



GIG  
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WALES

Bwrdd Iechyd Prifysgol  
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University Health Board

# THE UPPER “HAND” OF SUSTAINABILITY



*PREETHAM KODUMURI  
EDWIN JESUDASON  
PROF VIVIEN LEES*

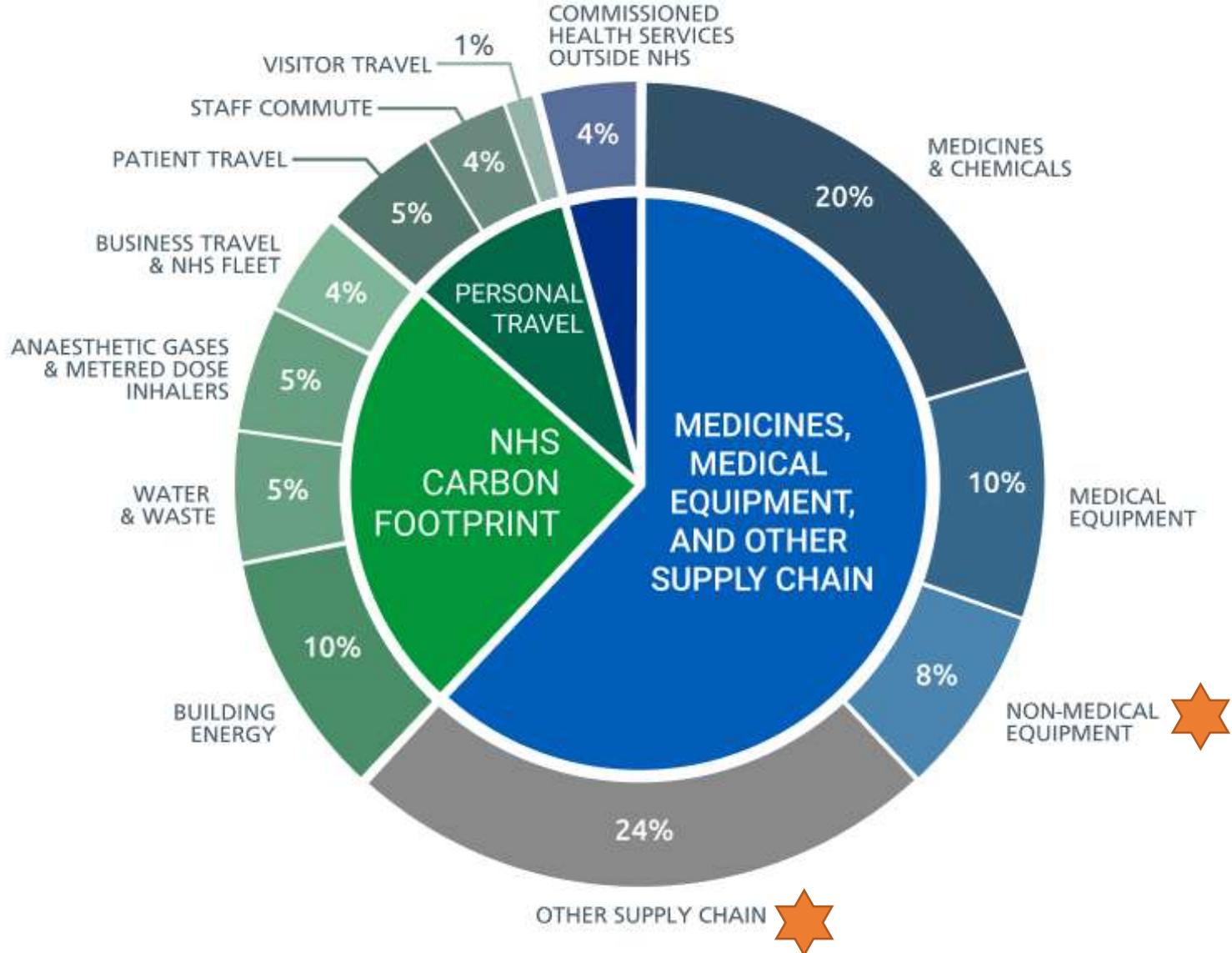


British  
Orthopaedic  
Association

Comisiwn  
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Commission



# NHS CARBON FOOTPRINT



# RATIONALE

- Operating Theatres – up to 70% hospital waste (2.8 billion pounds/yr)
- Waste disposal – 20% of annual environmental budget.
- Steady rise (15% annually) due to increase of disposables.
- Carpal tunnel surgery: Most Common hand procedure (53,000 per year)

