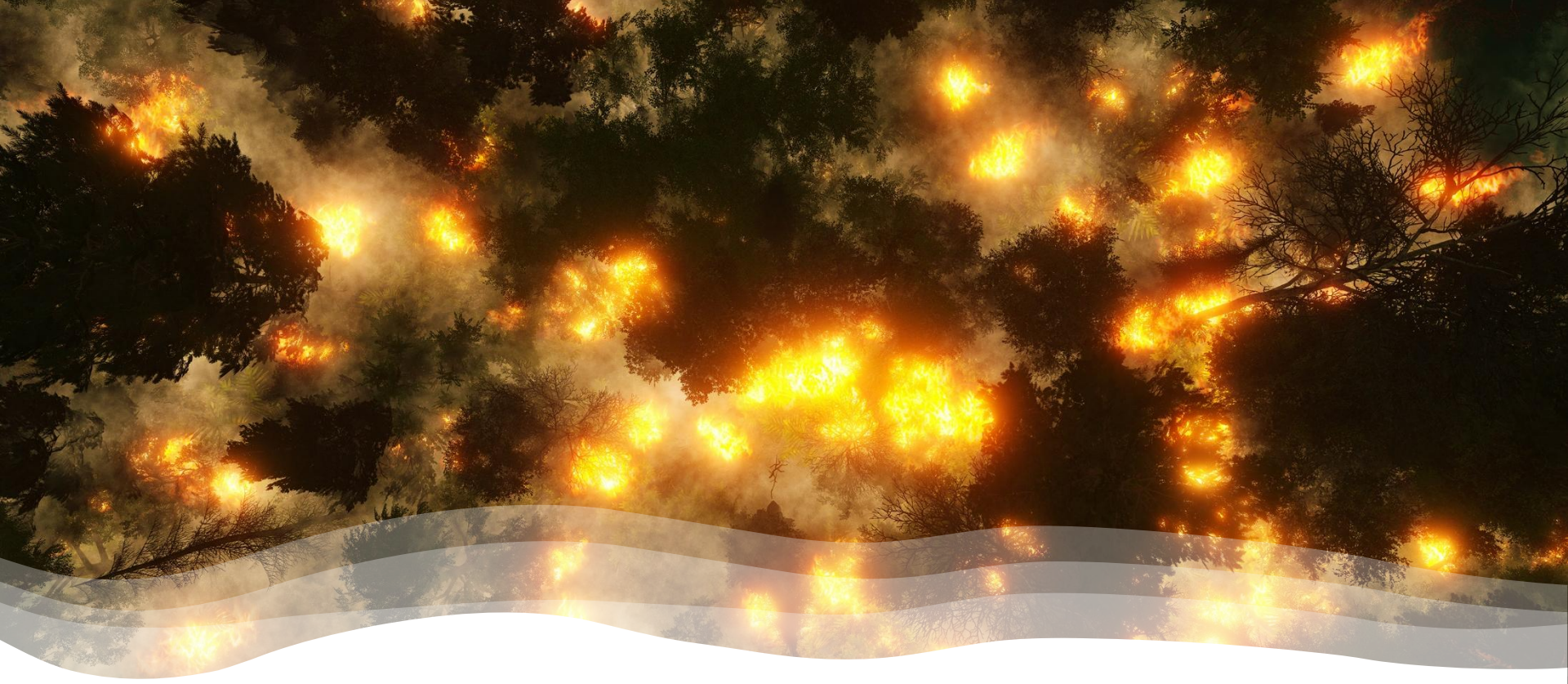


Mark Wright

Sustainable Kidney Care



What's the problem?

- The world is warming
- Carbon (and other) emissions are the cause
- 4 warmest years on record
- This will progress but we can stop overshoot
- The world needs to move to net zero, then carbon capture if we are to avoid no return

This Photo by Unknown Author is licensed under CC BY

How is this manifesting?

- Floods in Pakistan
- Fires across North America, Siberia & Australia
- Shrinking Glaciers & Rising Sea Levels
- Crop failures across Central America, Middle East, Horn of Africa
- Feeds conflict, causes poverty, promotes migration
- Interferes with supply chains

London NHS trust cancels operations as IT system fails in heatwave

Guy's and St Thomas' trust having to postpone and divert appointments, with doctors unable to see patients' notes

Denis Campbell *Health policy editor*

Thu 21 Jul 2022 16.26 BST



Both of the trust's data centres, one at Guy's hospital and the other at St Thomas', stopped working on Tuesday afternoon. Photograph: Maureen McLean/Rex/Shutterstock

East London hospital cancels operations after flooding

Ambulances diverted away from Whipps Cross hospital as heavy rain causes flooding across capital

Kevin Rawlinson *and* **Jane Clinton**

Mon 26 Jul 2021 13.55 BST



Whipps Cross hospital in east London. Photograph: Nigel Howard/ANL/Rex/Shutterstock

Where does healthcare fit in?

