

Session: M5

Saving the Planet - reducing healthcare waste to improve environmental impact

Maureen Bisognano
Gill Smith
Elaine Mead

Susan Hannah
James Mountford

20 June 2022



Welcome!

**Please find yourself a
seat at an available table
and make yourself
comfortable.**

**Please also introduce
yourself to your table
mates!**

Objectives for this session

- Highlight the link between waste in care design and delivery and poorer experience for staff and patients as well as greater cost - describing the contribution of healthcare to environmental challenges
- Discuss strategies and approaches to quantify the impact of waste in healthcare
Identify opportunities that exist right now to make a positive change by minimising the impact of healthcare waste on our environment
- Apply tools to assess the impact of healthcare without harm and green planning for organisations.





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President Emerita and Senior
Fellow IHI

@maureenbis



Gill Smith

Managing Director, Kaizen Kata
and IHI Fellow

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James Mountford

Director of National Improvement
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Elaine Mead

Managing Director, Improvement
Care & Compassion



Susan Hannah

Senior Director, Europe Region,
IHI. @suzi_hannah



Agenda

*Get ready for lots of
interaction in today's
session*

*There will be a break at 2.45
-3.15pm*



Defining 'waste'

noun

- 'Material or resources which are expended carelessly, extravagantly, or to no purpose'

verb

- 'To use or expend carelessly, extravagantly, or to no purpose'

'Fail to take advantage of an opportunity'

The Free Dictionary



If you invested 1m Euros today in healthcare what proportion of that do you think would make little or no contribution to good health outcomes? Select which you think applies:

- 2%
- 5%
- 10%
- 15%
- 20%
- 25%
- 30%
- More than 30%

<https://www.menti.com>
add code



**What does the term 'waste' in health care mean to you?
Select as many as you think apply.**

- Poorly invested euros/money
- Overuse of diagnostic testing
- Unnecessary steps in the patient journey
- Patient time spent waiting for results
- Unnecessary patient admissions/hospital stays
- Under-utilised staff spirit/skills

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Select two statements to describe how this challenge of reducing waste in healthcare feels to you?

- Difficult to think how I can make a difference
- Something I need to give more consideration to
- Not something I feel I have any influence over at an organisational level
- I feel I could make some positive personal changes
- I feel I could do something right now

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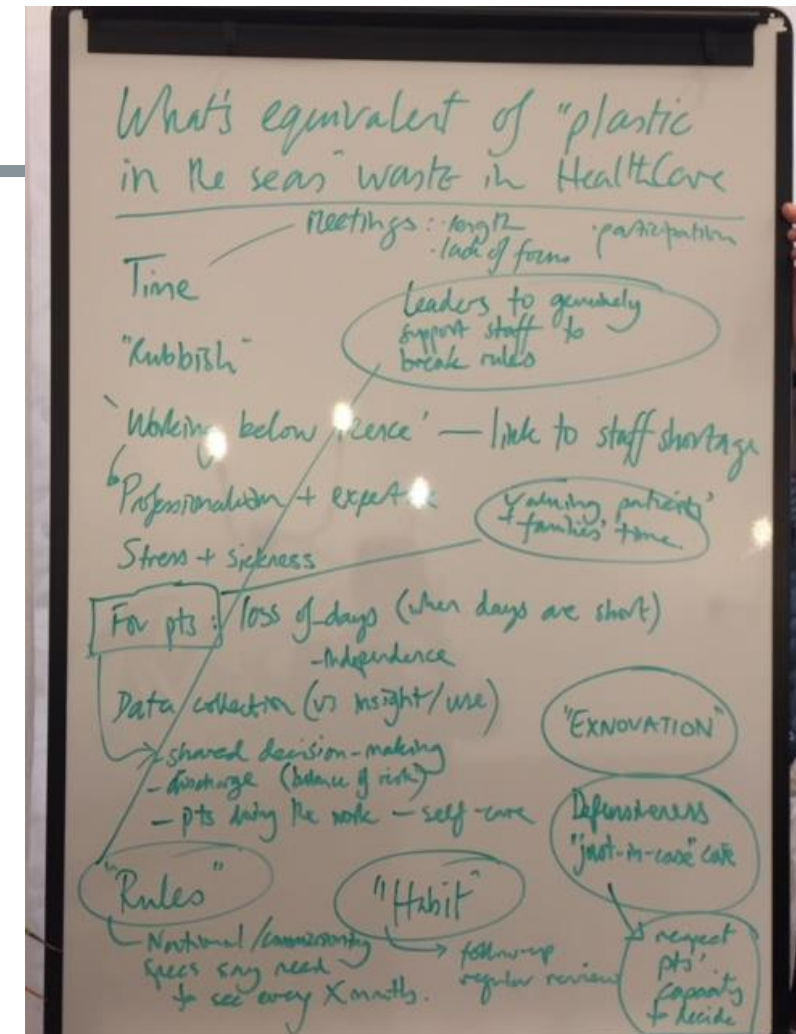


