North of Scotland Hepato-Pancreatico-Biliary (HPB)/Oesophago-gastric (OG) Surgical Service Sustainability Review

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Executive Summary

The future sustainability of Oesophago-gastric (OG) and Hepato-Pancreatico-Biliary (HPB) cancer surgery in the North of Scotland was questioned. The Regional Cancer Advisory Forum (RCAF) agreed that a short life working group (SLWG) be set up with clear terms of reference to consider the pertinent issues.

The objective of the group was to identify and explore options of delivering the service in the North of Scotland which are in accord with the spirit of quality improvement in general and the volume QPIs specifically.

The group members were nominated by the Health Boards of the NoS and met on three occasions to review: the current status of OG and HPB surgery, the previously audited outcomes, the finalised QPIs, and to identify and explore options for the delivery of OG and HPB cancer surgery in the NoS.

Key benefits and risks for each option were identified. The Analytic Hierarchy Process (AHP) was adopted as a Multi Criteria Decision Analysis (MDCA) approach to support the group decision making process. The benefits and risks were transformed into assessment criteria for evaluation and included safety, effectiveness, feasibility, person centredness and knowledge generation / learning.

Bearing in mind the validity and robustness of the methodology used for evaluative comparison, it was concluded that the group’s top choice was option B (ie a virtual treatment centre on all three sites in NoS for both OG and HPB cancers). The second ranked options were options C and D (a single centre for OG / HPB cancer surgery on one or two sites). Options C and D were considered similar for practical purposes. They should be considered if option B proved unsuccessful or impractical after a significant attempt of implementation. Options A (status quo) and E (referral out with NoS) were rejected by the group.

The implications, requirements and possible subsequent re-configuration of existing services needed to provide a virtual specialist service on three sites across the North of Scotland (Option B) were considered. These included: a single service MDT (one for OG and one for HPB cancers) in which every patient across the 3 sites is considered, commonality of clinical management including surgeons visits to other centres, agreed and joint/shared governance arrangements and reporting, training, support, job planning, contractual arrangements, recognition, and resource implications.

The group agreed that the preferred option B should be implemented in a time frame of one calendar year to enable common reporting for the QPIs.

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1. Background

Two recent National HPB Cancer reports outlined governance concerns, which raised questions regarding the sustainability of services in parts of the North of Scotland (NoS).

Concurrently, the National Cancer Quality Steering Group (NCQSG) programme of work to agree Quality Performance Indicators (QPIs) for OG and HPB Cancers, outlined a significant challenge in the NoS in respect of surgical volumes for both cancers. This challenge was based on guidelines (Appendix 1) produced by The Association of Upper Gastro-Intestinal Surgeons of GB & I (AUGIS), the specialist association for OG, HPB and Bariatric surgeons, which stipulate certain surgical volumes and surgical service configuration for surgical units managing these cancers. In the finalised QPIs, surgical volume was specified as one of the quality indicators in HPB cancers but not for OG cancers. However, it was agreed by the NCQSG that surgical volumes for OG Cancers will continue to be monitored as part of the process. As such, the future sustainability of surgical services for OG and HPB cancers across the north in their current design was called into question.

Members of the Regional Cancer Advisory Forum (RCAF) carefully considered the implications of the HPB reports, and the HPB and the OG QPIs on the potential for patient pathways and future service configurations in the NOS. It was agreed that a short life working group (SLWG) be set up to consider these issues. Subsequently, both reports had been put on the agenda for the Medical Directors NoSPG meeting and there was agreement that the Medical Directors from the NoS health boards would nominate membership and chairmanship of this group. Meeting and progress reports from this group would be made available for RCAF meetings.

Following a call for nominations, an expert group was convened and Mr Sami Shimi, Consultant Surgeon, NHS Tayside was nominated as Chair (Appendix 2). Terms of reference were agreed (Appendix 3), with the main remit of the group being to identify and explore options of delivering the service in the North of Scotland which are in accord with the spirit of quality improvement in general and the volume QPIs specifically.