- 4.4% of global emissions - 2 Gt CO_2e
- If healthcare were a country it would be fifth highest emitter in the world

What is the NHS doing about it?

- Net zero for emissions under direct control by 2040
  - 80% reduction by 2028-2032
- Net zero for indirect emissions by 2045
  - 80% reduction by 2036-2039
  - Includes suppliers and supply chains

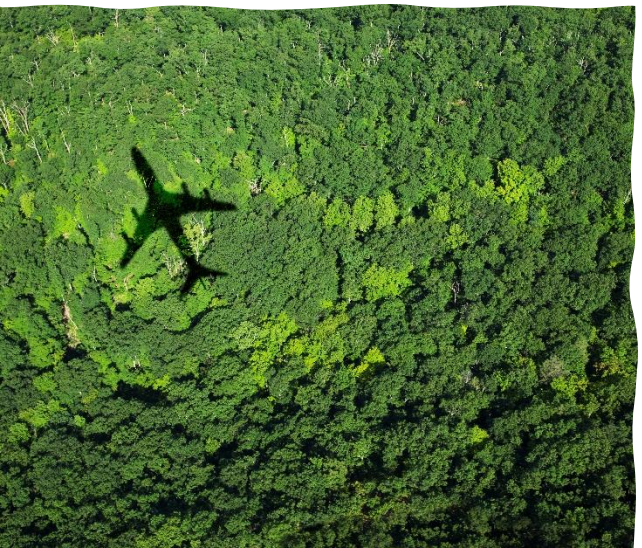
Progress so far?

- Good – 30% reduction since 2010
- October 2021: Greener NHS assessment – on track
- Social value is part of procurement policy