What do we mean by waste in the health context

Maureen Bisognano

HIAE working group: Ideas shared by the group from experience and local context

- **Wasted time and resource in the system:** meetings, approaches to data collection, clinical drug rounds, IV ABs and nursing staff time, theatres redundant non-working time, community resources, hospital admission and discharge processes.
- **Wasted time of patients and families:** precious time of some patients and families at critical time of treatment plans, impacting on quality of life. Waiting for services, delays in appts.
- **Wasted time of staff (and development opportunities):** be more co-productive with our patients in decision making - what people want rather than what the system thinks they need. Psychological safety and impact on joy in work including recruitment and retention. The professional roles and enabling people to deliver better e.g. support staff in community services/development of roles and appropriate pay/compensation.



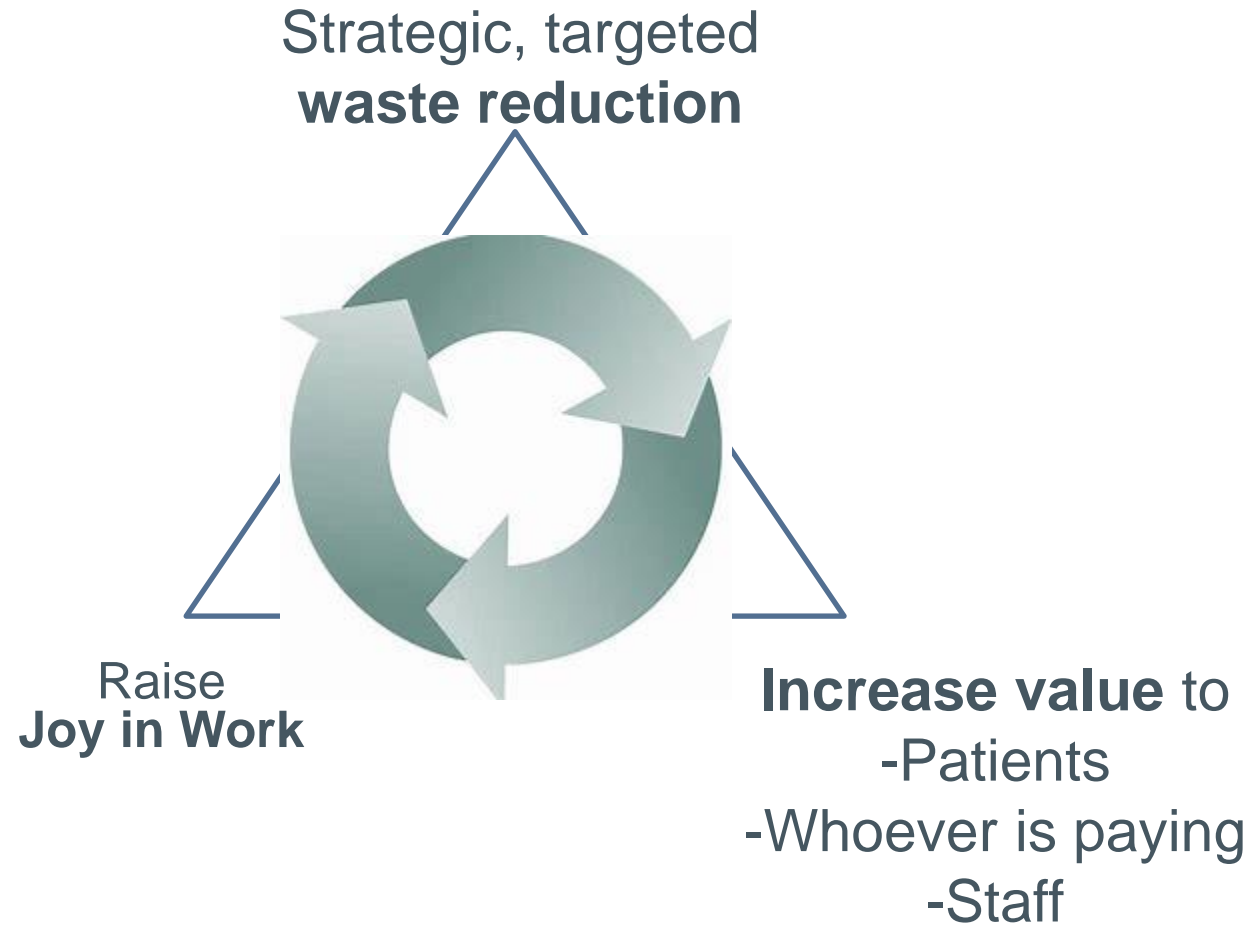
Our Vision is...