2. Review of current situation

Oesophago-gastric and HPB cancer surgery in the North of Scotland is carried out at the three cancer centres: Ninewells Hospital & Medical School, Dundee – NHS Tayside, Aberdeen Royal Infirmary, Aberdeen – NHS Grampian and Raigmore Hospital, Inverness – NHS Highland.

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NHS Shetland and NHS Orkney patients with oesophago-gastric or HPB cancer requiring surgery have historically been transferred to Aberdeen Royal Infirmary and patients from NHS Eileanan Siar (Western Isles) to Raigmore Hospital, Inverness for onward care and specialist surgery. Where existing transport links are more convenient, established arrangements dictate that patients residing in both the most southerly W. Isles of Barra, and those living in south Argyll and Bute will also be transferred for onward care and specialist surgery to Glasgow.

The three centres delivering oesophago-gastric and HPB cancer surgery in the NoS are large and each serves around 0.5 million of a population. All three centres deliver acute and elective general surgery as well as a number of surgical sub-specialities. All centres have active oncological and gastro-enterology services, which have contributed to the diagnosis, curative and palliative management of these patients as appropriate. All three centres in the North of Scotland have in recent years contributed annual audit data to NOSCAN Managed Clinical Network (for OG cancers) or to the National HPB network (for HPB cancers). This data was presented at national meetings for either HPB or oesophago-gastric cancer. The outcome data were in general comparable to those units from SCAN or WoSCAN.

There are some variations between the units: Ninewells Hospital & Medical School in Dundee is a large Teaching hospital on one site and serves as a tertiary referral centre. It covers the population of Tayside, North Fife, Angus and Perth. All patients diagnosed with HPB or oesophago-gastric cancer, are referred to a specific MDT which is run weekly. The hospital has a 24/7 diagnostic and interventional radiology services. The hospital also has a PET CT scanner as well as endoscopic ultrasound for staging of patients with oesophago-gastric cancer. Oesophago-gastric and HPB surgery are carried out in a single designated theatre and the patients recover in a High Dependency Unit or rarely in the Intensive Care Unit. After the acute phase, the patients are managed on Ward 11, which is the Oesophago-gastric/HPB Unit. Advanced protocols are available for the management of all patients. As well as cancer surgery, the unit manages benign oesophago-gastric and HPB patients.

The unit has four oesophago-gastric surgeons: Mr Sami Shimi, Mr Afshin Alijani, Mr Pradeep Patil and Mr Jamie Young. All surgeons contribute to oesophago-gastric cancer resections either as primary or secondary surgeon. All patients are operated on by two consultants. The four surgeons have a published rota for covering acute and elective oesophago-gastric surgery 24/7. Based on audit figures available for the past 3 years, the unit carries out approximately 15 oesophageal resections (including high grade dysplasia) and 10 gastric resections per annum. In addition, a number of palliative procedures are carried out. The unit also carries out approximately 60 bariatric operations per year.
For HPB surgery, there are three consultant surgeons: Mr Iain Tait, Mr Francesco Polignano and Mr Christoph Kulli. These consultants operate on 12 to 15 pancreatic resections and a similar figure of hepatic resections per year. This is in addition to ablative procedures in the liver. The three surgeons also have a 24/7 rota to cover acute and elective HPB surgery.

Aberdeen Royal Infirmary (ARI), Aberdeen is a large Teaching hospital covering Grampian and North East Scotland with a population of 0.65 million. This hospital also receives referrals from the N. Isle Boards of NHS Orkney and/or NHS Shetland. All referred patients are discussed at a weekly MDT which is well attended. There is a 24/7 diagnostic and interventional radiology service. Patients are operated on in different operating theatres and are managed postoperatively in either the High Dependency Unit or the Intensive Care Unit. Further postoperative management is on the general surgical wards. The hospital has a PET CT scanner and endoscopic ultrasound facility. Currently there are three surgeons who carry out oesophageo-gastric cancer resections, though only two remain doing so in practice. These are Mr Ken Park and Mr Abdul Qadir. Over the last 2 to 3 years they have carried out on average 6 oesophagectomies and around 10 gastrectomies per year between them. In addition, a number of palliative procedures are carried out. All operations are done by a single consultant. Mr Duff Bruce continues to participate in the acute general surgical receiving and on-call and contribute to oesophageo-gastric cancer surgery at Aberdeen but has in recent years increasingly focused his attention to bariatric surgery. Mr Shayanthan Nanthakumaran is a fourth surgeon who participated within the surgical team at ARI, but is only involved in benign oesophageo-gastric and HPB surgery.

