Royal College of Anaesthetists

e-LA
e-Learning Anaesthesia

Sustainability: **Processes, pathways and journeys**

Version 1.00 October 2020

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Contents

Module Learning Outcomes

- Increasing efficiencies and minimising waste (Muda principles, and SUSQI – the Centre for Sustainable Healthcare's 'Sustainability in Quality Improvement' framework).
- Cutting waste in clinical care (lean patient pathways) and choosing wisely.
- Healthcare related transport – contribution to climate change and chronic disease.
- Active transport, low-carbon transport and positive health benefits for patients, relatives and staff.

This module describes methods to minimise the environmental impact of the NHS. This includes the creation of lean patient pathways, principles for minimising waste as well as the impact of healthcare related transport and the benefits of active and low carbon transport.

Lean Patient Pathways

The “Lean Approach” is a concept taken from the Japanese car industry that can be used to increase efficiencies in healthcare by the elimination of waste, referred to as Muda which means waste in Japanese.[1] Most waste within healthcare is due to inefficiencies in models of care or systems, rather than wasted physical products.[2]

Value is the opposite of waste. Hence, promoting low waste in healthcare will allow for high value. A “value-promoting doctor”[2] follows a patient centred approach to develop a sound differential diagnosis, allowing only essential testing to be carried out. Clinicians need to have a good understanding of healthcare systems to enable the “leaning” of patient pathways.

The five **“lean principles”**[3] aim to increase efficiency.

Lean principles:

1. **Value** – caring for the patient effectively to meet their expectations
2. **Value Stream** – mapping out the steps and processes in the healthcare pathway to identify and eliminate wasteful steps where possible
3. **Flow** – streamlining the process to remove obstructions and minimise interruption wherever possible
4. **Pull** – ability of the patient to manipulate the service according to their needs
5. **Perfection** – continual improvement

‘A Blueprint for Streamlining Patient Pathways Using a Hybrid Lean Management Approach’[4] is an excellent resource providing a blueprint for clinicians looking to streamline pathways.

Minimising waste

Healthcare Professionals (HCPs) have a responsibility to promote environmental sustainability in the healthcare service and reduce waste at all levels. This is in line with the Public Services (Social Value) Act 2012.[5]

HCPs are trusted advocates in society; they have the ability to lead by example in both their personal and professional lives and can push for sustainability as a core value in their workplaces and homes.

Figure 1 is a list of wastes from the 2014 Academy of Medical Royal Colleges (AoMRC) report: Protecting resources, promoting value; a doctor's guide to cutting waste in clinical care.[2] The report commented: 'Maintaining NHS services may depend on doctors engaging with this issue to an extent that has not previously been the case'. The report spelt out that 'avoiding waste and promoting value are about the quality of care provided to patients – which is a doctor's central concern. One doctors' waste is another patient's delay. Potentially it could be that other patient's lack of treatment'.[2]

1. **Overproduction**
   For example, automatically requesting blood tests for pre-op assessments or duplicating patient information across different services or teams.
2. **Inventory**
   For example, inappropriately using inpatient beds for patients who are waiting for tests but could be discharged safely, or ordering excess medical equipment because the supply is unreliable.
3. **Waiting**
   For example, surgeons waiting for a theatre to become available.
4. **Transportation**
   For example, moving a patient to an inpatient bed for review at post-op ward round and then to another ward for discharge.
5. **Defects or errors**
   For example, an inaccurate patient history or the incorrect recording of a blood test.
6. **Staff movement**
   For example, separate sites for outpatient clinics or large distances between clinically related areas.
7. **Unnecessary processing**
   Using complex equipment or processes to undertake simple tasks. For example, a referral to a specialist service that involves having to be reviewed by several different people before acceptance.

Figure 1: There are seven "wastes" (7 types of Muda) as described in the AoMRC Report Protecting resources, promoting value: a doctor's guide to cutting waste in clinical care[2]

Sustainable Quality Improvement in Healthcare

The Centre for Sustainable Healthcare (CSH) is the world's foremost institution for sustainable healthcare research and practice. The CSH describes 4 principles of sustainable clinical practice: prevention, patient empowerment and self-care, lean clinical pathways and low carbon alternatives.[6]

Sustainability in Quality Improvement (SusQI)[7] embeds these 4 principles into traditional quality improvement (QI). Including sustainability and resource stewardship in QI allows health professionals to respond to ethical challenges such as climate change and social inequalities. It also benefits the QI process itself: inspiring new energy for change, highlighting wastes and opportunities otherwise overlooked, and directing projects systematically towards the highest value improvements.