“Strategic Waste Management”

From	To
Arbitrary, reactive cutting costs, disconnected to the process or understanding of care delivery	A systematic, targeted set of interventions designed to simultaneously <ul style="list-style-type: none">- Improve patient outcomes- Control costs- Increase Joy in Work
	Owned by the staff who are delivering care – as part of their job and professionalism (supported by management and the organization's assets)
	Ability to share the gains once captured between patients, staff and organization/system



Is there a “golden triangle”?



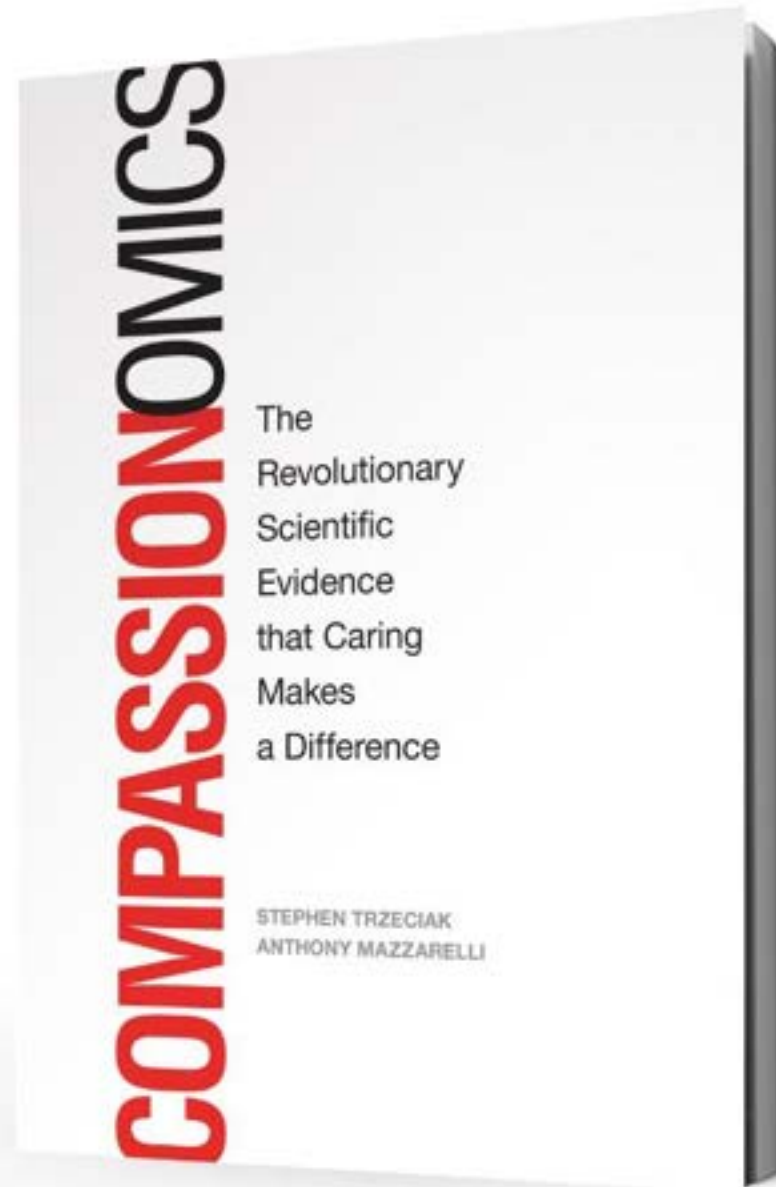
Exploring the different types of waste we see in the system and the impact it has

