Metrics Matter: measuring sustainability in improvement work

QIPPP, October 2022

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@sushealthcare

#SusQI

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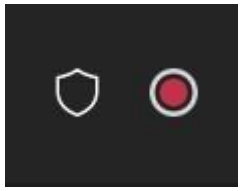
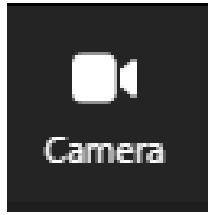
Housekeeping:

Mute please

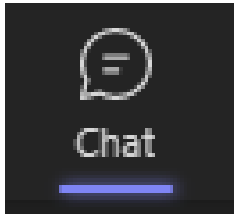
Recording



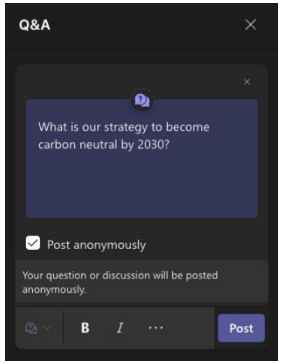
Cameras on!



Chat



Q&A



Use reactions

Quality Improvement for our patients, people and planet

The Academy of Fabulous Stuff

Institute of Health & Social Care Management

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HEALTHIER PLANET HEALTHIER PEOPLE

Welcome

Introduce yourself in the chat box

- Your name
- Role
- Location
- “It is important for me to be here because…”

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By the end of the session:

- What is sustainable quality improvement
- Measuring social and environmental value
- Carbon Instincts
- Case studies and discussion
- Signpost to support

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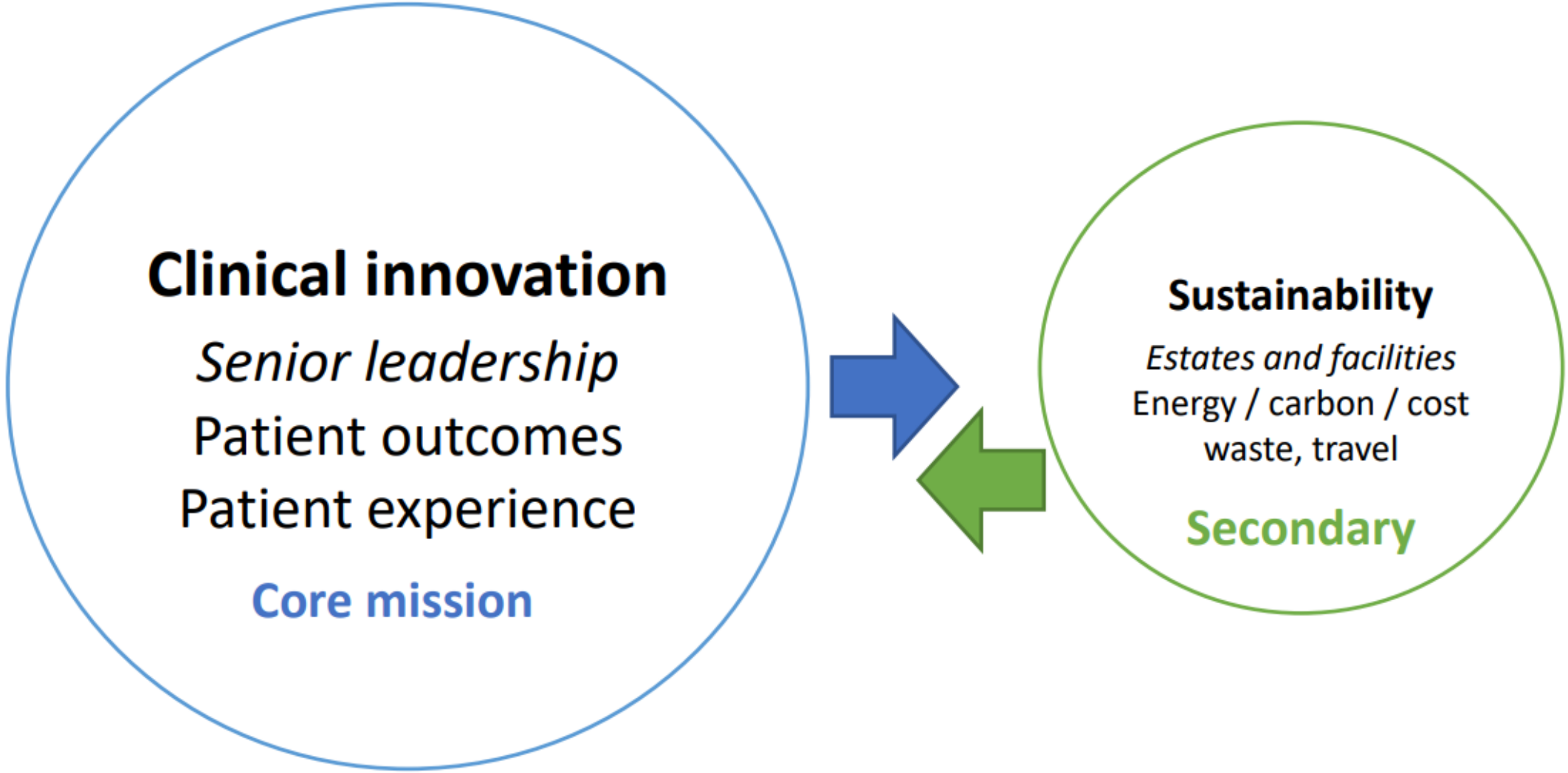


What if… sustainability became a mainstream part of quality improvement?

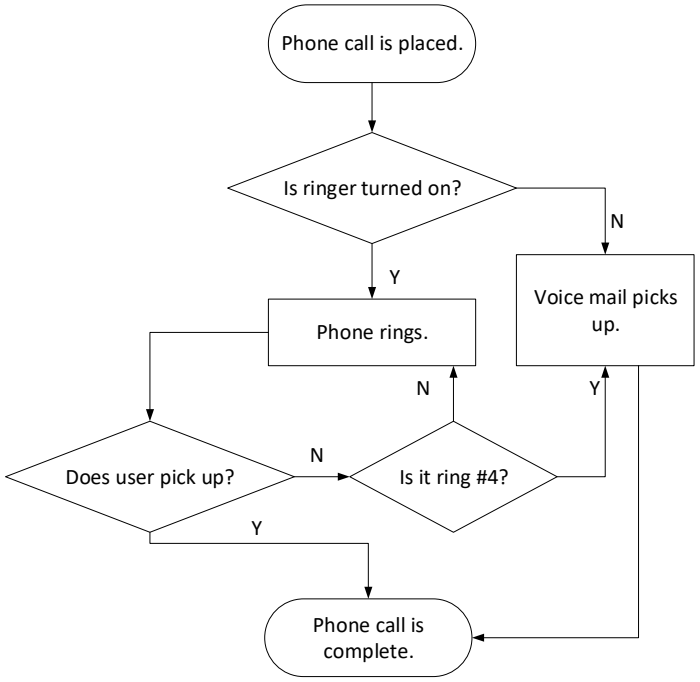
The Sustainability in QI (SusQI) Framework