The HPB surgery is provided in ARI by two surgeons Mr Irfan Ahmed and Mr Bassam Alkari. Between them, these two surgeons carry out approximately 15 pancreatic resections and a similar number of hepatic resections annually. This is in addition to a number of ablative procedures on the liver.

Raigmore Hospital, Inverness is a large Teaching hospital which covers most of the north and west Highland geographical area and serves a population of around 0.5M. Referred patients with oesophago-gastric and HPB malignancies are discussed in a weekly MDT which covers for all GI malignancies. Patients are also referred from the W.Isles. There is an interventional radiology service during working hours but there is no PET CT scanner and there is limited facility for endoscopic ultrasound. Both oesophago-gastric and HPB surgery are carried out by two designated consultant surgeons: Mr Ron Coggins and Mr Appou Tamijmarane. These two surgeons carry out approximately 12 oesophageal and 10 gastric resections per year as well as between 3 and 12 pancreatic resections and a similar number of hepatic resections
annually. In addition these two surgeons contribute to the general surgical acute receiving service. There is a close cooperation and cover between these two surgeons. The patients are managed in a High Dependency Unit or Intensive Care Unit post-operatively and on General Surgical wards after the acute phase. No bariatric surgery is carried out in Raigmore Hospital.

3. Development of a sustainable model

Objectives: The group agreed unanimously that the objective of the process was the identification of the most appropriate model of OG and HPB surgical service delivery in the NoS.

Options for evaluation: The group discussed and agreed the 5 preferred options for evaluative comparison. There was agreement that the options should be considered for OG and HPB surgical services in a similar manner where possible. The options were as follows:

Option A: This reflects the Status quo with all three centres continuing to deliver both OG and HPB surgical services independently, similar to the current situation (see above summary).

Option B: This would be a virtual specialist centre on three sites with a unified MDT, protocols and CMGs and would be subject to outside scrutiny. Surgery will be delivered across 3 sites with frequent visits by surgeons to all three sites either operating (in their site) or assisting (during visits).

Option C: A single NoS centre for the delivery of each of OG/HPB cancer surgery. OG and HPB are carried out on 2 sites (one centre for OG and another for HPB). If this option was found to be preferred, it could be further examined for sub-specialisation. For example, there is a potential for a NoS liver centre and a separate NoS pancreas center. Similarly, there could be a single NoS gastric centre and a separate NOS oesophagus centre. ie all cases being discussed and treatment plans agreed through a regional MDT, with patients thereafter transferring from the two non-specialist centres to either of the HPB or OG specialist surgical centres.

Option D: This option is a more restrictive version of option C. This describes a single specialist site within the NoS for both HPB and OG surgery ie. all cases being discussed and treatment plans agreed through a regional MDT, with patients thereafter transferred from the two non-specialist centres to the single remaining regional specialist HPB/OG surgical centre. It was agreed that any further decision-making around specifying the site would only be addressed in the event that ‘the single site’ option carried sufficient weight in the evaluative process.

Option E: This option implied transferring OG and HPB patients requiring surgery out of the North of Scotland to another specified or unspecified centre.

For each option, the group identified and considered the key benefits and risks based on the existing
service or on the perceived model of the option. The overriding considerations in this assessment were efficacy of the option and safety to patients (Appendix 4). Similar and important unique themes were then listed and considered. This process helped shape the assessment criteria and the factors to be considered under each heading.