Low hanging fruit – it gets tougher from here

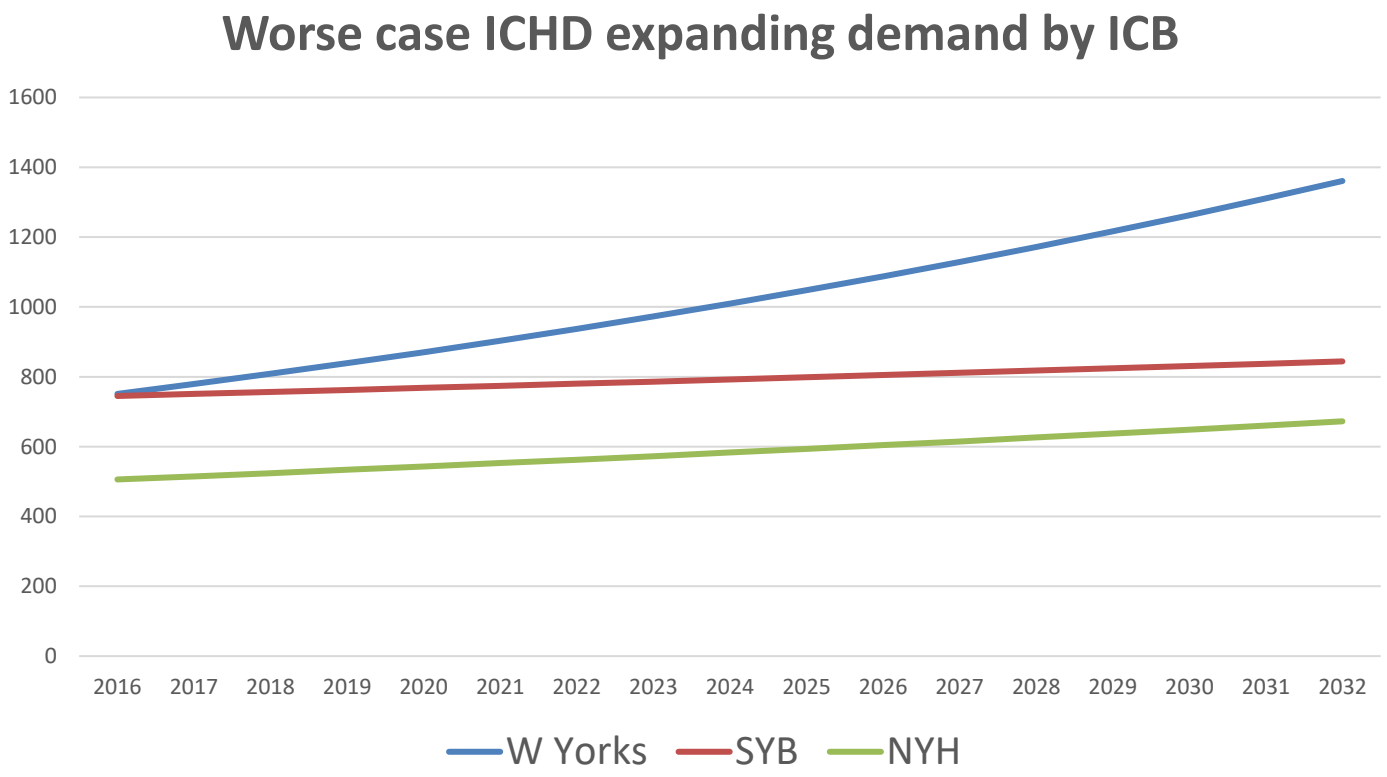






Where do we fit in?

- ICHD emits 3.4-7 tCO2e per user per year
  - 24,000 people in 2020
  - 82-169 ktCO2e for UK
    - 13,500 African elephants
    - 199 Jumbo jets

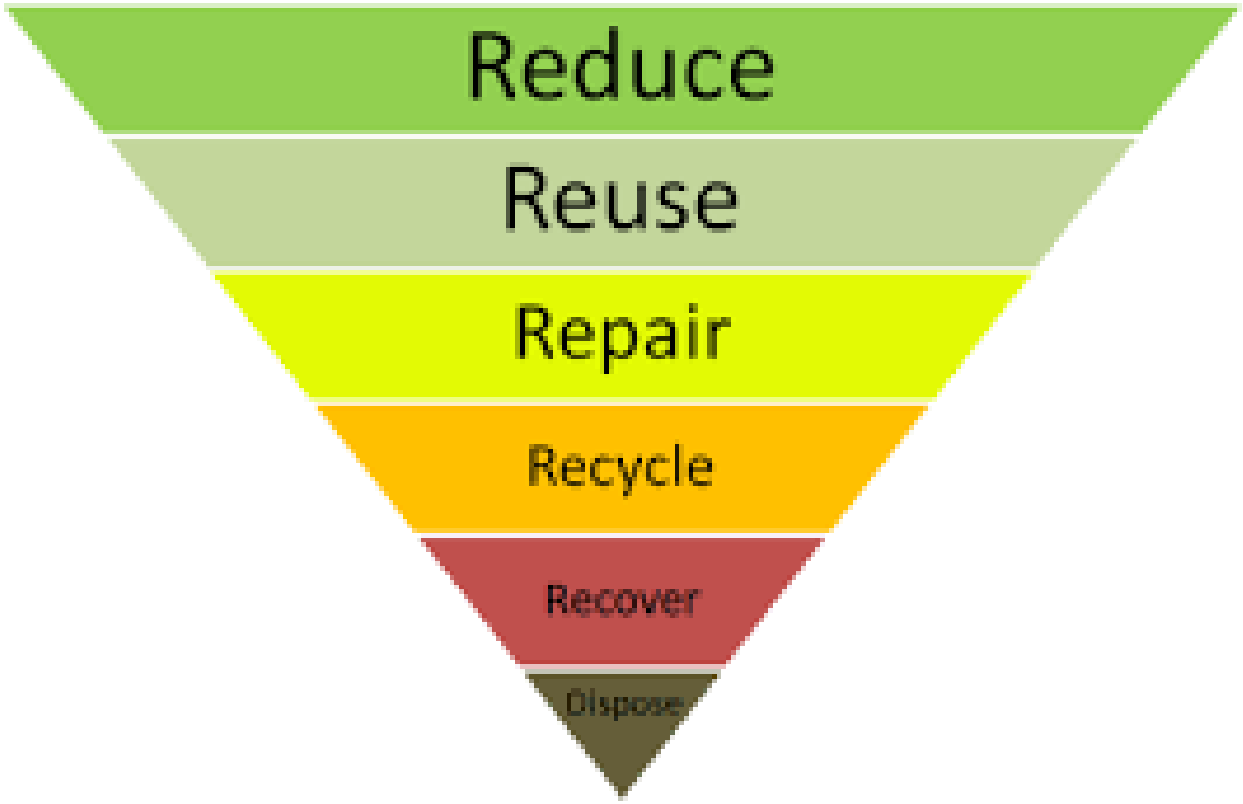

Worse case ICHD expanding demand by ICB
1600
1400
1200
1000
800
600
400
200
0
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
W Yorks
SYB
NYH