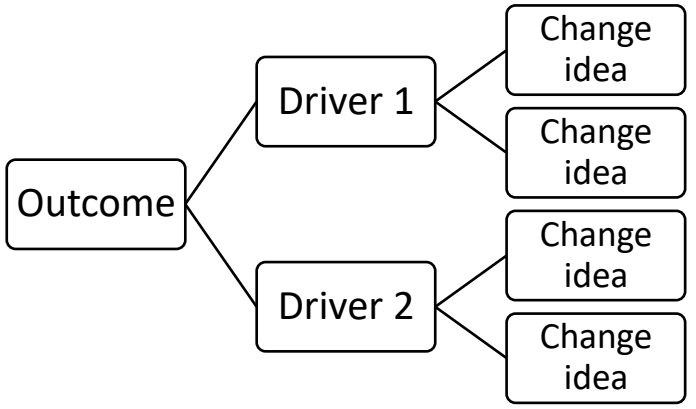
↑ Value = ↑ Outcomes for patients and populations / Environmental + social + financial impacts (the 'triple bottom line') ↓

The Sustainability in QI (SusQI) Framework

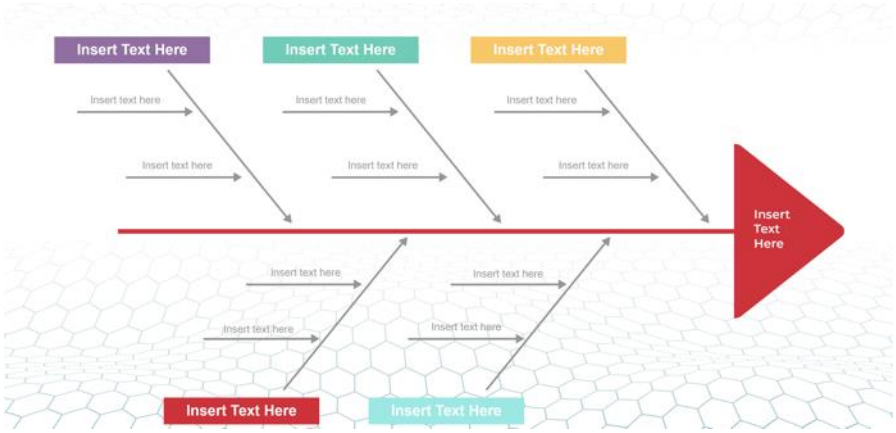
Step 2: Study the system

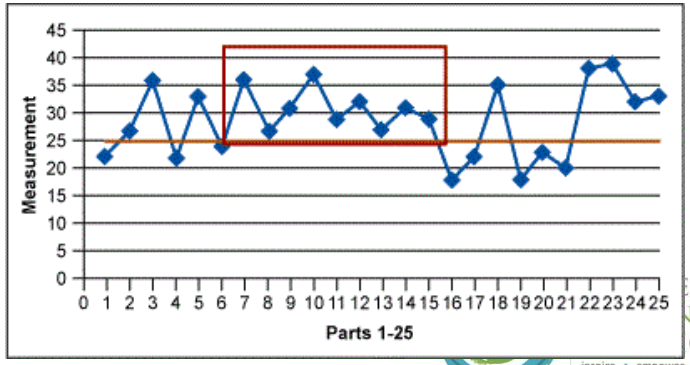
Understanding environmental and **social resource use** and impacts



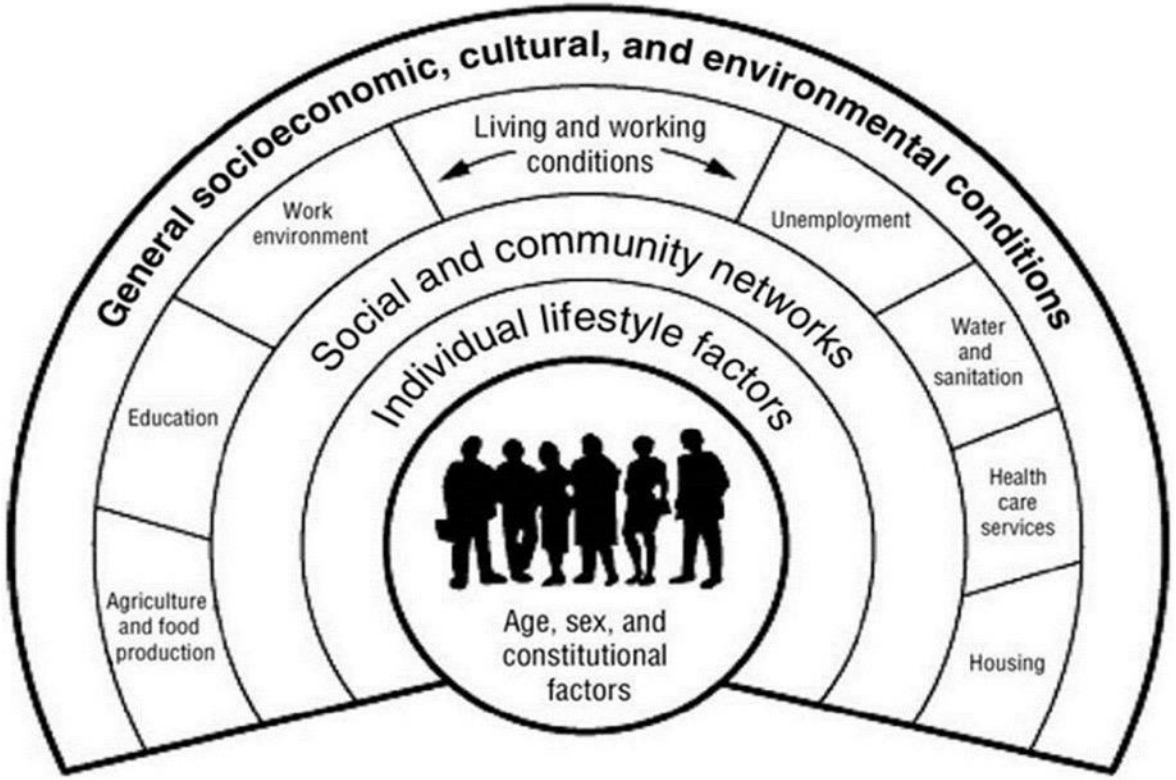


Make use of QI Tools





Social sustainability: avoiding social harm and building social value



"Health inequalities and the social determinants of health are not a footnote to the determinants of health. They are the main issue."