**Assessment Criteria:** The group agreed on the structuring of Assessment Criteria - relative measurement and valuation framework. The following Five assessment criteria were selected:

- **Safety** - Under this heading, the following factors were considered: optimal outcomes, meeting the clinical and quality standards, efficiency with minimal waste and variation.
- **Effectiveness** - Under this heading, the following factors were considered: minimal human errors and minimal system failures.
- **Feasibility** – Under this heading, the following factors were considered: capacity, 10 year sustainability, impact on local services, resource implications and a ‘supposed’ stakeholder support.
- **Person centredness** - Under this heading, the following factors were considered: continuity of care, clear communication, geographical accessibility, minimal patient delays and carer/family availability for support.
- **Knowledge generation / Learning** – Under this heading, the following factors were considered: training, research and Audit.

**Factors for evaluation:** Iterative group work focused on identification of the minimum number of factors that should be considered in comparisons between Surgical Service delivery models. Factors with common properties were grouped into Assessment Criteria, and structured in a hierarchy (see above and Figure 1). It was considered unlikely that the relative value of the decision elements within each hierarchy cluster would differ by more than one order of magnitude.

**Decision Support Methodology**

The Analytic Hierarchy Process (AHP) was adopted as a Multi Criteria Decision Analysis (MDCA) approach to support the group decision making process (Appendix 5, Figure 1).

In simple terms, AHP is a relative measurement and valuation instrument for comparing option performance. The AHP approach derives ratio-level estimates of option performance compensated across all considered assessment criteria.

AHP uses relative ratios with no units for measurement, weighting and synthesis - equivalent to
proportions and probabilities. A ratio-level scale is required for meaningful relative proportion statements or valid mathematical operations such as multiplication and division. In contrast, an ordinal-scale category cannot be product weighted to obtain meaningful results.

In a group setting, use of AHP decision-support can focus discussions, clarify consensus or divergence of individual opinions, and provide a procedurally rational basis for agreement. The validity of AHP decision model outputs depends on informed and consistent relative judgments by group participants.

Expert Choice© 2000 team AHP software was used for AHP model structuring, inputs, analysis and synthesis. Individual judgements were recorded using radio frequency keypads. An AHP ideal (performance) synthesis was chosen - ‘open’ synthesis where the highest performing (‘ideal’) option is allocated the full weight for a given covering criterion and the overall sum of the ‘idealised’ option priorities changes if options are added or removed.

- **Weighting of Assessment Criteria** - 10 clinicians / regional managers participated.
  Individual pair wise comparisons - relative importance between Assessment Criteria within each hierarchy cluster in terms of ‘parent’ element.

- **Estimates of Option performance against Assessment Criteria** - 9 clinicians / regional managers participated (1 additional set of judgements - completed independently using a document format).
  Individual pair wise comparisons - relative performance between options in terms of ‘covering’ Assessment Criterion.

**Results of AHP analysis and synthesis.**

At group level, the top ranked option was Option B - a regional North of Scotland virtual specialist center on three sites *(Appendix 5, Table 1)*. The derived performances against the Decision Goal were of similar magnitude for each of the three North of Scotland Options for change (Options, B, C and D).

Low inconsistency is necessary, but not sufficient for a good decision. At Group level, the combined judgements were sufficiently consistent *(Appendix 5, Table 1)*. [In a paired comparison of elements A and B, if A is x times larger than B, then B is 1/x as large as A. An Inconsistency Ratio of 1.0 is equivalent to random judgments, and an inconsistency Ratio of 0.1 or less is the usual applied standard.]

The top ranked option was sensitive to relative changes in the Assessment Criteria weighting *(Appendix 5, Table 2)*. Option C was top ranked when a lower threshold for two Assessment Criteria and upper threshold for five Assessment Criteria were exceeded. Individual participant weightings exceeded the one-
way sensitivity analysis thresholds for only one Assessment Criteria - two participants less than 0.044 weighting for Person-Centred dimension (Appendix 5, Table 3).

At individual participant level, there was consensus about a NoS solution (Appendix 3, Table 4). Option B was the top ranked option for seven out of ten participants.

Variation in estimates of option performance between individuals was noted (Appendix 5, Tables 5, 6, 7, 8 and 9). At individual participant level, the three North of Scotland Options for change (Options, B, C and D) were top ranked against effectiveness, safety, feasibility, and the potential for knowledge generation / learning dimensions.