# PDSA CYCLE



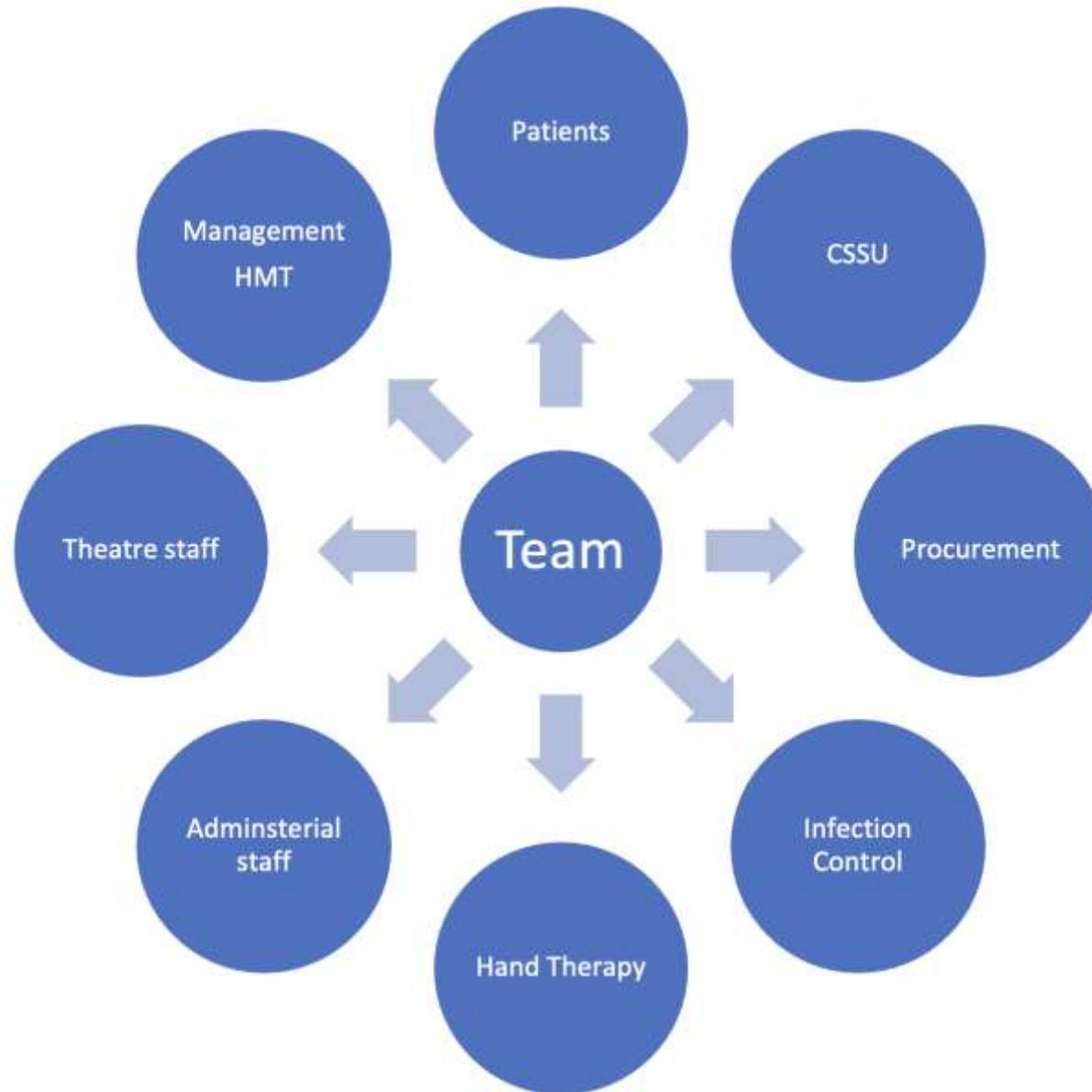
# PRINCIPLES OF SUSQI

<b>Step 1</b>	Set goals	Define the primary and secondary aims of this QIP
<b>Step 2</b>	Study the system	Focus on carbon intensive features of CTR set up inside theatre and patient pathway
<b>Step 3</b>	Design improvement	Plan and implement “lean and green” theatre set up and “Greener pathways”
<b>Step 4</b>	Measure Impact	<ol style="list-style-type: none"><li>1. Clinical waste</li><li>2. Carbon footprint</li><li>3. Cost savings</li><li>4. Wider applicability</li></ol>

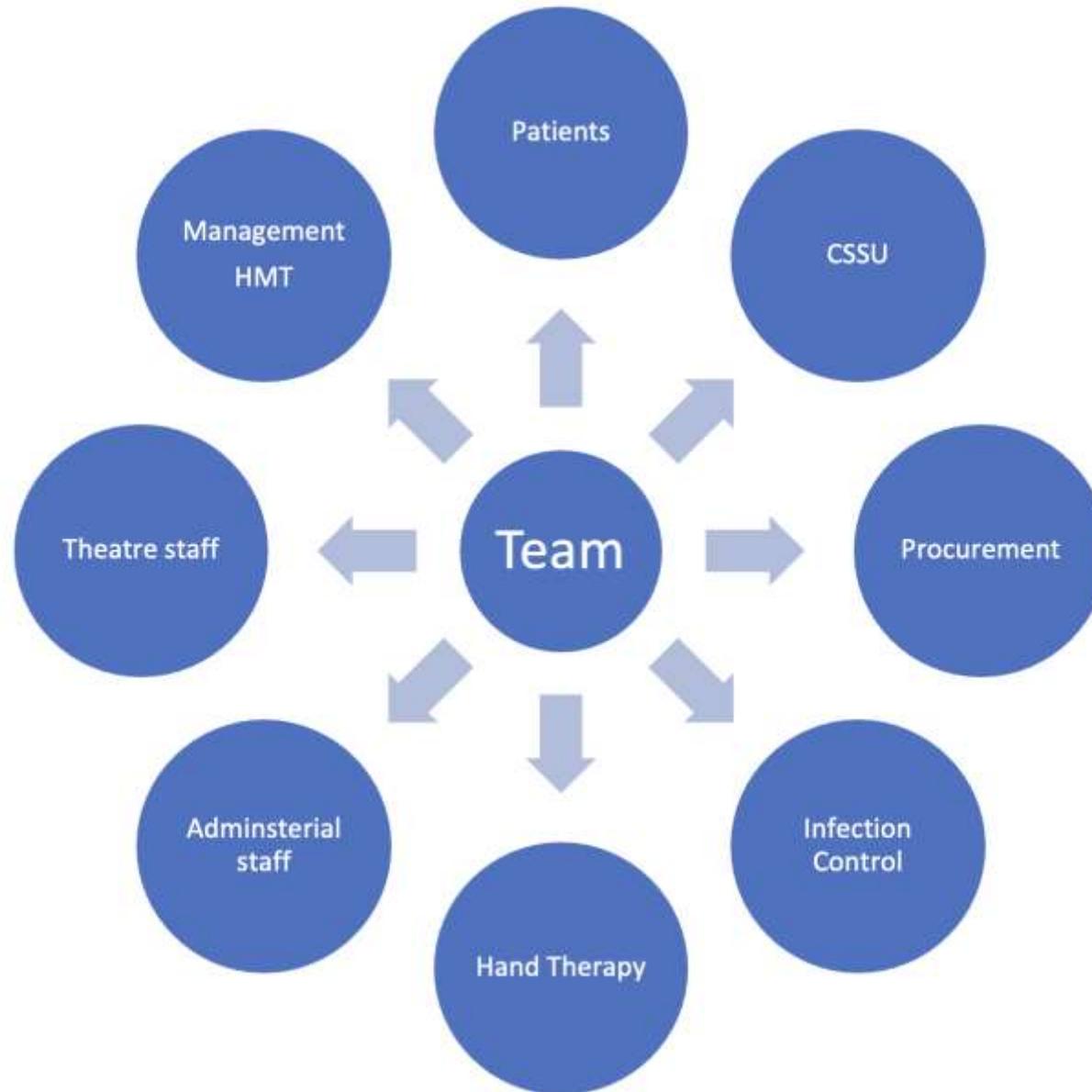
# AIMS

- Demonstrate reduction in carbon footprint in Carpal tunnel release by
  - “Lean and Green” instrument set up
  - Smaller drapes
  - Green patient pathway