	Additional cost 5 years		Additional cost 10 years	
	Million £ pa	CO2e tonnes pa	Million £ pa	CO2e tonnes pa
W Yorks	£3.5-5.2	473-693	£8.2-11.5	1096-1540
SYB	£0.8	109	£1.6	217
NYH	£1.4	182	£3.9	392



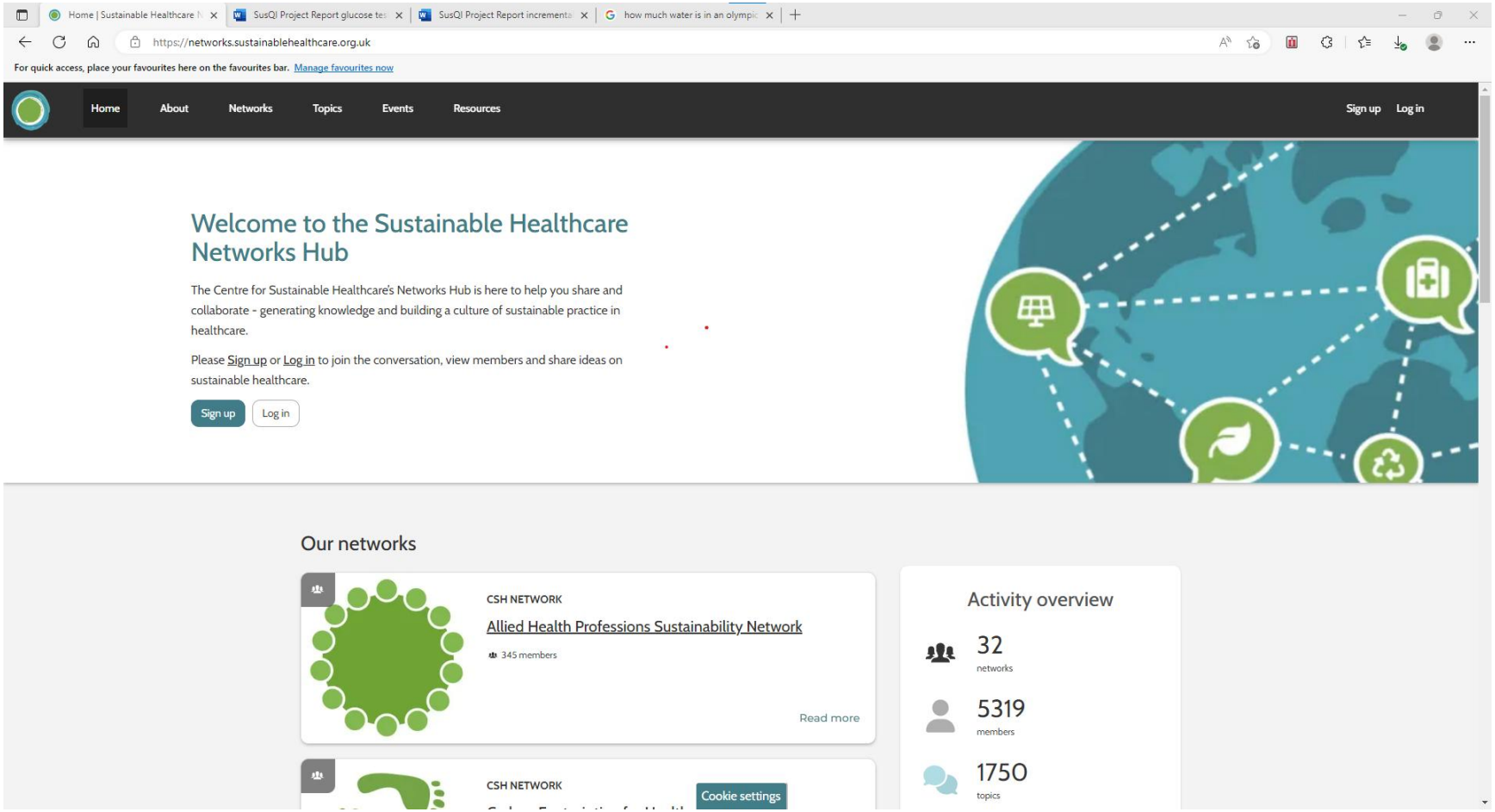
What can we do?