A high value intervention will allow the best patient outcome but with the least impact on the patient and staff striving for that outcome, the planet and finances, also referred to as the 'Triple Bottom Line'.

This has been described in the equation below (figure 2), with the most 'sustainable value outcome for patients and populations' being the one with the lowest 'triple bottom line' analysis.

$$\text{Sustainable value} = \frac{\text{Outcomes for patients and populations}}{\text{Environmental + social + financial impacts}}$$

(the "triple bottom line")

Figure 2: The triple bottom line equation explains this principle with costs described in terms of environmental, social and financial.[7]

The four principles of sustainable clinical practice, outlined below, are embedded into the CSHs principles of lean service delivery, an example of which is outlined in Figure 3.

Four principles of sustainable clinical practice[6]

1. **Prevention**
   Good peri-operative care; for example, keeping patient's pain free, warm and well hydrated to minimise complications, multi-disciplinary team (MDT) working, World Health Organisation (WHO) checklists, enhanced recovery after surgery (ERAS) pathways.

2. **Patient empowerment**
   As health professionals we can help empower patients to look after their health, participate actively in their disease management and in decisions about their care. Understanding that health inequalities are driven by structural societal inequalities far more than by individual choices, gives us a starting point to rethink ways we can help people overcome these.

   Promotion of health education in society to allow patients to manage their own health. The "Fitter, Better, Sooner" campaign[8] first published in 2018 and endorsed by the Royal College of Anaesthetists, General Practitioners and Surgeons is a good example of this. It challenges the patient to take an active role in preparation for their surgery giving direction on how to target weight, diet, exercise, smoking and alcohol and gives information about how to prepare for specific operations. It also signposts where to get help.

3. **Lean service delivery**
   Streamline patient pathways, minimise unnecessary face-face appointments, the rise of virtual clinics/pre-assessment, sophisticated online patient centred care models, optimise resource utilisation (equipment, time, space, financial and workforce capacity), question the use of single use devices.

   TheGetting it Right First Time[9] initiative is a good example of lean service delivery; sharing best practice between trusts to reduce system variations.

4. **Low carbon alternatives**
   Estates can lead on economical low energy alternatives for heating and lighting in clinical spaces.

   Clinical leadership is needed to accelerate adoption of low carbon alternatives in clinical care, such as inhalers, anaesthetic techniques (avoiding/minimising inhalational agents especially desflurane and nitrous oxide) and reusable vs single use equipment.

   For example, the hospital for special surgery in New York carried out a study in 2019 whereby they tried to perform as many knee and hip replacements as possible under regional anaesthesia (only 4% had General anaesthetics of 10,000 cases). They calculated that potential saving of greenhouse gases was the equivalent to 60,500 car miles.[10]

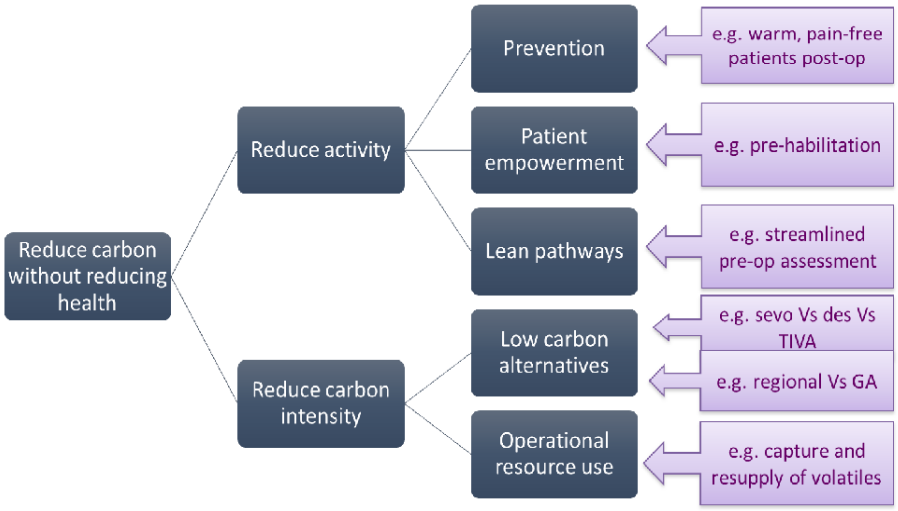

Figure 3: Principles of Lean service delivery from the Centre of Sustainable Healthcare[8]