# BUILDING AN EFFECTIVE TEAM



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# TRADITIONAL DRAPES

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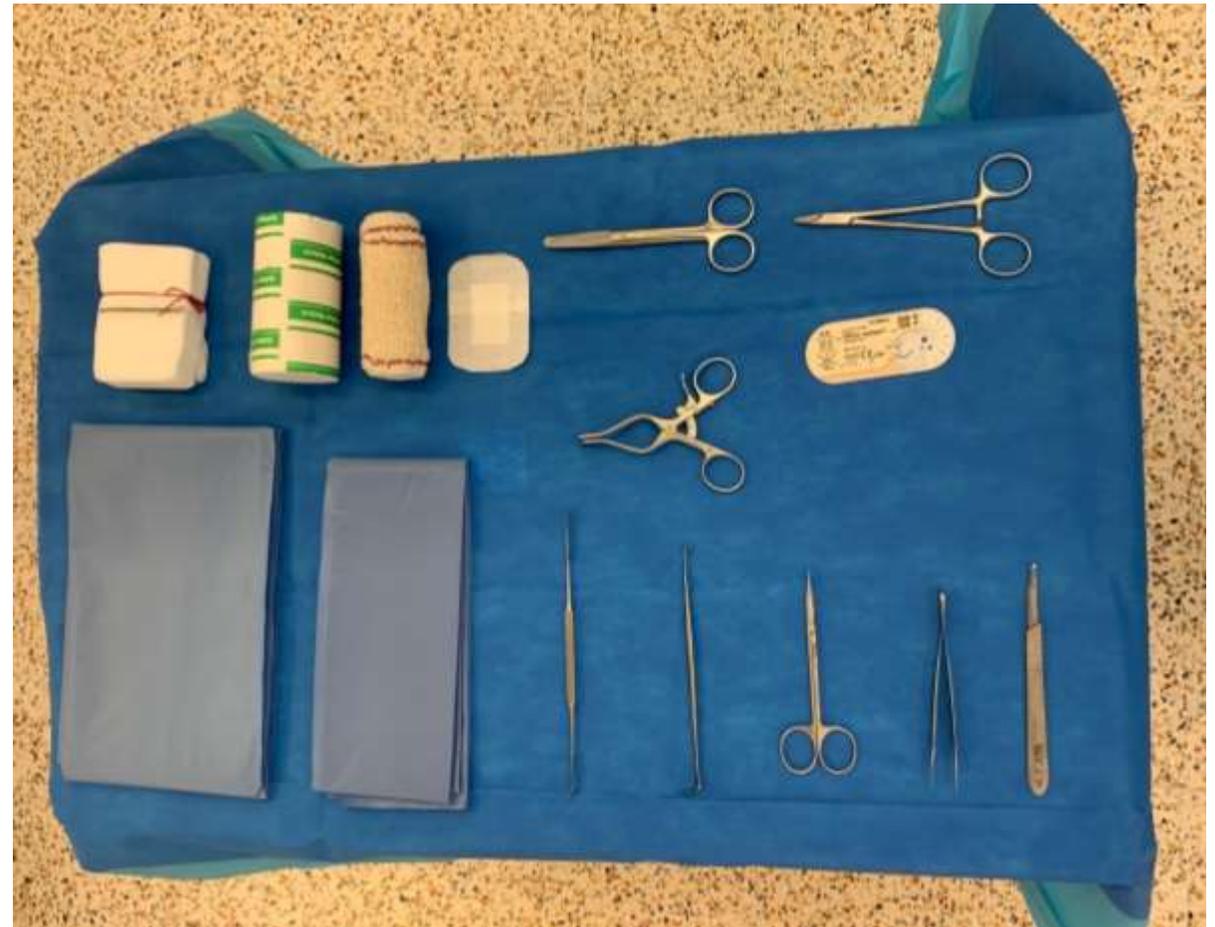
# DISPOSABLES



