Managing medical equipment: A national way forward

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Outline

• Current medical equipment situation in Scotland (TM)
• Learning from elsewhere in Europe (MPP)
• Developing a once for Scotland approach (TM)
• Work to date and next steps (MPP)
Current situation in Scotland

• There are approx. 269,000 assets of medical equipment across NHS Scotland with an estimated £201bn value
• There are 7 different medical equipment management databases
• There are 14 geographical health-boards
• There are 14 different approaches to managing these assets and at least 14 different approaches to how data is recorded
Medical equipment: Assets by Board

NHS Shetland – 2,000 - £6m
NHS Orkney – 1,700 (est) - £4m
NHS Western Isles – 2000 (est) - £5m
NHS Highland – 24,000 - £37m
NHS Grampian – 30,000 - £108m
NHS Tayside – 70,000 - £44m
NHS Fife – 10,000 - £26m
NHS Forth Valley – 10,000 - £37m
NHS Lanarkshire – 15,000 - £62m
NHS Lothian – 20,000 - £85m
NHS Greater Glasgow and Clyde – 63,000 - £156m
NHS Ayrshire and Arran – 10,000 - £44m
NHS Dumfries and Galloway – 12,000 - £15m
NHS Borders – 12,000 – £10m
Golden Jubilee NH – 12,000 - £25m
The challenges

Example of inventory of medical equipment in GG&C

![Graph showing NHS GG&C Medical Equipment Assets with a peak in 2014 and a new QEUH marked.](image)
Guidance that takes no account of resource

MHRA: “Managing Medical Devices”

“All medical devices and items of medical equipment are to be maintained and serviced in line with the manufacturer’s service manual and advice from external agencies e.g. Medical Device Alerts”

“Maintenance procedures are in line with manufacturer’s maintenance instructions and timescales.”
Workload versus staffing levels
And furthermore...

- An ageing work-force
- No readily available pool of skilled labour
- Difficulty recruiting
- Problems meeting obligations
“All NHS bodies must comply with all requirements laid down by statutes bearing upon the health and welfare of staff, patients and the public in relation to and in respect of the management of the property and other assets which they own or occupy in the performance of their functions.”
“It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.”

“The provision and maintenance of plant and systems of work that are, so far as is reasonably practicable, safe and without risks to health” *(Health and Safety at Work act 1974)*

The “reasonable practicability” test
Risky business?

• We analysed 30,000 assets covering 1,200 models
• We found an average failure rate of 0.2 per annum for true failures
• We found only 5 models breached > 1.0 failures per annum
• We found operator errors, accessory issues and damage, far outweighed true technical problems
• We found preventive maintenance intervention would have had no impact on the reported problems
• We moved away from manufacturers’ and guidance recommendations to a combined risk and reliability maintenance model
## Equipment Details

<table>
<thead>
<tr>
<th>Equipment Category</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
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<tr>
<td>Reference Number</td>
<td></td>
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</tbody>
</table>

### Device Function - select one
- This device saves or supports life
- Patient treatment device
- Patient monitoring device
- Diagnostic device
- Device with casual patient contact only
- Device without pt. contact, but in pt. location
- Device not related to patient care

### Maintenance - select all that apply
- Electronic adjustment / calibration
- Mechanical adjustment / calibration
- Moving Parts
- Regular parts replacement
- Significant user adjustment
- Requires frequent cleaning

### Consequences - select one
- Death
- Injury
- Mistreatment
- Discomfort
- Delayed treatment or diagnosis
- No consequence

### Failure rate - select one
- More than three per year
- Two or three per year
- One per year
- Less than one per year

### Frequency of use - select one
- Daily
- Regular (several times a week)
- Occasional (infrequent, but scheduled)
- Infrequent (not scheduled)

### Backup or redundancy - select one
- None
- Limited backup
- Alternative device available

### Impact on the organisation - select one
- Loss of major service / impact on whole organisation / failure to meet targets etc.
- Significant impact on major service / cancellations
- Disruption of local service / significant delays that affect patients
- Minor disruption / short delay / minimum effect on patients
- No significant impact

Final risk score is:  
Recommended service interventions:
A Scotland-wide harmonised approach...

• Instead of analysing 30,000 assets - what if, we were able to analyse 269,000 across the whole of Scotland?

• How much more powerful would that evidence be?

• How much better would it be if we all did the same thing?

• What if we all had the same SOPs?

• Wouldn’t it be better if there was no variation between boards and, like patients, equipment got the same standard of care no matter where it was?
“Realistic Medicine” for medical equipment?

“...reducing harm and waste, tackling unwarranted variation in care, managing clinical risk, and innovating to improve, are essential to a well-functioning and sustainable NHS.”
To do that we need:

- Data that is accessible nationally
- Data that is clean
- Data that is harmonised

Malcolm will now talk you through some best practice from elsewhere in Europe...
A chance encounter

• In 2015, NHS Lothian started work on identifying potential new databases for managing medical equipment
• A brief reference to Shared Services aims...
• A follow-up call from a potential supplier...

