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Gareth Chan qualified from The Royal Free and UCL in 2014 and is currently an ST7 on the HEKSS Orthopaedic Training Programme. He has an interest in both teaching and research, and is an Honorary Clinical lecturer at Brighton & Sussex Medical School. He has a strong interest in T&O and sustainability, and a track record of publications around this topic.

Let's talk about sustainability

What does this actually mean? And how realistic is it in practice?

Stephen Bendall and Gareth Chan

'Sustainability' is the phrase of our times. In simple terms it means the ability to maintain a process continuously over time and we apply it regularly to our workforce, our training, financially, socially, as well as in regard to global environmental sustainability. It's on this latter interpretation that we would like to develop in these series of articles.

by understanding the problems focusing on what we can change and then monitor the impact of our interventions and allow that to shape future developments accordingly.

So, in coming to the first point about understanding the problem, we need to explore what the conventions and current terminologies are.

NHS England published *Delivering a Net Zero National Health Service* in July last year. It states that the NHS overall accounts for 4% of England's total carbon footprint, of which orthopaedics is said to account for up to 20%. So there is an onus for us as Trauma & Orthopaedic surgeons to sit up and take note.

The goal of achieving in the NHS a 'net zero' NHS by 2040 seems daunting, as it appears to be a complex task with some areas we have remote access to influence as a group of clinicians.

We should approach this as we would any problem we encounter in our clinical practice,

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When talking about climate change, we tend to focus upon carbon dioxide emissions, but this isn't the only greenhouse gas involved, which include methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons plus numerous others.

These different gases each have a different range of warming effects – one tonne of methane does not have the same heat absorption impact as one tonne of CO₂. So, it has come about that there is an individual warming metric for each of these gases called the global warming potential or GWP. This indicates

We also have to look at areas that have become embedded in our day-to-day practice and understand the carbon impact of what we do. Rizan *et al.* (*J RSM* March 2023) gave an insight to cumulative carbon footprints for various surgical procedures, which uniquely encompasses all the products, including disposables used. The top carbon producing procedure was TKR at 85.5kg eCO₂, noting that 54% of the total carbon footprint of the products used related to the use of single use items. There is also additional significant energy usage from the use of laminar flow too, which accounts for a significant proportion of 'HVAC' (heating, ventilation and air conditioning) related emissions.

The BOA, and Brighton and Sussex Medical School recently undertook a survey of orthopaedic surgeons of all grades, aiming to assess the current appetite for a shift towards sustainable surgery, perceived barriers to change and where in their practice change would be most welcomed. The survey was run from March 2023 onwards and remains open for responses.

A total of 132 responses were recorded, with 70.5% being received from Consultant/ Associate Specialist grade surgeons and the remainder from Registrar grade and below. The response rate to the survey represents an approximate return rate of 0.03%, given the BOA's circa 5,000-strong membership to which the survey was distributed.

There was a near unanimous response (98%) in 'agreeing' or 'strongly agreeing' that there is

1. I have made significant changes in my personal or professional life to reduce my carbon footprint and/or other environmental harm.
2. At my place of work I feel I have the knowledge, skills and support to make changes to improve environmental sustainability.
3. There is a need to reduce the environmental impact of Orthopaedic Surgery.
4. I am concerned about the volume of single-use items in Orthopaedic Surgery.
5. I would be happy to operate on a patient using a spinal or regional block alone, whenever clinically appropriate and possible.
6. For any soft tissue and/or arthroplasty operation, I would be happy to use reusable gowns in place of single-use gowns.
7. For any soft tissue and/or arthroplasty operation, I would be happy to use reusable drapes in place of single-use drapes.
8. For any soft tissue and/or arthroplasty operation, I would be happy to use reusable surgical hoods in place of single-use hoods.
9. For any soft tissue and/or arthroplasty operation, I would be happy to operate in a room without laminar flow.
10. In comparison to single-use items, which of the following do you believe to be barriers to adoption of reusable equipment in orthopaedic surgery.
Table 1: Questions asked on the survey of Orthopaedic Surgeon attitudes to sustainability. Questions 1 to 9 graded on a six-point Likert Scale from Strong Agreement through to Strong Disagreement.

a need to reduce the environmental impact of surgery, 90% of respondents 'agreed' or 'strongly agreed' that single use items were an issue in orthopaedic surgery. Despite that, only a quarter of respondents stated they would be happy to use reusable drapes and/or gowns for arthroplasty and/or soft tissue procedures.

Regarding laminar flow usage, only 11% would be willing to perform arthroplasty and/or soft tissue procedures in a non-laminar flow theatre.

So despite there being a clear appetite for a change in practice to support a more sustainable future, the pathway to achieve this appears to be littered with hurdles, with the main one being the lack of a coherent national directive to challenge the status quo and drive changes in practice.

We believe the BOA is ideally placed to play a major role in this by embedding eco-sustainability into UK orthopaedics. This will need support at Council level and could include inserting sustainability in the GMC T&O syllabus and in the FRCS(Orth) examination. It is already supporting research and innovation in this area and should also provide guidance on managing changes in practice driven by the best evidence available.

We'll start the discussion by challenging the use of laminar flow and paper drapes, and we will discuss these topics in the two articles that follow. ■