# STANDARD SET UP



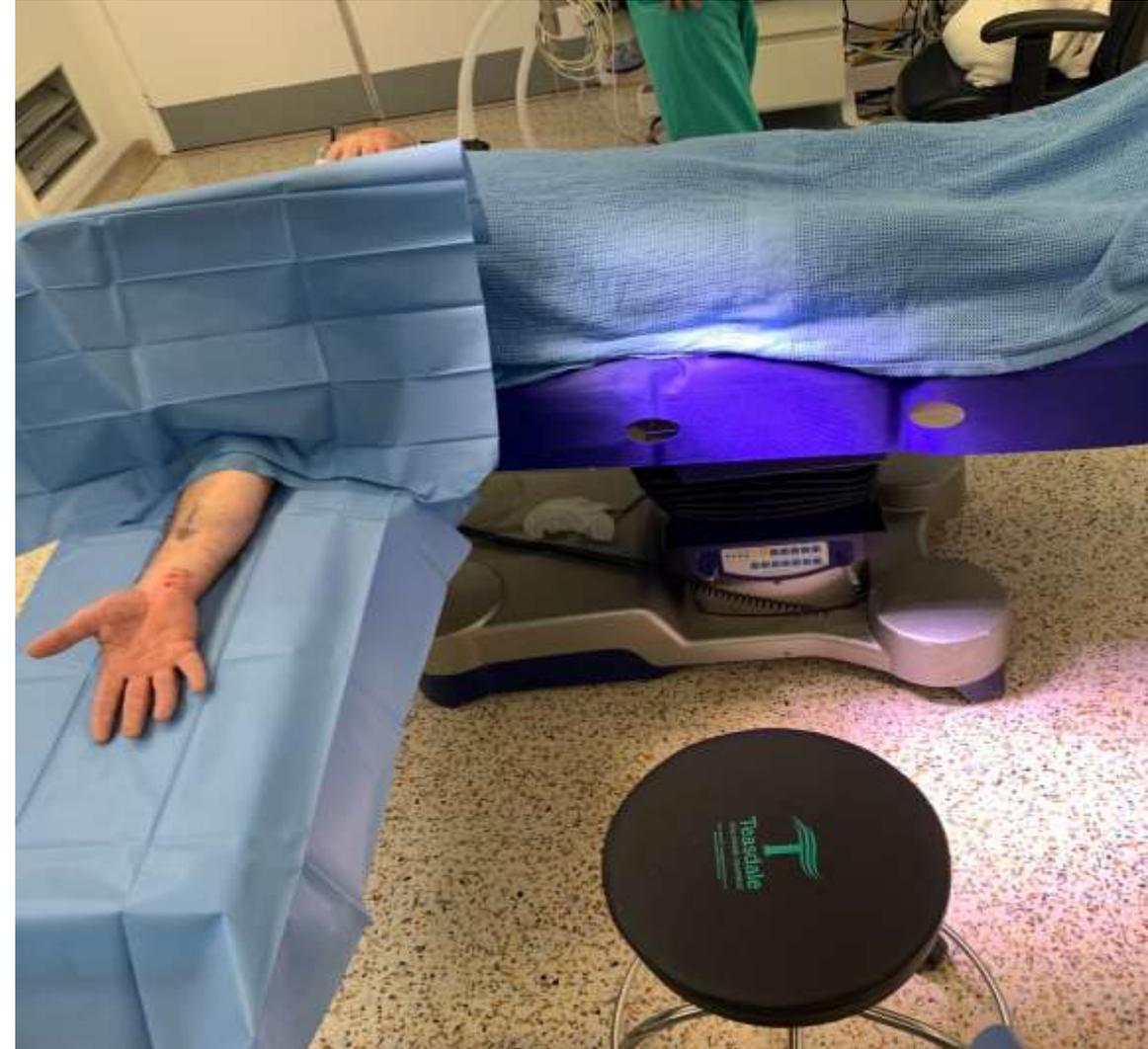
# LEAN AND GREEN SET UP



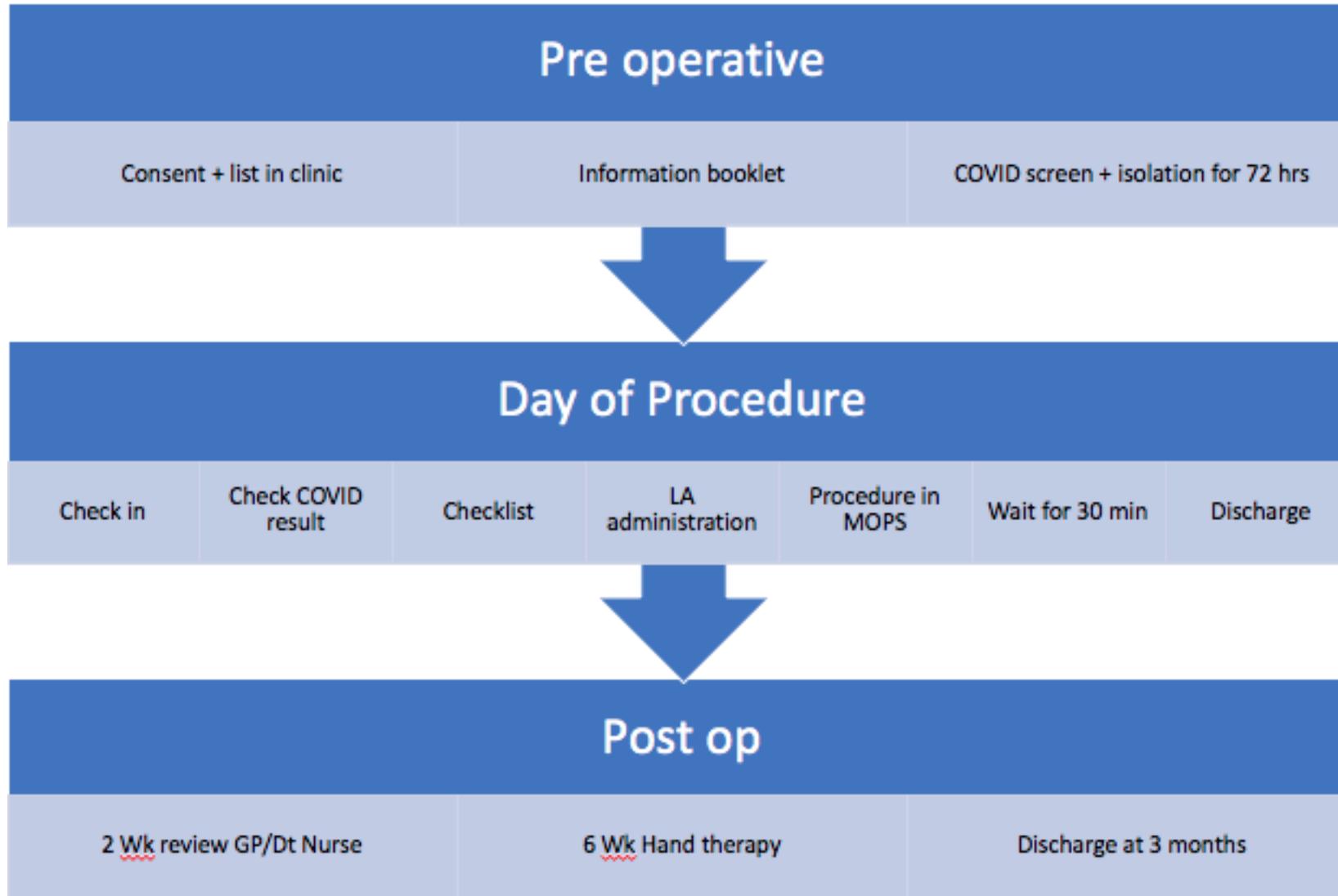
# TRADITIONAL DRAPING



# LEAN AND GREEN DRAPING

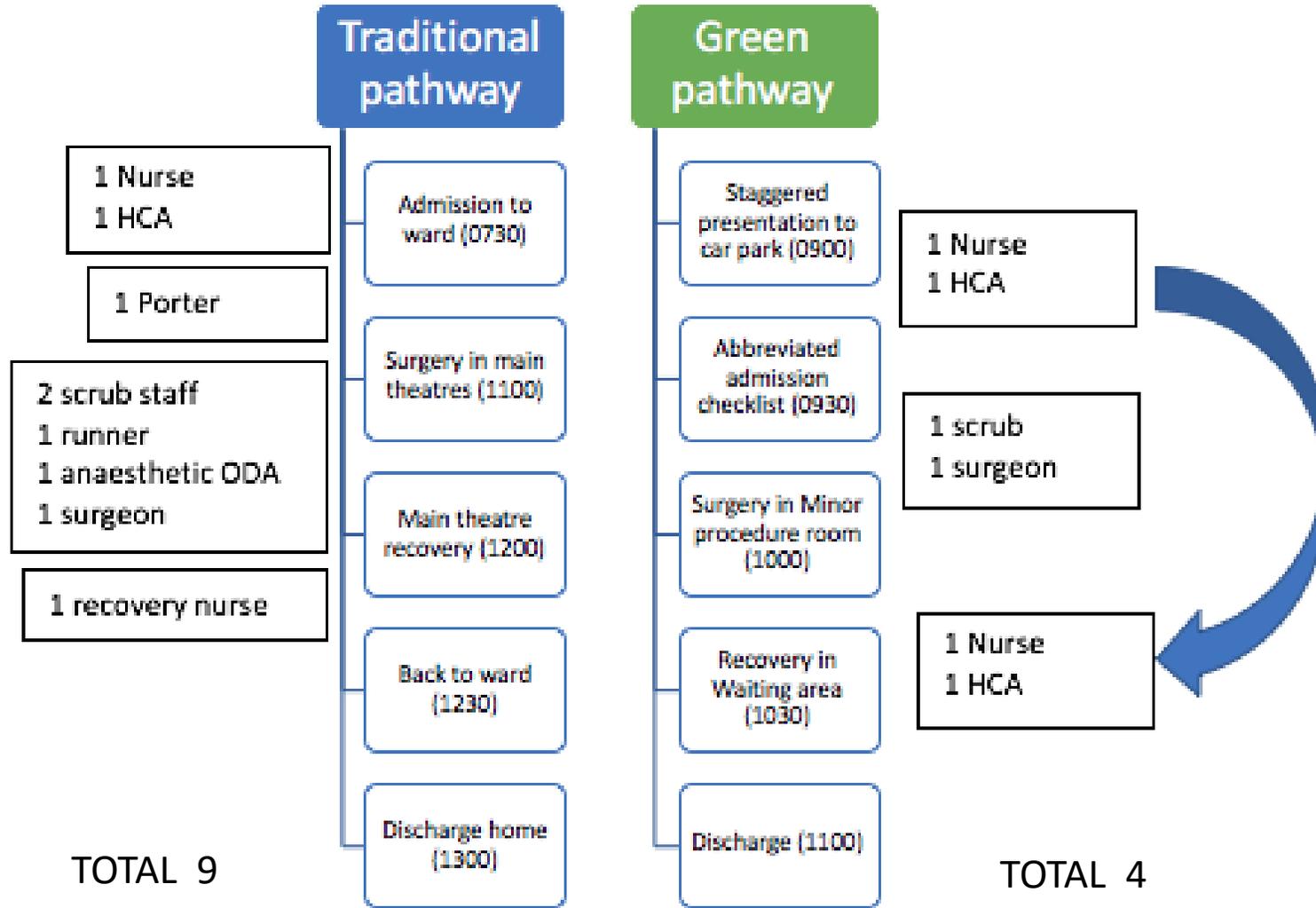


# Green Patient Pathway



Bypass Ward Admission  
Minor Procedure Room

# TEAM & TIME



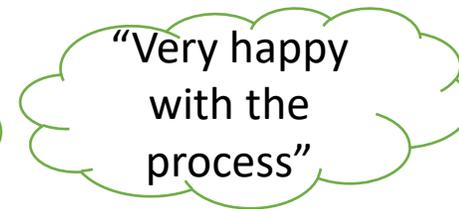
Total time 4.5 hrs    Total time 2 hrs

# RESULTS

- “Lean and Green Hand Surgery” lists