“They’ve already done this in Scandinavia...”
Scandinavia?
Fact finding in Scandinavia

Summer 2016 visit to Scandinavia:

Copenhagen 🇩🇰
Lund 🇸🇪
Trondheim 🇳🇴
Stockholm (Karolinska) 🇸🇪
General findings

• Clinical Engineers face the same broad challenges in all of Scandinavia as are found in the UK
• Approaches to national regulation are broadly similar
• MHRA guidance: more comprehensive than that issued in Scandinavia

⇒ Scandinavian Clinical Engineering departments devised their own standards

• Adherence with manufacturer’s servicing intervals is much less rigid than in the UK
Swedish approach

• Formed a national committee (LfMT) ~10 years ago
• LfMT acts as the Swedish professional management network for medical technology:
  – Formally recognised as the Swedish expert group for medical technology, providing advice to Swedish Government
  – Acts as the national coordination body
  – Initialises informal networks
  – Initiates nationwide projects
LfMT aims

To promote strategic initiatives to bring about:

• Excellence and improvements in patient safety
• The adoption of quality management approaches
• Cost-effective operation
• Standardisation of processes
• Co-operation between regions
• Increased awareness and best practice in environmental standards
LfMT outputs

• Various guidance documents, including:
  – Technical architectures for medical device networking
  – Medical device networking processes
• Policies and guidance surrounding training
• Major project to develop and adopt national standardised approach to management of medical equipment: “MTPReg”
MTPReg

- Pan-Sweden technical committee, virtual meetings
- National risk management standard based on the Modified Milwaukee† model
- Defined the majority of data fields related to medical equipment:
  - Equipment type (GMDN), model definitions, risk categories & others all set nationally

Benefits of MTPReg

- Uniformity when discussing, comparing and evaluating equipment performance issues
- Ability to compare records
- National dataset easy to maintain
- Adopted by Denmark with Finland considering adoption
- Norway used the system for a number of years
Areas for improvement

• Sweden lacks a national database:
  – Full benefits aren’t achieved
  – Regions lack ability to easily see national picture
  – Benchmarking appeared limited

• It felt that the regions continue to work operationally in isolation
Norwegian approach

• In 2009, regional clinical engineering leads approached Norwegian government with proposal:
  – Agree a full standard data set for Norway
  – Single supplier for medical equipment database
  – Database to operate as (central) hub and (regional) spokes
  – Central hub data visible to all regions and appropriate national bodies (with IG controls)
“NKKN” project

• Each region contributed to costs, optional whether regions adopt the system
• Government funded project manager
• Swedish MTPReg data used as starting point
• Full data dictionary defined
• Appointed Softpro (supplier of Medusa) to provide hub/spoke system to Norway
• Phased roll-out across Norway
National system architecture

- National database
  - National data definitions
  - National equipment statistics
- Local board database instance
- Job records
- Risks, categories...
NKKN project benefits

• National medical equipment inventory and life history of all medical equipment
• National device reliability information (disliked by manufacturers!)
• Reliability data ⇒ risk based maintenance
• Inherent ability to benchmark performance
• Negotiating national maintenance contracts
• Developing national clinical engineering SOPs
• Reduced technologist training effort
• Small regions inherit expertise that they don’t possess in-house
Once for Scotland: Shared services clinical engineering work-streams

1. Health technology informatics
2. Managed introduction of new technologies
3. National medical equipment framework project which has as its aims:
   • Best practice, harmonisation, cross boundary collaboration and standardisation, and
   • To ensure a safe and cost effective harmonised approach to medical equipment management for Scotland
For anyone familiar with it, this in line with...
ISO55001: Asset management standard

Organisational Strategic Plan

- Customers
- Legislation
- Investors
- Commercial Environment

Scope of Asset Management

- Organisation & People Enablers
  - Asset Management Strategy & Planning
  - Asset Management Decision Making
  - Asset Knowledge Enablers

Risk & Review

Lifecycle Delivery
- Acquire
- Operate
- Maintain
- Dispose
The scale of the task

• Agreeing a taxonomy for medical equipment is a big task. It encompasses *everything*:
  – Inventory data
  – Job data

• Example: Equipment categories
  – GG&C has 1435 categories on system
  – GMDN: ~24,000 categories in total!
  – Manufacturers define GMDN category themselves
  – Hence Sweden’s MTPReg define once for Sweden
Data consistency

• How do we ensure on-going data consistency?
• Create Scotland-wide technical expert group?
  – Scottish Technical Managers Group (STMG)?
  – MPNet
• Collaborate with Scandinavia on setting and re-using data standards/common definitions rather than re-inventing the wheel?
Work to date

• Technical steering group formed
• Initial discussions re: draft dataset principles
  – Use existing standards where possible. For example: GS1, GMDN, IMDRF
• Translated Norwegian dataset
• Started discussions with Sweden to formally collaborate with MTPReg
  – Share dataset?
  – Join MTPReg?
Next steps

• Agree a NHS Scotland dataset
• Conclude discussions with Sweden
• Work with Shared Services team to:
  – Develop business case for National database
  – Ensure standards consistently applied
• Within Boards:
  – Identify deviations from dataset
  – Work to clean-up existing data
Summary

• Scotland is well placed to manage medical equipment in a consistent way across the Nation

• Work to standardise data is strategically appropriate, realistic and achievable within a sensible timeframe

• Deliverables will improve quality, address challenges and realise significant productivity improvements
ANY QUESTIONS?
References


• NSS Shared Services (2017) **Clinical Engineering Programme Update** [online] (available: [http://www.shareservices.scot.nhs.uk/media/1452/2017-08-24-shared-services-clinical-engineering-newsletter-v20.pdf](http://www.shareservices.scot.nhs.uk/media/1452/2017-08-24-shared-services-clinical-engineering-newsletter-v20.pdf))