Where do we start?



USE LESS STUFF

Sustainable Health Network



map.sustainablehealthcare.org.uk ➡ “Green Nephrology”

• Waste

Waste Management in the Renal Dialysis Unit - Case Study & How-to Guide

By: NHS Greater Glasgow and Clyde



Savings per year:
£15,567 (Estimated)

CO2 savings per year:
85 tonnes CO2e (Estimated)

Description:
Within NHS Greater Glasgow and Clyde (GGC) 505 people attend our chronic hospital haemodialysis programme equating to 78,780 resource intensive treatments per year in six renal dialysis units (RDUs). We targetted clinical waste and unnecessary consumable equipment use as a simple and efficient method of reducing green house gas emissions (GHG) without impacting on the number or quality of dialysis treatments. Our health board already has off-site recycling of nearly

Baling and Recycling of Bottles & Cardboard

By: Newcastle Upon Tyne Hospitals NHS Foundation Trust



Savings per year:
£7,384 net savings (Actual)

CO2 savings per year:
85.2 tonnes CO2e (Estimated)

Description:
The Renal Unit produces huge amounts of waste plastic and cardboard during its clinical activities. In order to recycle this waste the Trust installed two new pieces of equipment. A cardboard baler was installed to service the whole Freeman Hospital site in March 2011, which allowed the Renal Unit's cardboard to be baled and recycled. In November 2011 a smaller twin baler was also installed to crush and bale the segregated 5L acid bottles from each renal dialysis session. Cardboard and plastic bottle recycling has increased by over 90 tonnes and savings of over £7,000 have been achieved.

• Water

Upgrade of Water Treatment Systems in the Dialysis Unit

By: Bradford Teaching Hospitals NHS Foundation Trust



Positive outcome(s) of project:
Additional capacity for water treatment in case of unit expansion or plant failure; nursing time no longer required for heat disinfection; reduced maintenance costs

Savings per year:
£18,000 (Actual)

CO2 savings per year:
8.42 tonnes CO2e (Estimated)

Description:
The St Lukes dialysis unit has gone through many expansions since its opening in 1994. Following the 2007 expansion, technicians noted that

Conserving Water in Haemodialysis - Case Study and How To Guide

By: Ashford & St Peter's Hospital NHS Trust



Positive outcome(s) of project:
4.492 million litres water saved per year, giving considerable savings on mains water and sewerage costs, environmental benefits as water is a finite resource, compliance with carbon targets

Savings per year:
£10,558 (Actual)

CO2 savings per year:
750kg CO2 (Estimated)

Description:
Haemodialysis consumes vast quantities of water. Producing the 120 litres of dialysate required for a typical four hour session requires

Some examples?

- Dialysate flow rates
- Heat disinfect cycles
- No flow / standby
- Linen use
- Acid concentrate – lots to discuss!
- Water waste / reuse
- Saline prime

Dialysate Flow – “Autoflow”

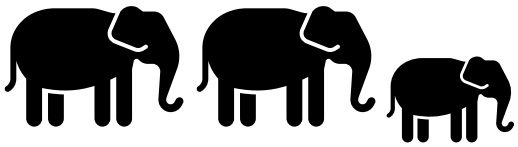
- Bradford – 2013
- Dialysate flow optimised at 1.2 x Blood Pump Speed (HDF)
- Default 500 or 800
- Apply Autoflow 1.2
  - Reduce water use by 202-876,000 litres per year
  - 25m swimming pool holds ~375,000 litres
- And … smaller bicarb bags will do the job

What's everyone else doing?

- Midlands survey
  - 43% autoflow
  - 57% standard settings
- What's the risk?
  - Underdialysis?
  - 0.01 kt/V change on OCM
  - The blood pump can go a bit faster

Heat clean cycles

- Full clean uses 0.75 kWh
- Rinse uses 0.1 kWh
- Full clean uses 14.6 l water, chemicals
- Dropping to 1 clean per day from 2 contributed to…
  - 16t CO2e saving
  - Less water
  - Less chemicals



What's everyone else doing?

- Midlands survey
  - 80% after each session
  - Others vary daily to weekly
- What's the risk?
  - Infection?
  - Scaling?