Healthcare related transport

Healthcare related transport refers to all transportation to and from healthcare institutions. As well as staff and patients travel, the NHS has an enormous global supply chain.[11]

A report by Sustainable Development Unit[12] in 2018 suggested that the health and social care contributed to 5% of road travel every year and the NHS contributed 3.5% which equated to 9.5bn miles. Data from 2017[13] demonstrated that patient and visitor travel accounted for 57% particulate matter (PM) and 55% nitrogen dioxide (NO_2); the staff commute contributed 22% of PM and 24% NO_2 of the overall NHS emissions.

In order to reduce healthcare related transport emissions, we need medical manufacturers, regulators and end users to work collaboratively to build more local resilient supply chains and ensure lean ordering and delivery.

Active transport, low carbon transport and positive health benefits for patients, relatives and staff

Our sedentary lifestyles contribute to the twin pandemics of type 2 diabetes and obesity. According to the World Health Organisation,[13] nine out of ten people are breathing in polluted air resulting in the deaths of 7 million people every year and contributing to a third of the deaths from stroke, heart disease and lung cancer, whilst also contributing to respiratory disease in children.

Active transport refers to a mode of transport that is human powered such as walking, running or cycling. This allows obvious health benefits by increasing physical activity, reducing the incidence of non-communicable diseases and also improving mental health. For example, the SDU[12] showed that the actual health benefit from regular staff active transport equated to savings of £18million pounds per year. This was just in the reduction of treatment costs.

There are also wider benefits due to a reduction in road traffic congestion, which leads to reduced incidence of road traffic accidents and improved air quality. Most areas require investment in infrastructure for people to feel safe walking and cycling, as well as improvements in facilities at the health facility itself.

Low carbon transport refers to electric (E) and hybrid vehicles, which produce less air pollution. Cycle to work schemes could increase their 'cap' so that E-bikes, inclusive bikes and cargo cycles could be purchased. The Green Commute Initiative[14] has introduced this already allowing people greater choice as to which bike to purchase.

Individual health boards can look to move to E-fleets to transport patients, staff and goods locally. The NHS car lease schemes can be preferential towards E-vehicles.

Cutting waste in clinical care and choosing wisely

This section looks at practical ways to "cut waste". The application of Lean Principles, Muda Wastes and Sustainable Clinical Practice can be seen in Cardiff's modern pre-assessment pathway which is outlined below.

In 2010 a typical pre-operative assessment pathway for the more complex patient would have involved:

- The initial surgical out-patient department (OPD) appointment and discussion about the operation, in this case a Hartmann's procedure
- Four months later the patient attended the nurse led pre-operative assessment clinic (POAC). Any concerns highlighted would warrant 'notes review' by an Anaesthetist who would decide if the patient required further investigations e.g. an echocardiogram
- The patient attended out-patient investigations and once they were reported the Anaesthetist reviewed the results and, if abnormal, booked the patient into a Consultant Anaesthetic led clinic 4 weeks later
- Further cardiac and respiratory assessments following on from this face to face appointment, if needed, to allow so for further assessment and optimisation
- Medication adjustments and advise for the patient to quit smoking result from these specialist appointments

This would equate to 6 hospital visits at a minimum, a lot of wasted time and we expect a very anxious patient.

The same patient in 2020:

- Attends the surgical OPD and decides to proceed with the procedure
- Following this discussion, the patient proceeds to POAC next door in the main ODP. The nurse will perform pre-operative assessments (POA) and because the patient is undergoing major intra- abdominal surgery, the patient has Cardiopulmonary Exercise Testing (CPET) on the same day with a Consultant

Anaesthetist. CPET performance suggests some element of deconditioning and no evidence of LV dysfunction therefore an echocardiogram is not needed. No significant respiratory limitation proven; therefore, inhaler medications appear optimised. No need for referrals to cardiology or respiratory colleagues.

- Long discussion with patient regarding the benefits of quitting smoking and improving exercise activities such as walking and cycling.

- Blood pressure noted to be high at POAC, so referral to the patients' General Practitioner for blood pressure optimisation.

- A follow-up telephone review 3 months later by the POAC nurse confirms that the patient has quit smoking and their exercise tolerance has significantly improved.