  - June - Sep 2021 “Pilot lists”
  - Dec 2021- Dec 2022 “New Standard lists”
- 122 patients across two sites.
- No complications (infection)
- Excellent patient experience
- Overwhelming staff feedback



“Delighted”



“Very happy  
with the  
process”



“Surprisingly  
less waste”

# WASTE GENERATED PER CASE

Standard List



Green List





# CARBON FOOTPRINT SAVINGS

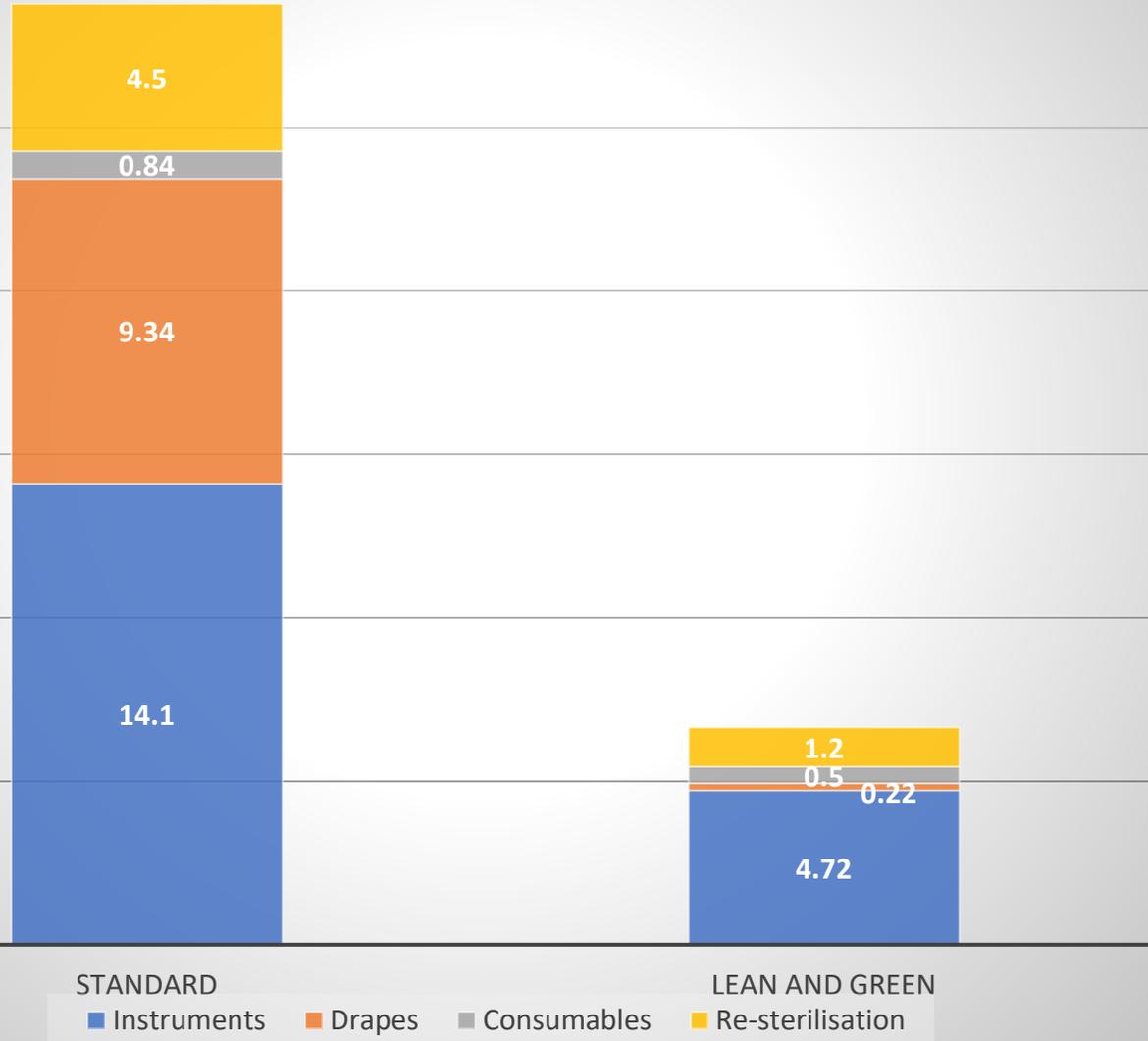
Total 22 Kg per case (80% savings)