**Wasted
resources and
processes**

**Wasted time
patients,
carers, staff**

**Wasted spirit
and
opportunities for
staff**





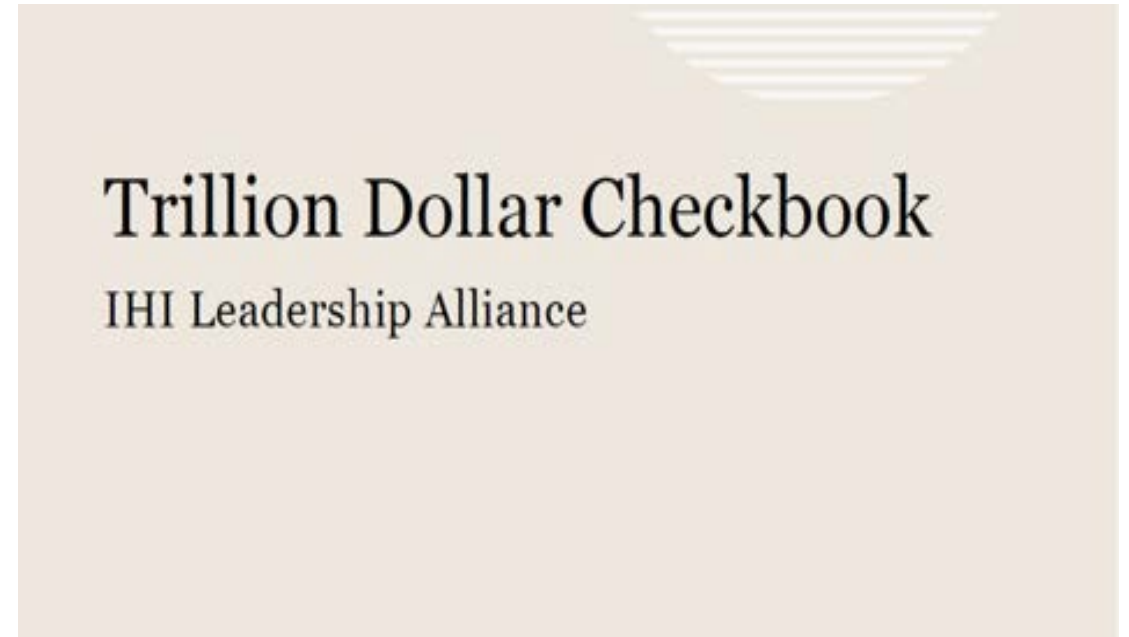


Light & Dark
green
dollars



Trillion Dollar Checkbook

1. Reduce harm & safety events
2. Reduce non-value added operational workplace waste
3. Reduce non-value added clinical workplace waste
4. Solicit staff and clinician ideas
5. Involve patients in identifying what matters most
6. Redesign care to achieve Triple Aim



Innovation – Spread - Exnovation

Innovation

- Where are care models and processes broken?
- Where do we need new thinking?
 - Innovation labs, design processes
 - Harvesting

Spread

- Where do we see variation in performance?
- How can we reliably spread to ensure that we can provide the best care to every patient, where they are?
 - Transparent data
 - Curiosity
 - Spread Model

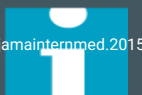
Exnovation

- How do we stop what doesn't work anymore?
- How will we eliminate wasteful practices and processes?
- **It takes courage!**



Exnovation and Undiffusion

- Established procedures can be hard to abandon, even when evidence for change is strong
 - Preference for what is familiar
 - Cost of training and new equipment can be a barrier
- Speed and shape of undiffusion
 - Not a perfect reverse S curve
 - Conflicting data can affect rate of undiffusion
 - Late adopters of old standard are often the first to Exnovate



De-prescribing

- The process of taking patients off drugs
- Cruel paradox: a large population on the severe end of the spectrum and a large population of others who are overprescribed and stay on the medication for years
- Roughly one in eight adults and adolescents in the US take antidepressants and a quarter of them have been taking them for over ten years
- Today, antidepressants are taken by one in five white American women



Implementation and de-implementation: two sides of the same coin?