– Sir Michael Marmot

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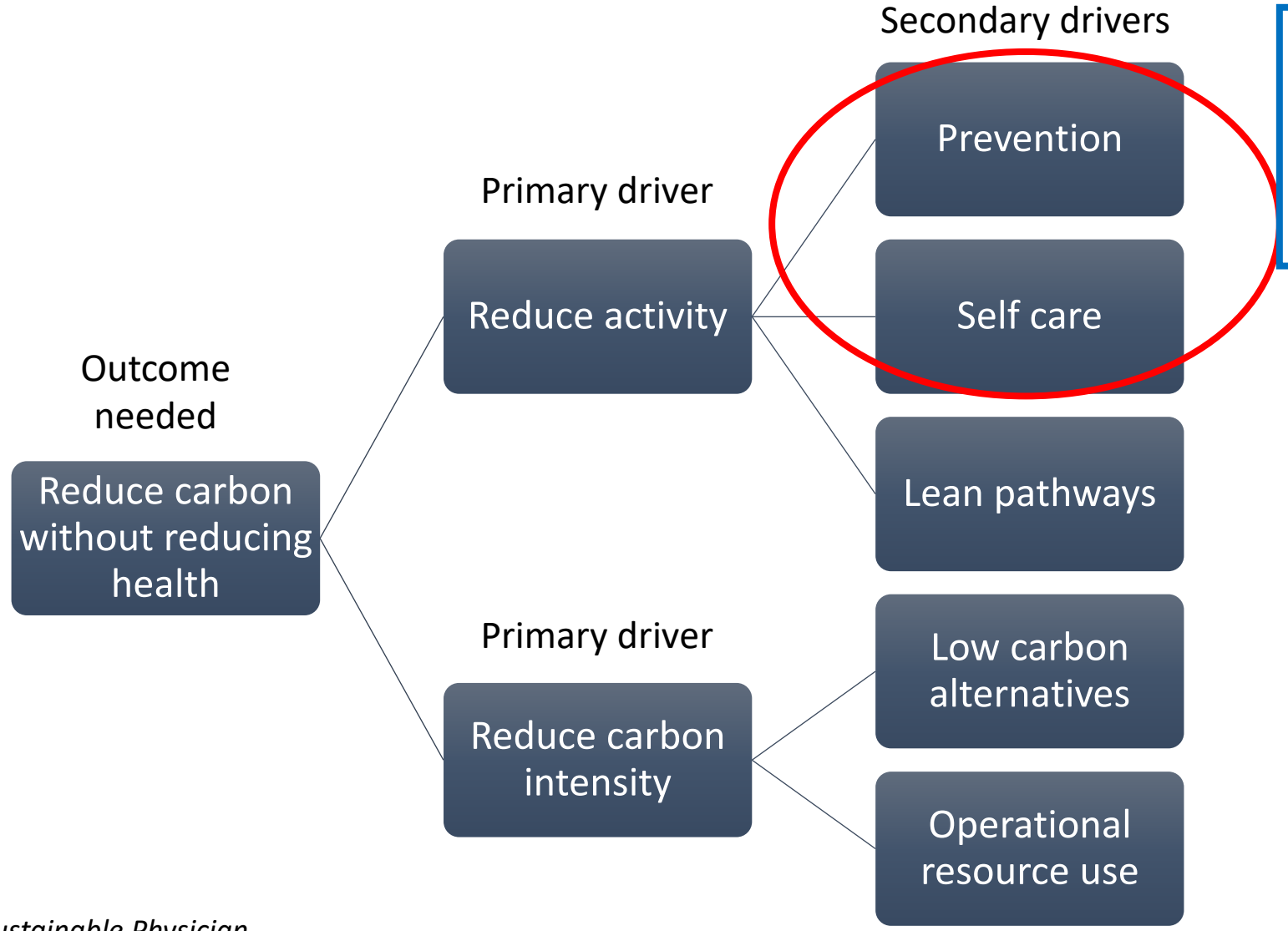
How can we achieve social sustainability within QI?



Target the social determinants of health within your QI project and make use of social assets

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Mortimer-F. The Sustainable Physician Clinical Medicine 2010, Vol 10, No 2: 110–11

What are the positive or negative social impacts on each of these groups?

Think about the social determinants of health & quality of relationships*: EDUCATION, WELLBEING, EMPLOYMENT STATUS, SATISFACTION & QUALITY OF LIFE, ACCESS TO SERVICES, INVOLVEMENT IN COMMUNITY NETWORKS

Carry out for 1) current situation 2) change proposed 3) change made

*** 7 capitals matrix**

Population groups	Impacts (positive or negative)	How will it be measured?
Patients, carers & their community network	Increased travel time for patients Time off work	Patient surveys Postcodes (travel distance)
Staff and their professional & community networks		
Wider community (e.g supply chain)		
Vulnerable groups **(staff & patients can fall into this group)** **-Unemployed, or those receiving benefits** **-Disabled people**		

The Sustainability in QI (SusQI) Framework

Step 2: Study the system

Understanding **environmental** and social resource use and impacts

Environmental impacts

	GHG emissions	Air pollution	Deforestation	Water consumption	Plastic pollution	Eco-toxicity	Scarce resources	Ozone depletion
Inhalers	x	x						
Energy use	x	x						
Anaesthetic gases	x	x						
Medical equipment	x	x			X		x	
Pharmaceuticals	x	x				x		
Operating theatres	x	x			x	x	x	x
Staff travel	x	x						
Patient travel	x	x						
Gloves (plastic, rubber)	x	x	x		x			
Dialysis	x	x		x	x			
Laundry services	x	x		x				
Medical instruments	x	x	x				x	
Single use plastic	x	x			x			
Antibiotics	x	x				x		
Cotton linen	x	x		x				
Oral contraceptives	x	x				x		
Anti-depressants	x	x				x		
Propofol	x	x				x		
Nitrous Oxide	x	x						x

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Why estimate the carbon footprint?

- Quantifiable
- Relatively easy to measure
- Can be measured over time => track progress
- Enables comparison of before and after and different projects and resources

Non-Carbon metric examples

- weight of consumable
- volumes (e.g. number of bags of waste, number of items used/ procured by the department)
- number of hospital visits per patient (e.g. for a given patient pathway)

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What is a carbon footprint?

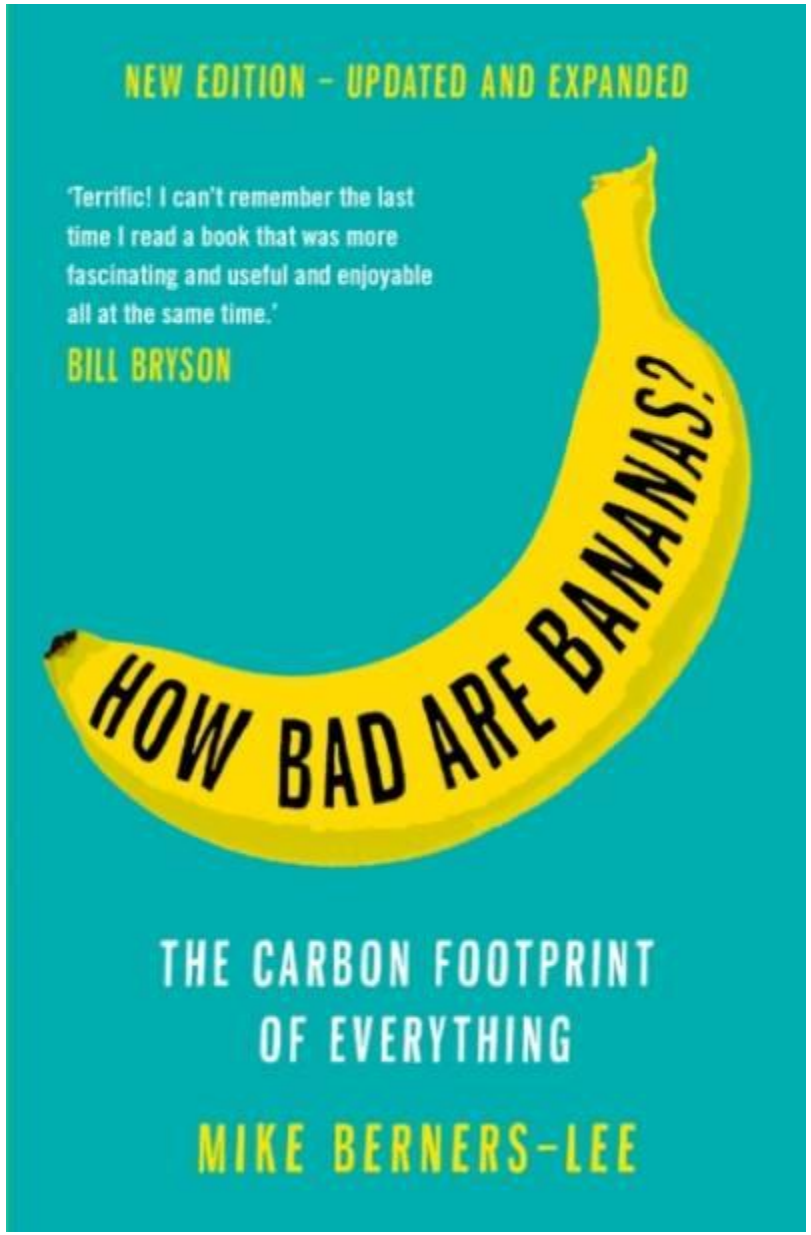
"Best estimate that we can get of the full climate change impact of something"