Smaller instruments 9.4 Kg

Smaller drapes 9.2 Kg

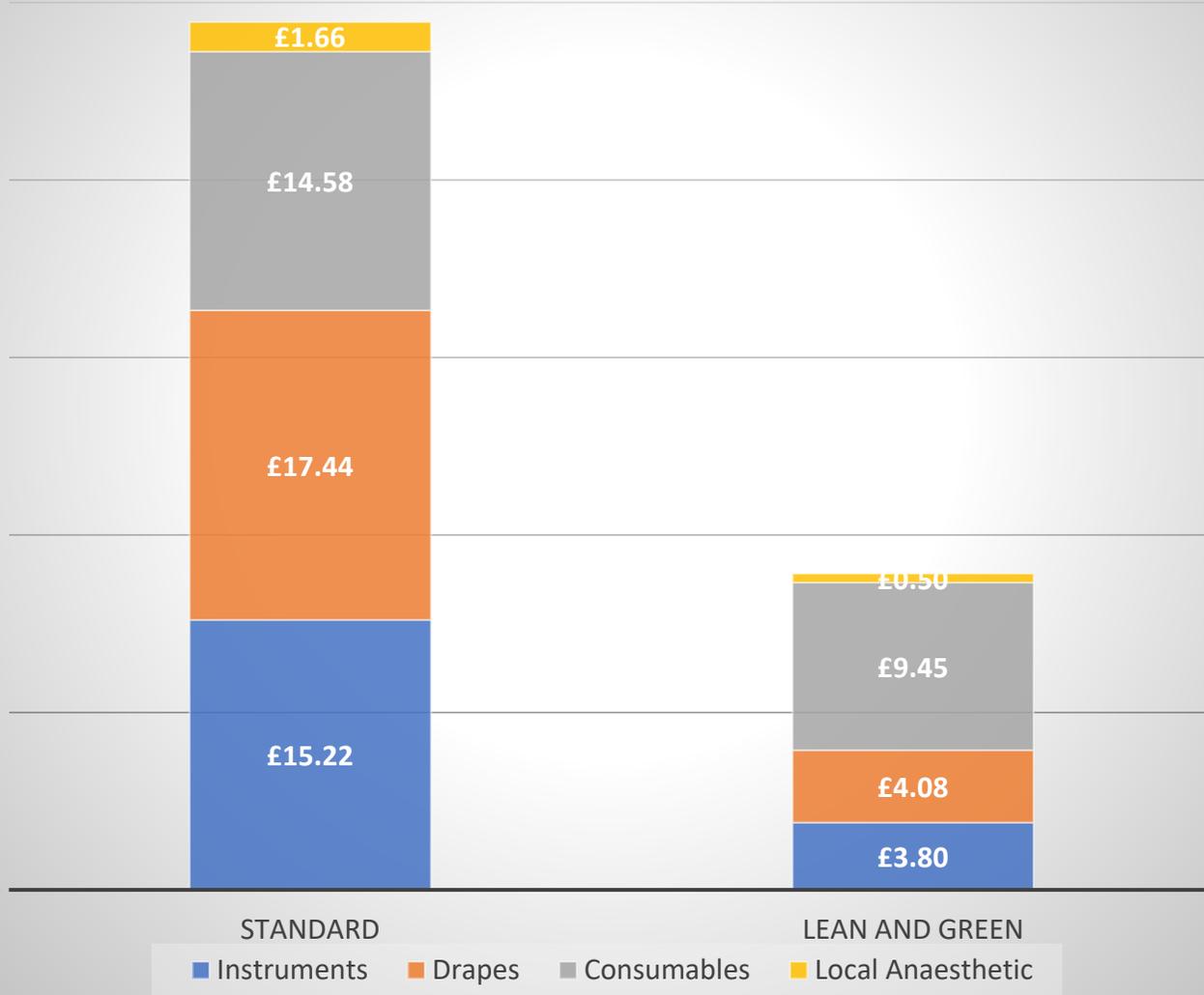
Bypassing ward 6.3 Kg (pilot lists)

Further indirect savings – water usage, ultra clean air theatres.



# ECONOMIC SAVINGS

## Cost Analysis



Total £34.72 per case (65% savings)

Smaller instruments £11.4

Smaller drapes £13.3

Minimising consumables £5.13

Further indirect savings – water usage, ultra clean air theatres.