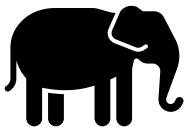
Prime with the patient

- Dialysate flow was on from prime to dialysis start
- More than 2 hours per week of power / water / concentrate use
- Prime on arrival reduced
  - CO_2e by 3.5t
  - Water by 7500l
  - Acid use across the year by 30,000l



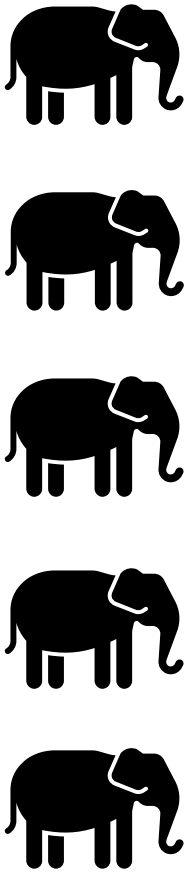
Linen use

- Cornwall 2022
- Bring your own blanket
  - 70% reduction in linen requirements
  - >2t CO2e
- …and eat up!
  - Waste sandwiches reduced from 35% to <5%
  - 3.8t CO2e



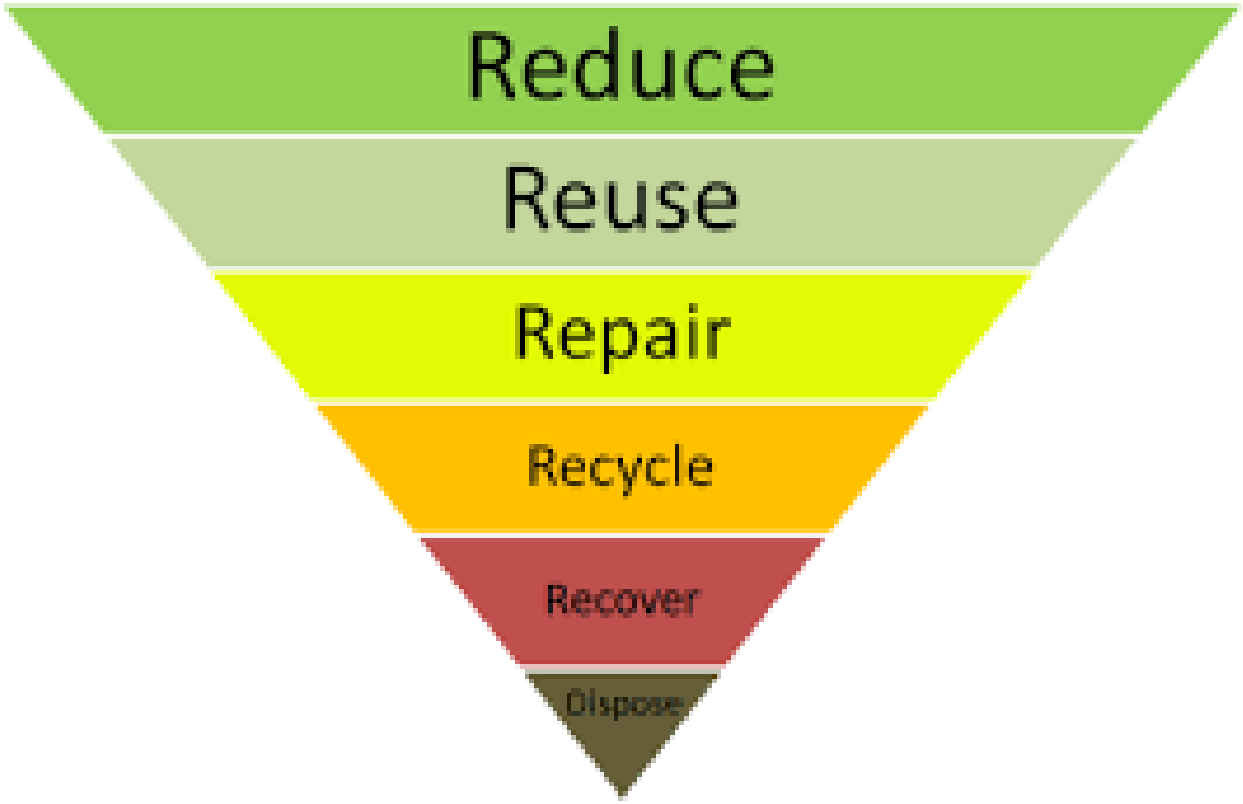
Acid concentrate

- Bradford 2011
- Fitted central delivery system
  - 16t CO2e reduction
- But there's more…
  - 1:33 vs 1:44 cannisters
  - 16t CO2e reduction in Canterbury
- Cannisters in boxes or pallets?



Water reuse

- 15-30% of RO water intake goes to drain
- Can be used for steam production / grey water
- Is this recycling???