Leti van Bodegom-Vos,¹ Frank Davidoff,² Perla J Marang-van de Mheen³

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/bmjqs-2016-005473>).

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³Medical Decision Making, J10-S, Leiden University Medical Centre, Leiden, The Netherlands

ABSTRACT

Avoiding low value care received increasing attention in many countries, as with the Choosing Wisely campaign and other initiatives to abandon care that wastes resources or delivers no benefit to patients. While an extensive literature characterises approaches to implementing evidence-based care, we have limited understanding of the process of de-implementation, such as abandoning existing low value practices. To learn more about the differences between implementation and de-implementation, we explored the literature

implementation and de-implementation in the people who are most likely to lead (or resist) these efforts.

BACKGROUND

In recent decades, abandonment of low value care has become more important in many countries. Evidence shows for example that an estimated 30% of all medical spending in the USA is unnecessary, and does not add value in care.¹ The importance of abandoning low value care is underscored by the Choosing



Perspective

NOVEMBER 8, 2018

Getting Rid of Stupid Stuff

Melinda Ashton, M.D.

Many health care organizations are searching for ways to engage employees and protect against burnout, and involvement in meaningful work has been reported to serve both func-

tions. According to Bailey and Madden, it is easy to damage employees' sense of meaningfulness my colleagues and I had reason to believe that there might be some documentation tasks that

of the beholder. Everything that we might now call stupid was thought to be a good idea at some point."

We thought we would probably receive nominations in three categories: documentation that was never meant to occur and would require little consideration to elim-

Status of "Getting Rid of Stupid Stuff" Requests from Nurses and Physicians.*

Status	Nurses	Physicians
	<i>no. of requests (%)</i>	
Completed	68 (46.6)	19 (45.2)
Not possible	18 (12.3)	8 (19.0)
In progress	27 (18.5)	2 (4.8)
Assigned to work groups or not yet started	33 (22.6)	13 (31.0)

* Does not include 31 suggestions from other disciplines or related to issues other than improvements to electronic health records.





Reducing Inappropriate Medication Use by Implementing Deprescribing Guidelines

A Case Study for US Health Care Delivery System Innovation

IHI/Commonwealth Fund Innovations Network



Table 1:	What's in it for each stakeholder: Examples of stakeholder "gains" from tackling waste
Patients	<ul style="list-style-type: none"> • Reduced harm – both physical as well as psychological worry • Returning the money (less out of pocket) • Less wasted time waiting
Community	<ul style="list-style-type: none"> • Reduced overall costs of health care to community • More resources to invest in other needed community infrastructure and activities • Beneficial taxation implications • Reduced costs to employers, freeing them to be more competitive in a local and global marketplace
Providers	<ul style="list-style-type: none"> • More effective use of limited resources • Providing care that truly helps • Lower claims liability • Improved joy/satisfaction in work
Health Systems	<ul style="list-style-type: none"> • Pursuit of value and the Triple Aim • Conservation of use of precious resources, allowing investment in activities that promote health • Reduced claims liability
Health Plans, Payors	<ul style="list-style-type: none"> • Increased marketability • Improved cost structure
Government	<ul style="list-style-type: none"> • Reduced non-value-added spending • Reduced administrative bureaucracy • Reduced national debt





Cambridge University Hospitals NHS Foundation Trust

"You don't have to take your clothes off..."

Spot the difference

For people over 80 – 10 days in a bed ages muscles by 10 years

One week of bed-rest results in 10% muscle loss

Loss of strength could make the difference between dependence and independence

Get dressed – Get moving!