Mike Berners-Lee in 'How Bad are Bananas?'

- Is the sum of direct and indirect greenhouse gas (GHG) emissions which are attributable to a given process, product or organisation.

- It usually includes the 7 GHGs covered by the Kyoto Protocol.

- As the GHG have different global warming potentials, the carbon footprint is expressed in carbon dioxide equivalents (CO_2e).
  - 1 kg of nitrous oxide = 298kg CO2e



CARBON

1 pair of jeans

GP appointment

Same!

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GP appointment

1 return journey Oxford-London in average sized car

Higher!

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1 return journey Oxford-London in average sized car

Inpatient day

Lower!

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Inpatient day

1 cappuccino

Lower!

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1 cappuccino

1 cannula

Higher!

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1 cannula

1 banana

Lower!

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Answers

- 1 banana – 0.08kg CO2e
- 1 letter referral (virgin paper & disposed of at landfill) – 0.2kg CO2e
- 1 large cappuccino – 0.235kg CO2e
- 1 cannula – 0.54kg CO2e
- 1 GP appointment – 6kg CO2e
- 1 pair of jeans - 6kg CO2e
- 1 inpatient day – low intensity – 37.9kg CO2e
- 1 return journey Oxford-London in average sized car – 40kg CO2e

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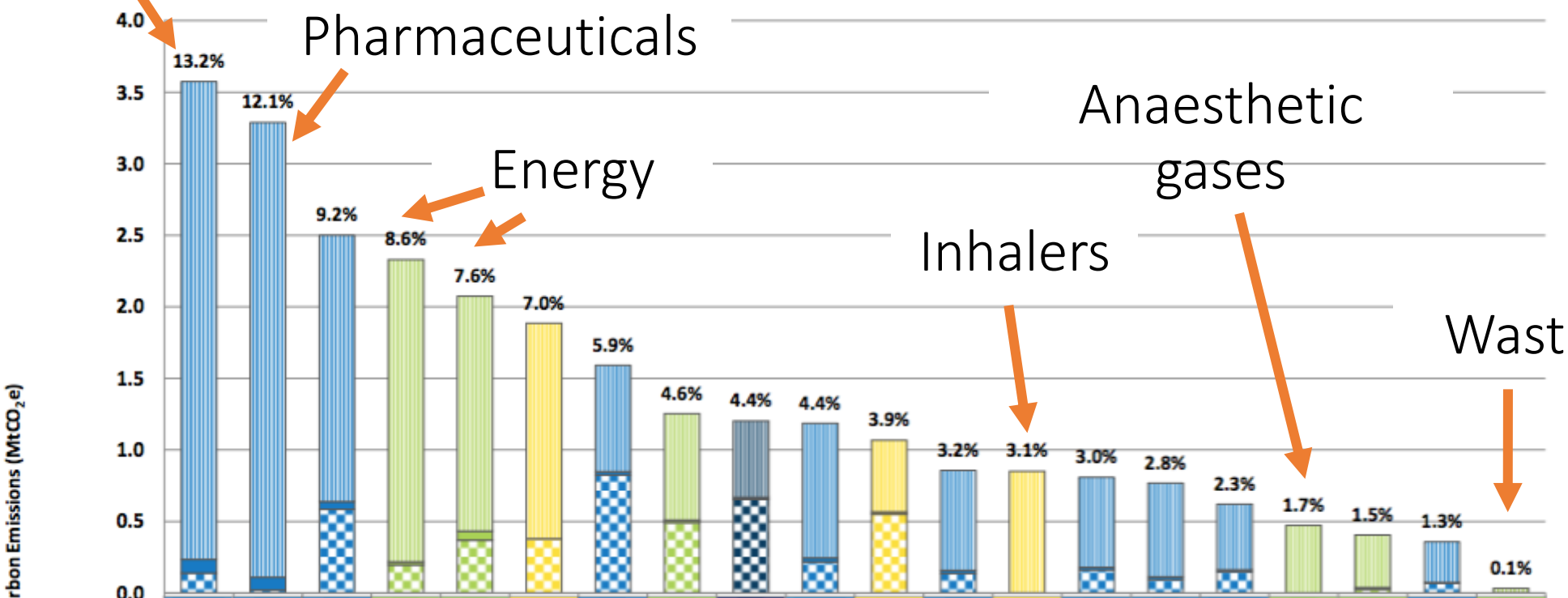
Medical instruments

Figure 2. Health and Social care detailed breakdown 2017



	Medical Instruments /equipment	Pharmaceuticals	Business services	Fuels	Electricity	Patient and visitor travel	Food and catering	Business travel / fleet	Commissioned Healthcare	Manufactured fuels, chemicals and gases	Staff Commuting	Freight transport	MDI usage	Construction	Paper products	Other manufactured products	Anaesthetic gases	Water	ICT	Waste
Total	3.57	3.29	2.50	2.33	2.07	1.89	1.59	1.25	1.20	1.19	1.07	0.86	0.85	0.81	0.77	0.62	0.47	0.40	0.36	0.03
%	13.2%	12.1%	9.2%	8.6%	7.6%	7.0%	5.9%	4.6%	4.4%	4.4%	3.9%	3.2%	3.1%	3.0%	2.8%	2.3%	1.7%	1.5%	1.3%	0.1%
NHS	3.34	3.18	1.86	2.11	1.64	1.51	0.74	0.74	0.53	0.94	0.50	0.70	0.85	0.63	0.66	0.46	0.47	0.37	0.28	0.03
Public Health	0.10	0.09	0.05	0.02	0.06		0.02	0.02	0.02	0.03	0.02	0.02		0.02	0.02	0.01		0.01	0.01	0.00
Social Care	0.14	0.02	0.58	0.20	0.37	0.38	0.83	0.49	0.65	0.22	0.55	0.14		0.16	0.09	0.15		0.03	0.07	0.00

