **'Ring-Geometry' Linacs:** These linacs differ from conventional 'C-arm' linacs in that they are optimised for delivery of advanced treatments (IMRT and VMAT) and they offer rapid acquisition of CT images at the time of treatment. The cost is very similar to conventional linacs and throughput has been reported as being superior to conventional linacs. The ART capability, which comprises additional computer hardware and software, can be added at a later date, though this would incur additional cost. (Note that there is no agreed terminology for this new technology, so the term 'Ring-Geometry Linac' has been adopted solely for the purpose of this document.)

The replacement of NHS Grampian's three existing linacs is scheduled to begin in financial year 2021/2022, with one linac being replaced each year over a period of three years. The NHSG Radiotherapy Strategy Group has agreed to explore the acquisition of ring-geometry linacs as a way to future proof the department for ART, which is a technique that we expect to implement in the next few years.

3.2.3 Capacity challenges

- a) The absolute number of patients is increasing:** The number of treatment courses delivered by NHS Grampian increased by 6% between 2015 and 2019, rising from 1650 to 1750 courses. A robust evidence-based study conducted by the European Society for Radiotherapy and Oncology predicts that the UK will deliver approximately 217,000 courses of radiotherapy in 2025, which is an increase of 21.6% over the number delivered in 2012¹. Given that NHS Grampian represents 11% of the Scottish patient load and Scotland, in turn, represents 8.2% of the population of the UK, then NHS Grampian should expect roughly 1950 courses of radiotherapy in 2025. This is an 11% increase over the current workload.
- b) The complexity of treatments is increasing:** The complexity of radiotherapy treatment delivery and, therefore, the time required to deliver each individual treatment is increasing. In 2012, the Department was forced to move from 10-minute to 12-minute treatment appointments. A measurement of actual patient throughput in the first 11 months of 2019 showed that the average time required per patient has now increased to 13.5 minutes compared to 10 mins in 2012. The department currently runs at 3.8% over capacity and even if the time per patient remains unchanged, the department will be running at 15% over capacity (just under 3 additional linac-hours) on an average day and will struggle to cope with peaks in demand.

The radiotherapy department is exploring options for streamlined working to reduce treatment times as well as the number of treatments (through the implementation of clinically proven shortened – or ‘hypo-fractionated’ – treatment courses). In the tender process for the replacement of the linacs, efficiency will be a key consideration in order to ensure that the purchased linac is appropriate for the clinical workload.

3.2.4 Actions and timelines

The following equipment replacement strategy is proposed to address the issues raised above:

1. Pending final agreement of all parties within the radiotherapy service, the replacement of the existing x-ray simulator will not proceed. The funding of £0.9mm allocated by CERP for the replacement in the financial year 2020/2021 will be made available to the wider CERP programme.
2. A multidisciplinary project team will be established to more fully define the options for an MRI Simulator and build a robust business case including an assessment of staffing and other ongoing revenue implications. Currently, £2.65m capital funding for the MRI scanner and associated building works is scheduled to be available through CERP in the financial year 2022/23. The associated revenue costs will fall to NHS Grampian, and a business case will be prepared for consideration and approval by the Board prior to any commitment.
3. The planned replacement of the existing CT simulator will proceed in 2022/23 (£0.8m is allocated for this purpose through CERP) but the multidisciplinary project team mentioned in 2 above will also be asked to consider potential joint use with radiology for oncology imaging.
4. CERP has allocated a total of £8.7m (£2.9m in each of the financial years 21/22, 22/23 and 23/24) to progress replacement of NHS Grampian’s linacs – this includes the cost of the linac and the ‘turn-key’ costs for installation. The intention is to replace the oldest linac first with a ring-geometry linac, which can be used conventionally but also provides a foundation to upgrade to an ART-capable linac. In 21/22, £1.1m is also available for replacement of the radiotherapy IT systems. The department are currently developing the procurement strategy in order to ensure maximum benefit e.g. by combining the procurement there may be scope for a package that includes an ART capability.

5. Risk Mitigation

Approval of the recommendations as outlined will assist in mitigating the Board strategic risk number 2515 *There is a risk that our infrastructure will not be fit for purpose nor compliant with statutory requirements if we do not have an adequate medical equipment, information technology and backlog maintenance programme and plan for redesign and transformation of services.* Failure to progress will result in existing infrastructure not being able to support our objectives for future patient care

5. Responsible Executive Director and contacts for further information

If you require any further information in advance of the Board meeting please contact:

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Date 21 July 2020