So now the same pre-operative assessment pathway can be achieved in 1 hospital visit, 1 local GP visit and lots of walking/cycling! This new patient pathway is also outlined in figure 4 below.

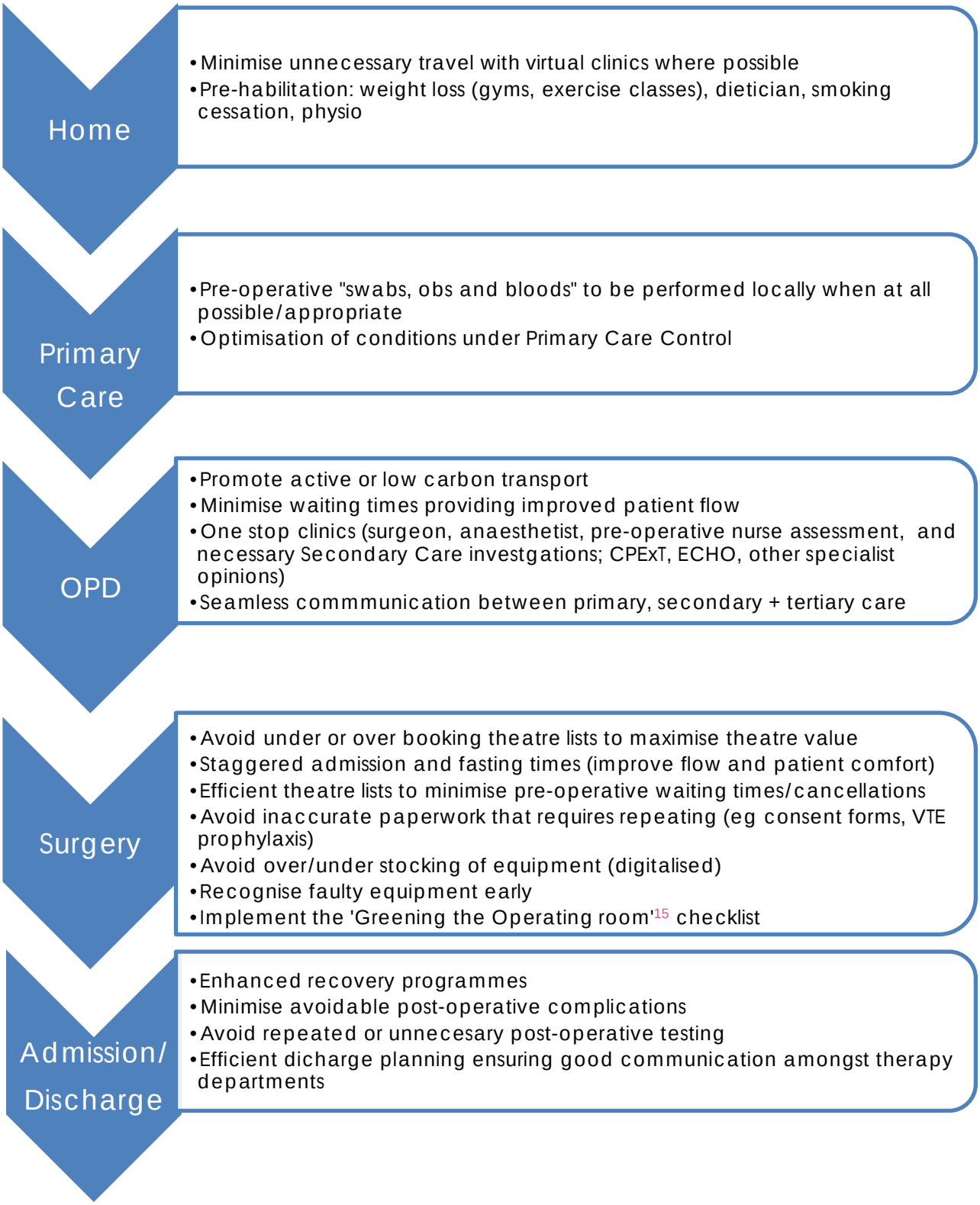

Figure 4: Ideas for a lean peri-operative pathway minimising waste

We hope this module has provided some strategies to aid us all in minimising the environmental impact of the NHS and encourage us to strive for the most sustainable value; our processes, pathways and journeys can all become leaner, greener and less wasteful.

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Information correct as at October 2020