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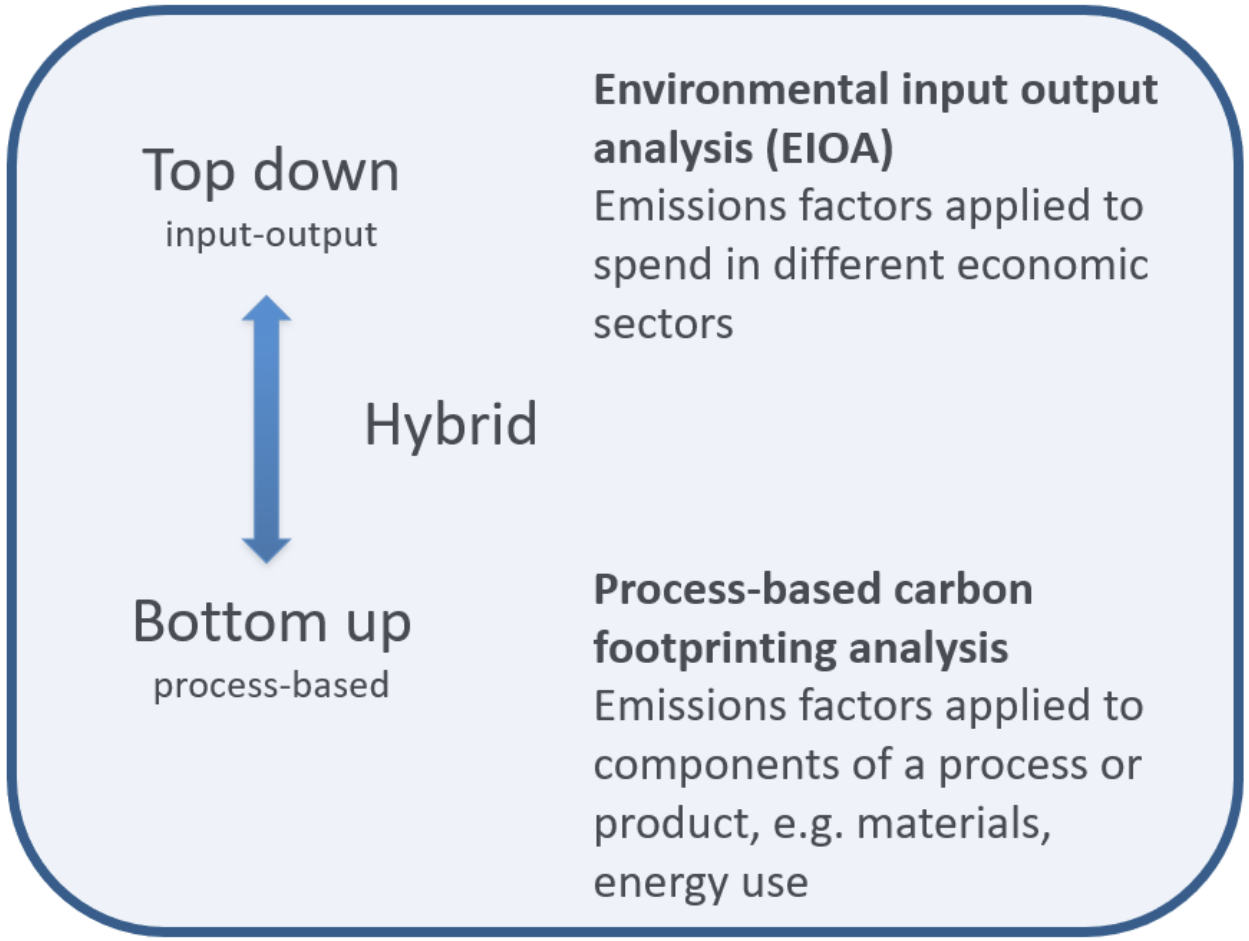
SDU 2018. Reducing the use of natural resources in health and social care 2018 report

How to estimate the carbon footprint?



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How to estimate the carbon footprint?

1. Identify and measure the change in resource use
   a) set boundaries

REDUCING UNNECESSARY CANNULATION IN THE EMERGENCY DEPARTMENT

Winners of the Royal Devon and Exeter 2018 Green Ward Competition.

GREEN WARD COMPETITION
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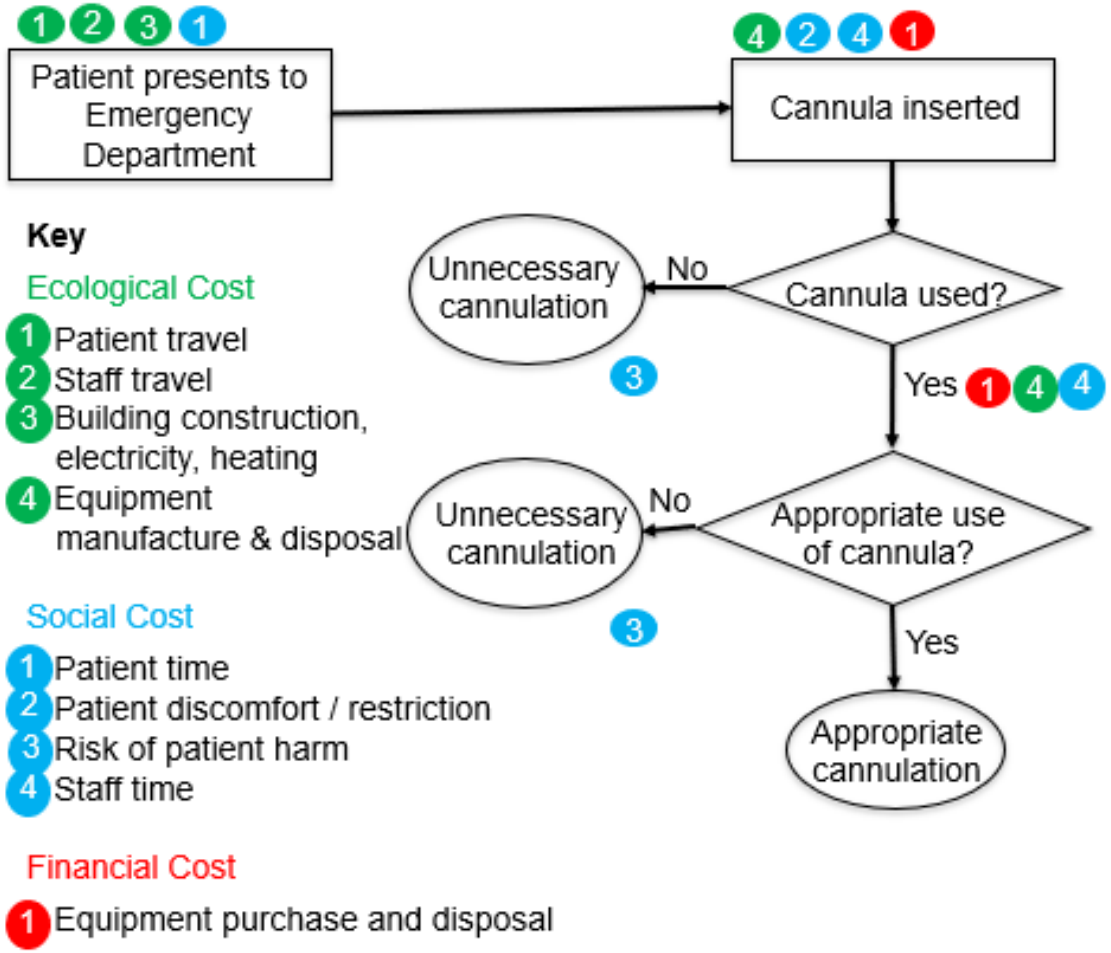
Royal Devon and Exeter NHS
NHS Foundation Trust



How to estimate the carbon footprint?