#endPJparalysis

Addenbrooks

Produced by the CUM Corporate Communications Team Addenbrooks's Hospital Rosie Hospital

Excellent care with compassion

NHS Lancashire Teaching Hospitals NHS Foundation Trust

End PJ paralysis

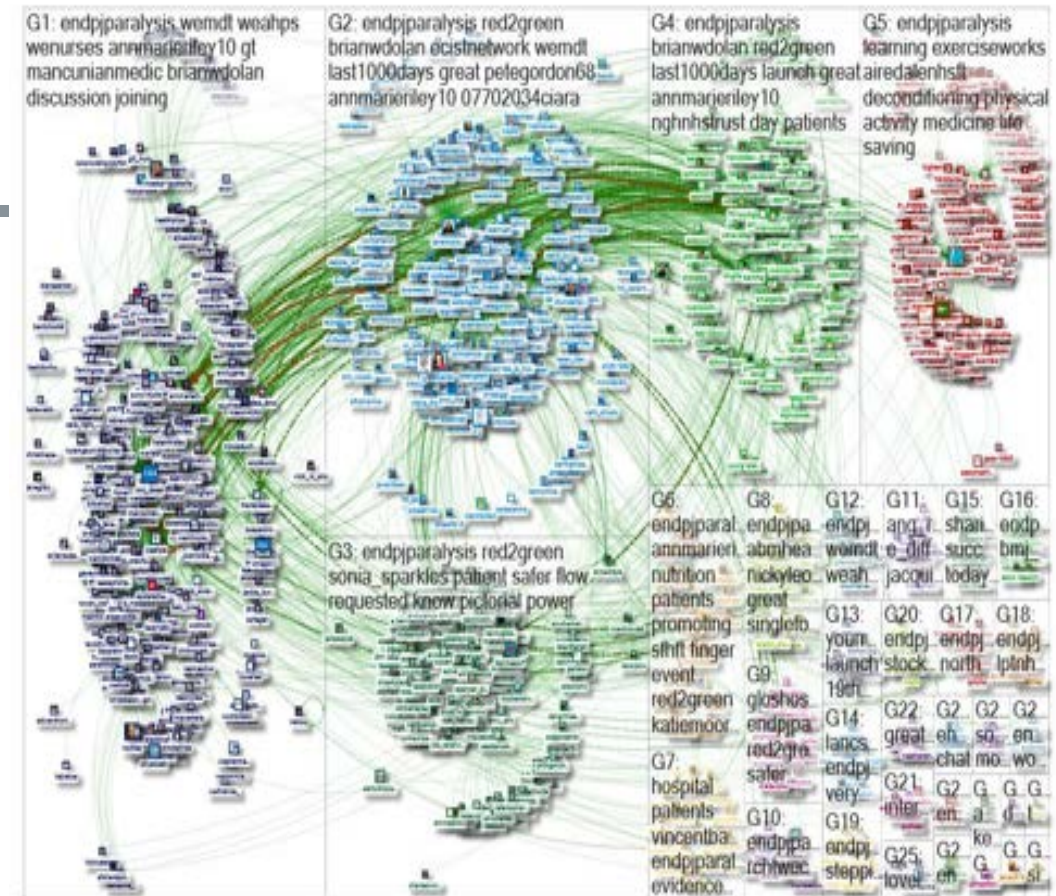
Wearing pyjamas longer than you need to can make you feel vulnerable.

Being mobile helps you recover more quickly from illness and injury.

So we'll be encouraging you to get out of bed when you're well enough, get out of those PJs, and get moving.

On Friday 24th March
our staff are wearing PJs to understand how it feels to be a patient.

#endPJparalysis



#endpjparalysis: connected social communities



International What Matters To You Day

June 9th



BC PATIENT SAFETY
& QUALITY COUNCIL
Working Together. Accelerating Improvement.