USE LESS STUFF

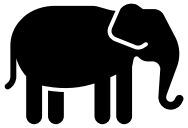
Where from here?

- Autoflow everywhere?
- One heat clean per day everywhere?
- Prime with the patient everywhere?
- BYO blanket everywhere?
- Central acid delivery everywhere?
- Water reuse everywhere?



We need information

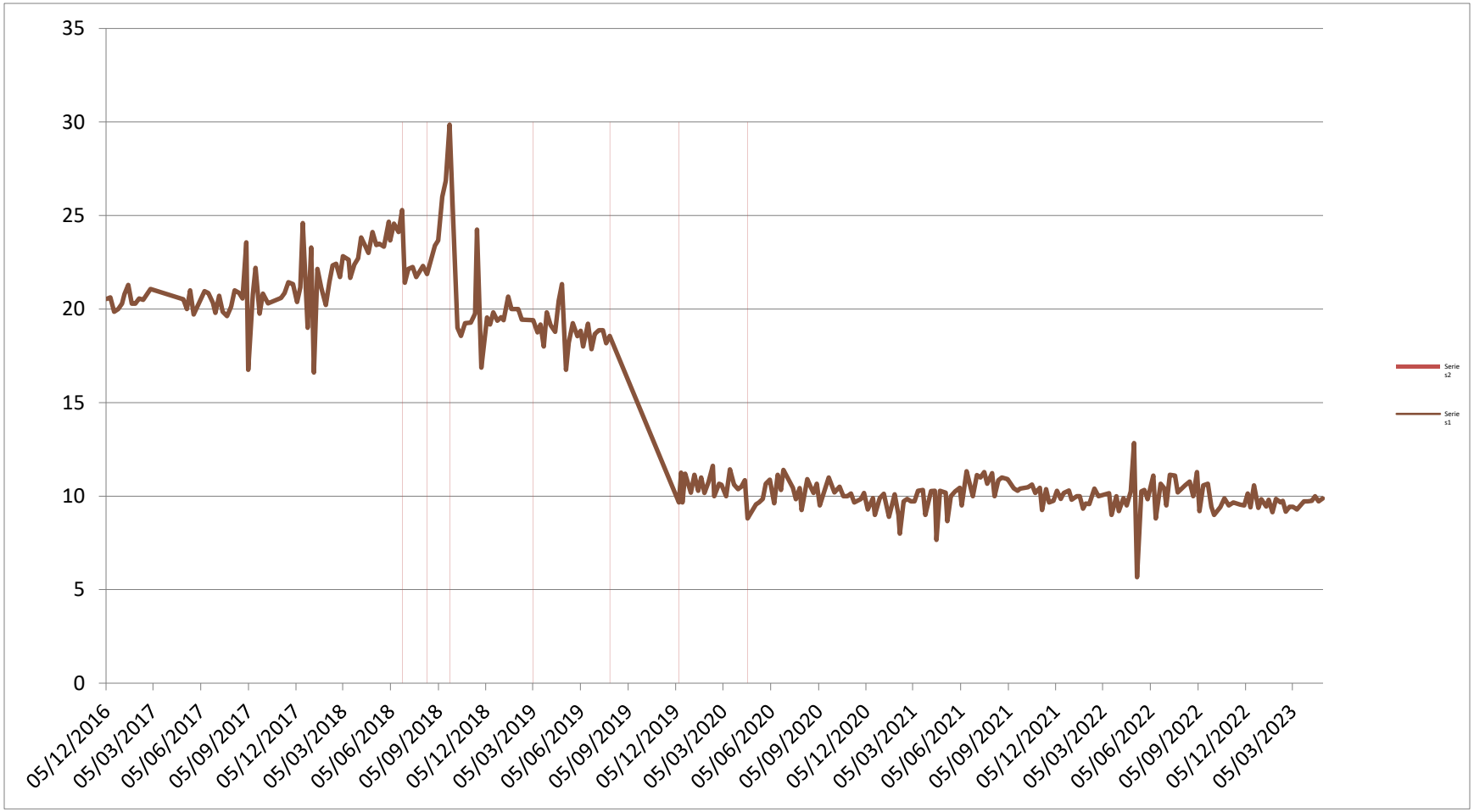
- How many of these are you doing already?
- We'll calculate potential gains
- Track our progress as we implement where we can