1. Identify and measure the change in resource use
   b) create an inventory

	Units of measurement	
Items/activity data	**Bottom-up**	**Top-down**
Energy use	kWh	£
Medical instruments/equipment	kg	£
Pharmaceuticals		£
Non-medical items	kg	£
Water use	cubic metre/litre	£
Waste disposal	tonnes	£
Travel	km	£

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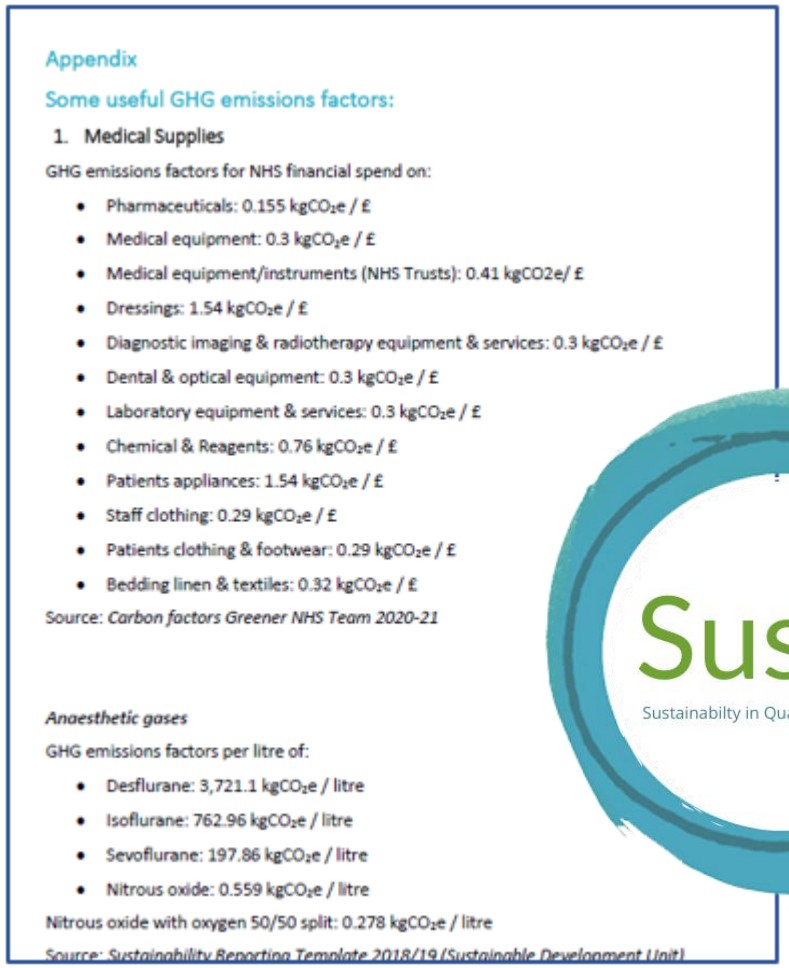
How to estimate the carbon footprint?

2. Allocate the appropriate carbon conversion factor



Appendix

Some useful GHG emissions factors:

1. Medical Supplies

GHG emissions factors for NHS financial spend on:

- Pharmaceuticals: 0.155 $kgCO_2e$ / £
- Medical equipment: 0.3 $kgCO_2e$ / £
- Medical equipment/instruments (NHS Trusts): 0.41 kgCO2e/ £
- Dressings: 1.54 $kgCO_2e$ / £
- Diagnostic imaging & radiotherapy equipment & services: 0.3 $kgCO_2e$ / £
- Dental & optical equipment: 0.3 $kgCO_2e$ / £
- Laboratory equipment & services: 0.3 $kgCO_2e$ / £
- Chemical & Reagents: 0.76 $kgCO_2e$ / £
- Patients appliances: 1.54 $kgCO_2e$ / £
- Staff clothing: 0.29 $kgCO_2e$ / £
- Patients clothing & footwear: 0.29 $kgCO_2e$ / £
- Bedding linen & textiles: 0.32 $kgCO_2e$ / £

Source: *Carbon factors Greener NHS Team 2020-21*

Anaesthetic gases

GHG emissions factors per litre of:

- Desflurane: 3,721.1 $kgCO_2e$ / litre
- Isoflurane: 762.96 $kgCO_2e$ / litre
- Sevoflurane: 197.86 $kgCO_2e$ / litre
- Nitrous oxide: 0.559 $kgCO_2e$ / litre

Nitrous oxide with oxygen 50/50 split: 0.278 $kgCO_2e$ / litre

Source: Sustainability Reporting Template 2018/19 (Sustainable Development Unit)

Item	Unit	Conversion factor
Medical instrument	£	0.3kg CO2e
Waste disposal	Tonne	220kg CO2e/tonne

*Based on 2019 emissions factors

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How to estimate the carbon footprint?

3. Calculate the carbon footprint – Top down

Activity data x carbon emissions factor = carbon footprint (CO_2e)

Item: Cannula				**Disposal:**		**Total:**
Cost	Emissions factor for medical equipment	Saving from reduced use	Weight	Emissions factor for incineration	Saving from reduced disposal	Total per item
£1.80	0.3kg CO2e / £	**0.54 kgCO2e**	0.000061 tonnes	220kg CO2e/tonne	**0.013**	**0.553 kg CO2e**

Reduced use by 105 cannula per week = 58.06 kgCO2e

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*Based on 2019 emissions factors

How to estimate the carbon footprint?

3. Calculate the carbon footprint – bottom up

	Item				Packaging				Transport		Disposal			
Item	Weight (kg)	Material	Emissions factor (kgCO2e/kg)	Total Item GHG emissions (kgCO2e)	Packaging material	Weight (kg)	Emissions factor (kgCO2e/kg)	Total packaging GHG emissions (kgCO2e)	Distance of origin - NHS supply emissions kgCO2e	Total Transport emissions (kgCO2e)	Weight (t)	GHG emissions factor (kgCO2e/t)	Total Disposal emissions (kgCO2e)	Cannula Carbon Footprint (kgCO2e)
Cannula	0.0025	PET	4.032	0.0254425	LDPE film	0.00274	2.6	0.00933876	0.002165	0.00275894	0.000008	1074	0.008592	0.0461322
	0.0025	Stainless Steel	6.145		Paper	0.00026	1.49							
					Cardboard	0.00142	1.29							

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Measuring impact

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

(the 'triple bottom line')

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Mortimer et al., Future Healthcare Journal 2018, Vol 5, No 2: 88-93

Measuring impact

REDUCING UNNECESSARY CANNULATION IN THE EMERGENCY DEPARTMENT

Winners of the Royal Devon and Exeter 2018 Green Ward Competition.