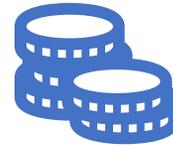
# RESULTS



65% reduction in  
clinical waste



80% reduction in  
carbon footprint



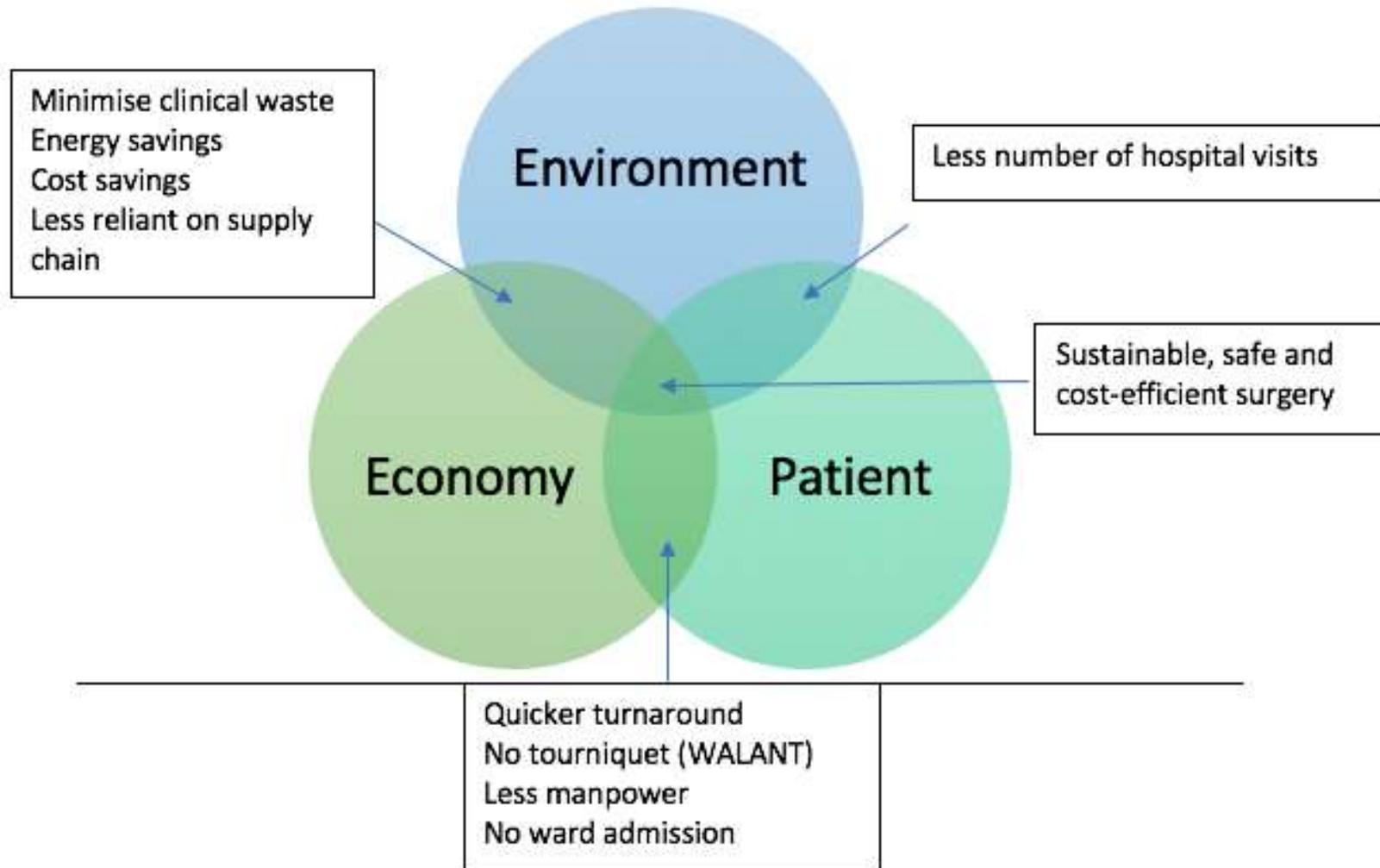
65 % cost savings



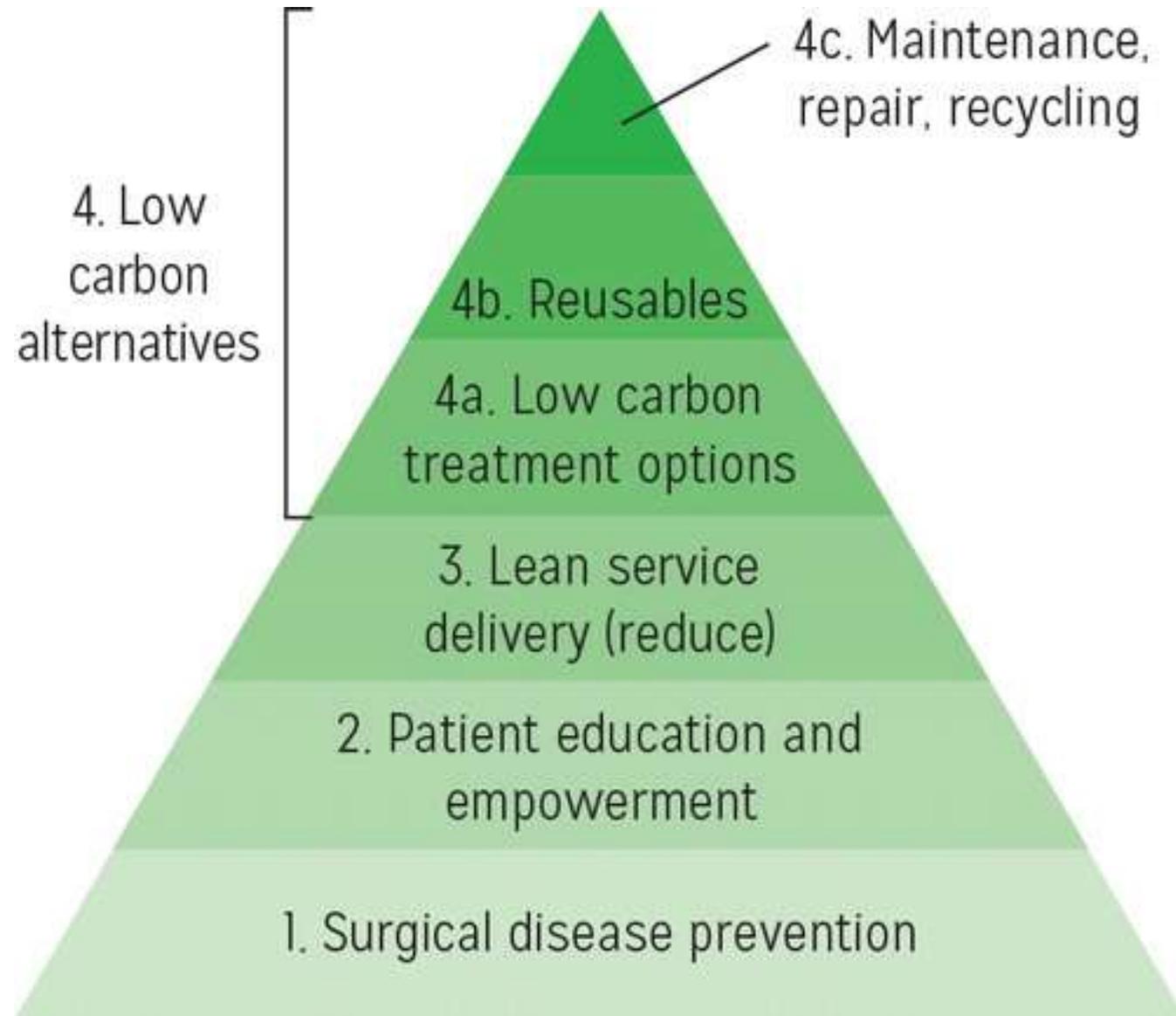
Excellent patient  
reported outcomes

Improved Productivity

# TRIPLE BOTTOMLINE OF SUSTAINABILITY



# PYRAMID OF IMPACT IN SUSTAINABLE SURGERY

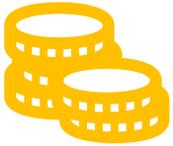


(With permission from Rizan et al, The Bulletin, 2020)