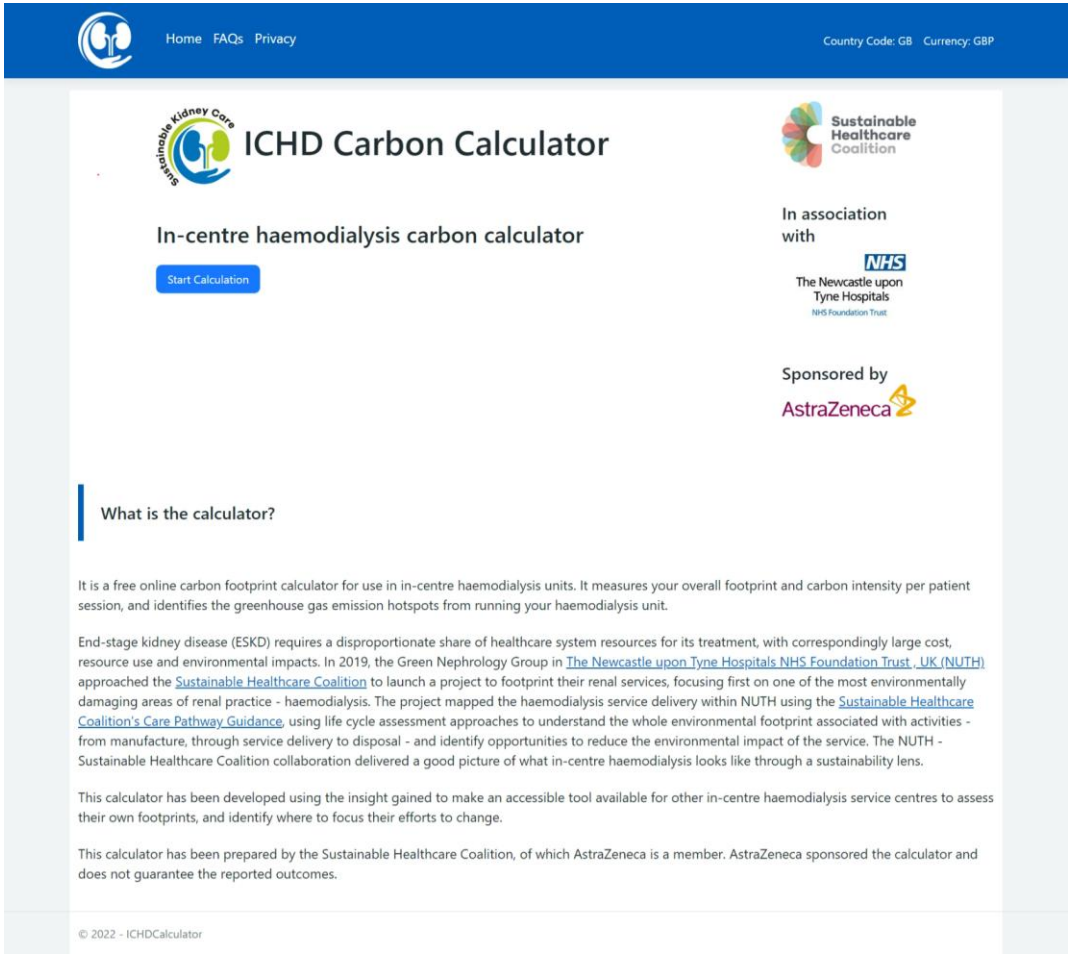
KQuIP

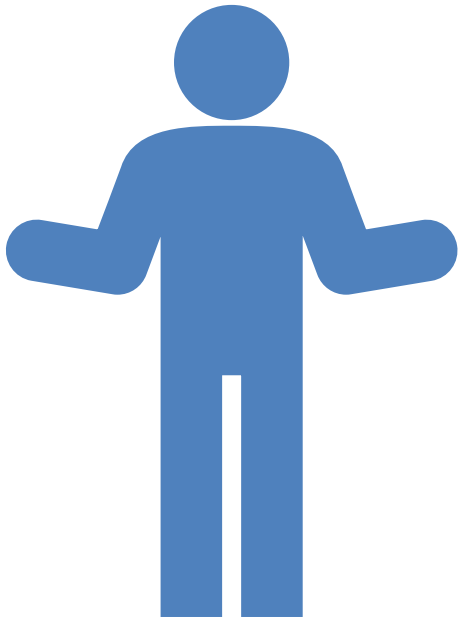
- Deeper QI upskilling
- Do you want to go further?
  - 1:44 concentrate?
  - Reducing wasted transport?
  - Waste streaming?
  - As much dialysis as you need – not more?
  - Or your ideas…

Water consumption York



Ichdcarbon.org





What do you think?