Reduced infection risk
Less inappropriate iv fluid use

Annual savings £27,831

Annual savings 8,403 kg CO2e

~24,202 miles driven in an average car
~29 return trips between London Kings Cross and Glasgow Central

Patients ↑mobility/independence, ↓pain
Staff ↑time, improved work flow

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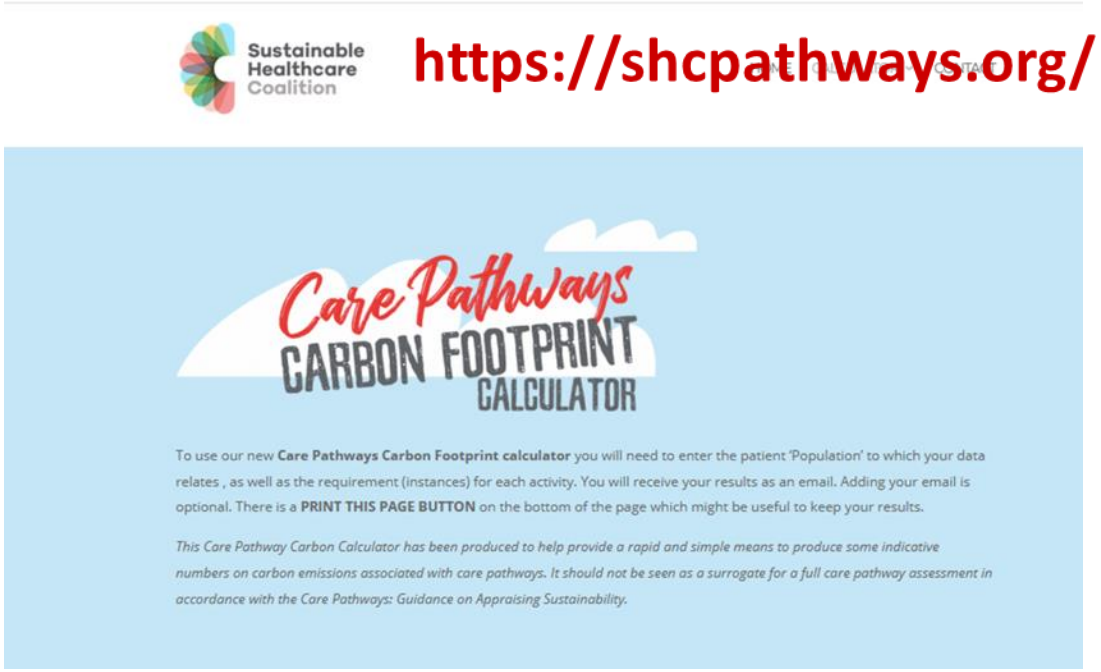
Carbon by units of healthcare activity

Care Pathways Guidance on Appraising Sustainability (SDU, 2015)



[Sustainable Healthcare Coalition Pathways Calculator | Pathways Calculator (shcpathways.org)](https://shcpathways.org/)

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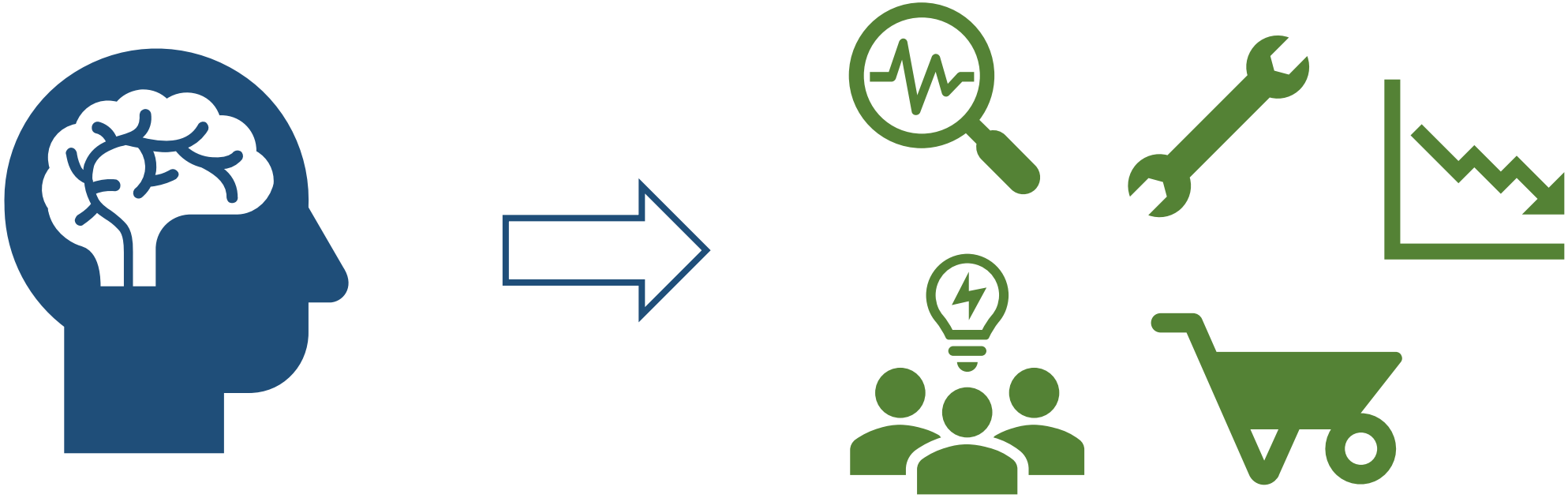
Sustainable healthcare & quality improvement



knowledge

about the need for sustainable healthcare

action

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Open discussion

- NHS Trusts share their experiences
- Discussion/ Q&A

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Meaningful metrics

Metric Domains

- **The Leeds Improvement Method uses 5 key measurement DOMAINS.**

Domain	Description	Example
Quality	How well the process or product achieves the desired outcome.	Infection rates, cancellation rates, report accuracy, supply availability.
Delivery	Usually the time (hours/days/weeks) taken to complete the process or move through the care pathway.	Length of stay, Referral to Treatment, Emergency Care Standard, Request response times, Recruitment: advert to start date.
Service	Customer impression of how well the product or service met their needs.	Customer feedback from surveys, volume or topic of complaints.
Morale	Impact on the people involved in the process	Staff satisfaction and/or engagement results, turn-over or retention rate, absenteeism.
Sustainability	Relates to cost, efficiency and/or environmental benefits	Reduction in electricity, water, carbon and waste.

Leeds Improvement Method

CONTINUOUS LEARNING

Asking sponsor's and project owners 3 questions at the planning stage –

What are the environmental benefits this project supports through more effective use of natural resources?

Does this project contribute to the Trust Net Zero goals in the fight against climate change?

How might this project support communities, patients and supporting services to become more sustainable?

NHS
The Leeds Teaching Hospitals
NHS Trust

https://www.susqi.org

Home Page | About | Do a Project | Teach Others | SusQI Academy | SusQI Beacon Site

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More About SusQI

What is SusQI?