# THE UPPER “HAND” OF SUSTAINABILITY



Reduce clinical waste by 65%  
Design greener patient pathways



Annual savings £1.84 Million



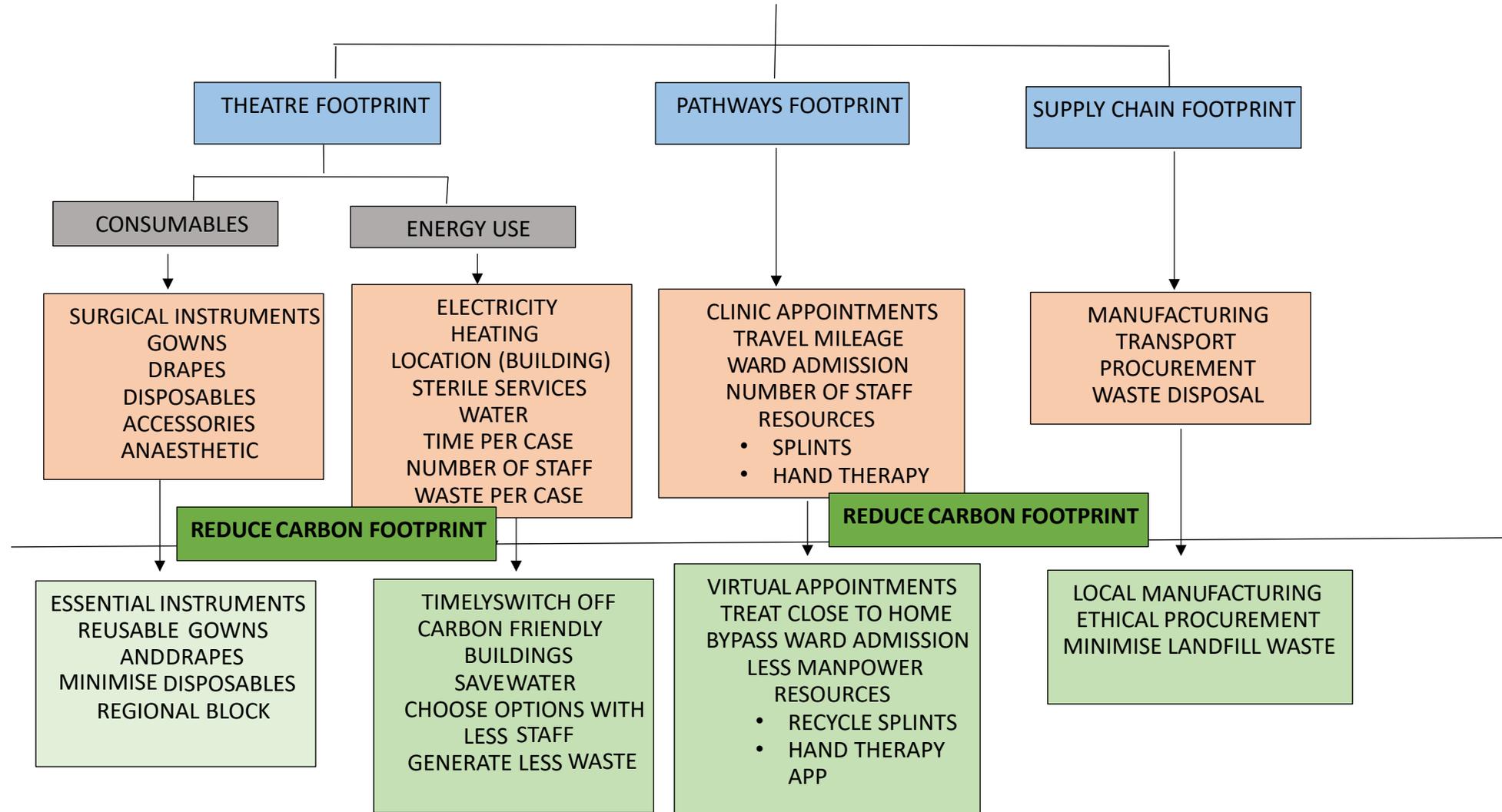
Annual savings 1166 tonnes CO2e

Minimal stay in hospital, bypasses ward admission, increased productivity, scalable to bigger surgical procedures.



GREEN SURGERY  
CHALLENGE

# ALGORITHM TO REDUCE CARBON FOOTPRINT OF CARPAL TUNNEL RELEASE



# NEXT STEPS

## GIRFT GUIDELINES MAY 2022

Procedure The survey considered a limited range of procedures, with the assumption that these could be extrapolated to comparable procedures. For example, a setting suitable for a mucous cyst excision will likely be acceptable for a nail bed repair.	Settings		
	Non-main theatre No formal air exchange	Non-main theatre Formal air exchange *	Main theatres Formal air exchange
Open carpal tunnel release	✓	✓	✓
Trigger finger release	✓	✓	✓
Single or multiple finger Dupuytren's procedure	✓	✓	✓
Flexor tendon repair	✓	✓	✓
Mucous cyst excision	✓	✓	✓
Ulnar collateral ligament repair (without bone anchor)	✓	✓	✓
Kirschner wire fixation of fracture		✓	✓
Bone anchor placement			✓
Plate and screw fixation of fracture			✓
Prosthetic arthroplasty			✓

\* rate not specified

# NEXT STEPS

- Expand to other operative procedures (Trigger fingers, Dupuytren's and ORIF)
- Major orthopaedic procedures – Joint arthroplasty
- Moving CTR out of main theatres (GIRFT guidelines)
  - MOPS room in Llandudno Hospital
  - OP clinic room setting at Wrexham

# ACKNOWLEDGEMENTS

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