4. Conclusions and Implications

Bearing in mind the validity and robustness of the methodology used for evaluative comparison, it was reasonable to conclude that the group’s top choice was option B (ie a virtual treatment centre on all three sites in NoS). The second ranked options were options C and D (ie a single centre for OG / HPB cancer surgery on one or two sites). Options C and D were considered similar for practical purposes. They should be considered if option B proved unsuccessful or impractical after a significant attempt of implementation. Options A (‘status quo’) and E (‘referral out with NoS) were rejected by the group. The implications, requirements and possible subsequent re-configuration of existing services needed to provide a virtual specialist service on three sites across the North of Scotland (Option B) were considered and are summarised below:

- The establishment of a single service MDT (one for OG and one for HPB cancers) in which every patient across the 3 sites is considered (except those which were benign or complex), and which is appropriately supported administratively. Bearing in mind the numbers of cancer patients across the three sites, the MDT should be convened weekly.
- All NoS Chief Executives would need to ensure the MDT was appropriately supported by each of the required specialist clinicians from within their Boards through appropriate accommodation in their work plans.
- Commonality of clinical management: the putting in place across the North of Scotland of agreed Clinical Management Guidelines (CMGs) and treatment protocols (eg. chemotherapy regimens). This includes infra-structure to support the surgical services across all three sites such as 24/7 interventional radiology.
- Honorary contracts being approved to support surgeon’s visits across the three sites; it was agreed that each surgeon would visit both of the other two NoS sites at least once a year. The visiting non-operating surgeon would be recorded as ‘First Assistant’.
• There is a need for agreed and joint/shared governance arrangements and reporting put in place, including the preparation of an annual audit report at each year end. The annual audit report should include the figures from all three sites co-ordinated and reported by NOSCAN for the ‘single virtual centre’. The legal identity of the virtual centre will be under the NoS health boards and carry their logos. Monitoring the governance framework standards should be undertaken 3 monthly with review of outcome data by a Lead Clinician(s) and Lead Manager(s).

• Bearing in mind the complexity of the transition including contractual arrangements across the three sites for all surgeons involved, reflection in job plans, a unified MDT, etc., it was agreed that the transition should be completed within a calendar year. In the interim period, surgical treatment should continue across all three sites.

• The next steps would include implementation and facilitation of this NoS service with one overall unit or directorate, down to contractual arrangements to support the proposal.

• Trainees for the service would be from the north of Scotland health boards. They should be offered opportunities to rotate across the 3 sites for experience and the three centres should also be seen to provide support for fellowship. This will be negotiated with local Deanaries.

• It was deemed that resource implications for this model are by-en-large minimal but essential, particularly when this is considered against other feasible options.

5. Acknowledgments

I am immensely grateful to all members of the Short Life Working Group for their unreserved contributions throughout the meetings of this group. I am also immensely grateful to Dr William Moore, Public Health Consultant, NHS Grampian for introducing, running and analysing the Analytic Hierarchy Process (AHP) which was adopted by the group as a Multi Criteria Decision Analysis approach to support the group decision making process. My sincere gratitude goes to Ruth Nisbet (NOSCAN PA) for arranging the meetings venues, taking the minutes during the prolonged discussions of this group, distributing and collating responses. I am also grateful to Richard Carey (Chief Executive: NHS Grampian and NOSCAN Chair) for endorsing the SLWG process and for providing valuable input at various stages of the group discussions and out with group discussions. I am also grateful to Elaine Mead (Chief Executive: NHS Highland) and Caroline Selkirk (Assistant Chief Executive: NHS Tayside) for their helpful advice from their Health Board’s perspective.
Enclosures:

Appendix 1 – AUGIS Guidelines on Minimal Surgeons volumes

Appendix 2 - Membership and chair of SLWG

Appendix 3 – Terms of reference of the SLWG

Appendix 4 – Options selection and evaluation

Appendix 5 - The Analytic Hierarchy Process (AHP) process and results.

Appendix 6 - Minutes of meeting on 11th January 2013

Appendix 7 - Minutes of meeting on 11th March, 2013

Appendix 8 - Minutes of meeting on 24th April 2013