The SusQI Education Project

Meet the Team

Helping you to Use SusQI

Step by Step Guide

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Green Ward Competition

Green Ward Competition

Helping you Teach SusQI

SusQI Course

Teach SusQI Resources

Teach SusQI Course

Join the SusQI Network

Become a Beacon Site

CSH Networks

SusQI Projects

https://www.susqi.org/susqi-academy

Home Page | About | Do a Project | Teach Others | SusQI Academy | SusQI Beacon Site

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SusQI

Sustainability in Quality Improvement

Academy

A practical way to drive incremental change towards a more ethical and sustainable health system.

Join the CSH SusQI Academy and become a leader in Sustainable Quality Improvement Delivery and Education

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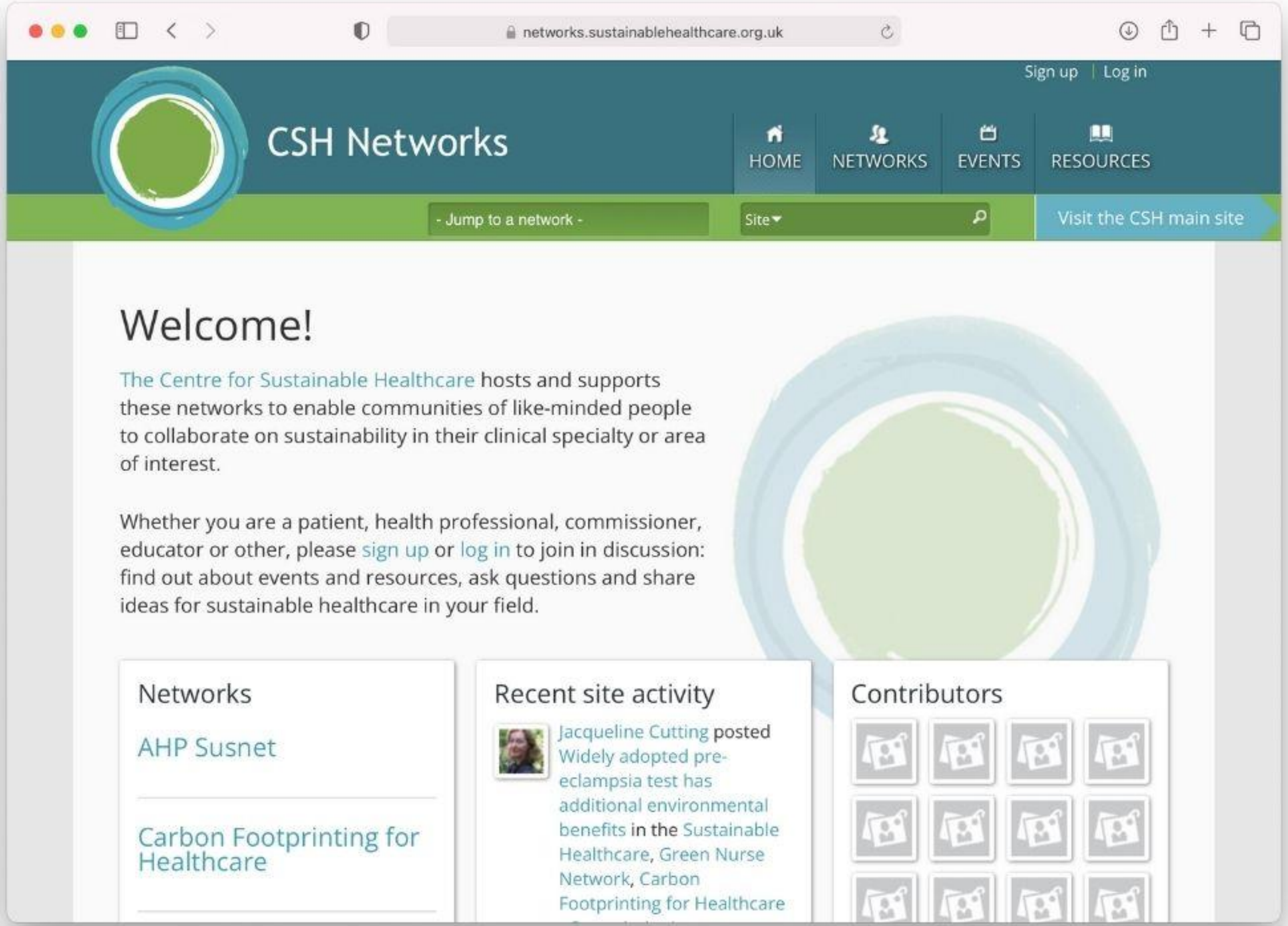
NHS

1. **Building a Net Zero NHS**: *An introduction to environmentally sustainable healthcare.*
2. **Environmental Sustainability in Quality Improvement**: *Integrating environmental, social and financial considerations into quality improvement.*

Sustainable Networks



https://networks.sustainablehealthcare.org.uk

carbon footprinting for healthcare

EyeHealth susnet – Improving the sustainability of eye health services

Green ED Network

AHP susnet – Improving the sustainability of the allied health professions

sustainable healthcare education

SUSTAINABLE PAEDIATRICS NETWORK

sustainable Kidney Care

occupational therapy susnet – Improving the sustainability of occupational therapy

Physio Susnet

dental susnet – Improving the sustainability of dental services

Sustainable Primary Care

sustainable Respiratory Care

Critical Care Susnet

Sustainable Commissioning

sustainable Operating Theatres

MUSIC THERAPY SUSNET

SLT Susnet

Green Nurse Network – Prevent, Lean, Self care, Reduce need, Low carbon

GREEN STROKE CARE NETWORK

Scan to learn more

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INSPIRE | EMPOWER | TRANSFORM

Centre for Sustainable Healthcare support for educational and healthcare organisations

- SusQI Academy
- Course block-booking
- Sustainability Fellowship & Scholarship Programme
- Green Ward Competition

SusQI
Sustainability in Quality Improvement
Academy

sustainable healthcare education

GREEN WARD COMPETITION
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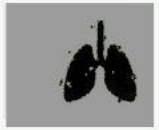
Short courses in sustainability, health and healthcare

Introduction to Sustainable Healthcare

Sustainable Mental Healthcare



Sustainable Primary Care

Sustainable Dentistry

Public Health Leadership for Sustainability

Green Space and Health

Carbon Footprinting for Healthcare

Sustainable Quality Improvement

Teaching Sustainable Quality Improvement

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INSPIRE EMPOWER TRANSFORM

Scan to learn more

FLOWCODE

It will be in my mind in day-to-day practice. I will constantly be thinking of changes and the ways in which we can improve the healthcare system

Developing a 'SusQI lens'

I have more respect for the difference that can be made through quality improvement

Increased motivation for QI

It is easy to feel hopeless with news of climate change. SusQI is valuable as it gives concrete ways in which we can make a difference, rather than just learning about the problem.

Giving hope

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Spooner et al. "Concrete ways we can make a difference": a multi-centre, multi-professional evaluation of sustainability in quality improvement education. *Medical Teacher* (2022).

Evaluation form

Thank you!

https://forms.office.com/r/ijuprzYQsb

Quality Improvement
for our patients, people and planet

The Academy of Fabulous Stuff

Institute of Health & Social Care Management

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HEALTHIER PLANET HEALTHIER PEOPLE

Thank you!

Contact us

http://sustainablehealthcare.org.uk

Home | Sustainable Quality Improvement (susqi.org)

@SusHealthcare
#SusQi

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