Patient
Voices
Network

#WhatMattersToYou
#WMTY22



The bigger picture: Carbon and Waste in Healthcare

James Mountford

Climate change poses a major threat to our health

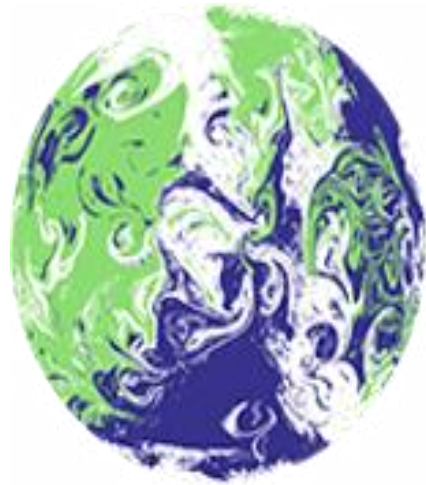


- For example, 356 000 deaths worldwide in 2019 were linked to extreme heat and cold
- 569.6 million people are living less than five metres above current sea levels, at risk of increased flooding, more intense storms, and soil and water salinification

But action on climate change is an opportunity for health:

- It has been estimated that reaching the UK's ambitions under the Paris Agreement could see over 5,700 lives saved every year from improved air quality, 38,000 lives saved every year from being more physically active, and over 100,000 lives saved from healthier diets

In November 2021, at COP26, UK & other health systems committed to become sustainable, low carbon systems



**UN CLIMATE
CHANGE
CONFERENCE
UK 2021**

IN PARTNERSHIP WITH ITALY

- In total **46 countries** committed to become sustainable low carbon health systems
- National Health Service (NHS) in England was the **first health system** to aim for Net Zero
- Now **15 countries** have a net zero commitment

Climate change and inequalities

Ella Adoo-Kissi-Debrah: Air pollution a factor in girl's death, inquest finds

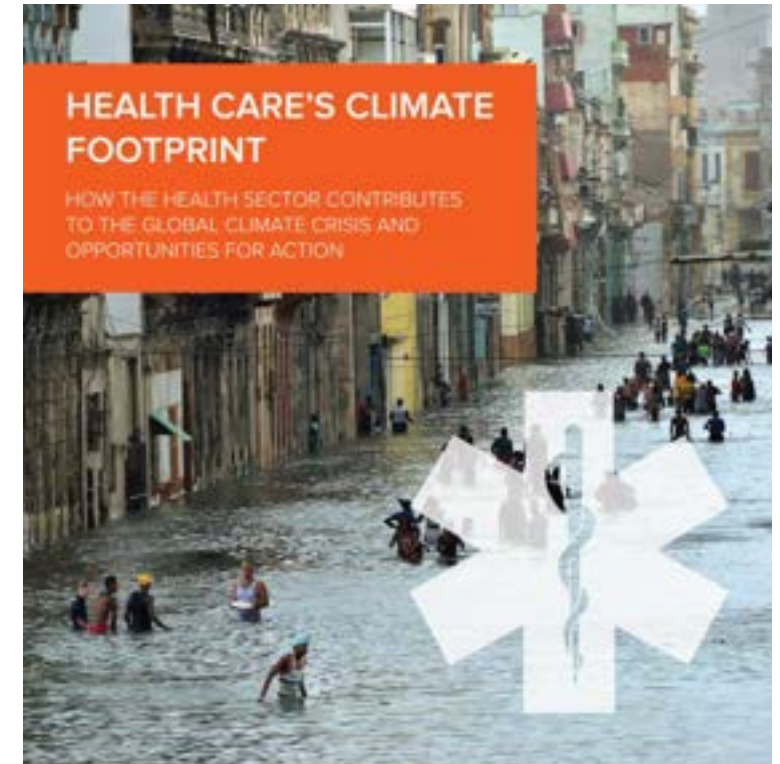
© 16 December 2020



| Ella Adoo-Kissi-Debrah lived 25 metres from the South Circular Road in south-east London

The health sector contributes to climate change

- The health sector contributes 10% of national greenhouse gas emissions in the United States (4% in the UK)
- In the US environmental impacts of the health sector are estimated between 405,000 - 470,000 DALYs lost from pollution-related disease (2003-2013)
- These in addition to the 44 000 to 98 000 deaths from preventable medical errors first reported by the IOM in *To Err Is Human 2*



ARUP

Health Care Without Harm
Climate-smart health care series
Green Paper Number One
Produced in collaboration with Arup
September 2019

[Source: How Healthy Is Health Care? | Environmental Health | JAMA Network Open | JAMA Network](#)



Greenhouse gas emissions

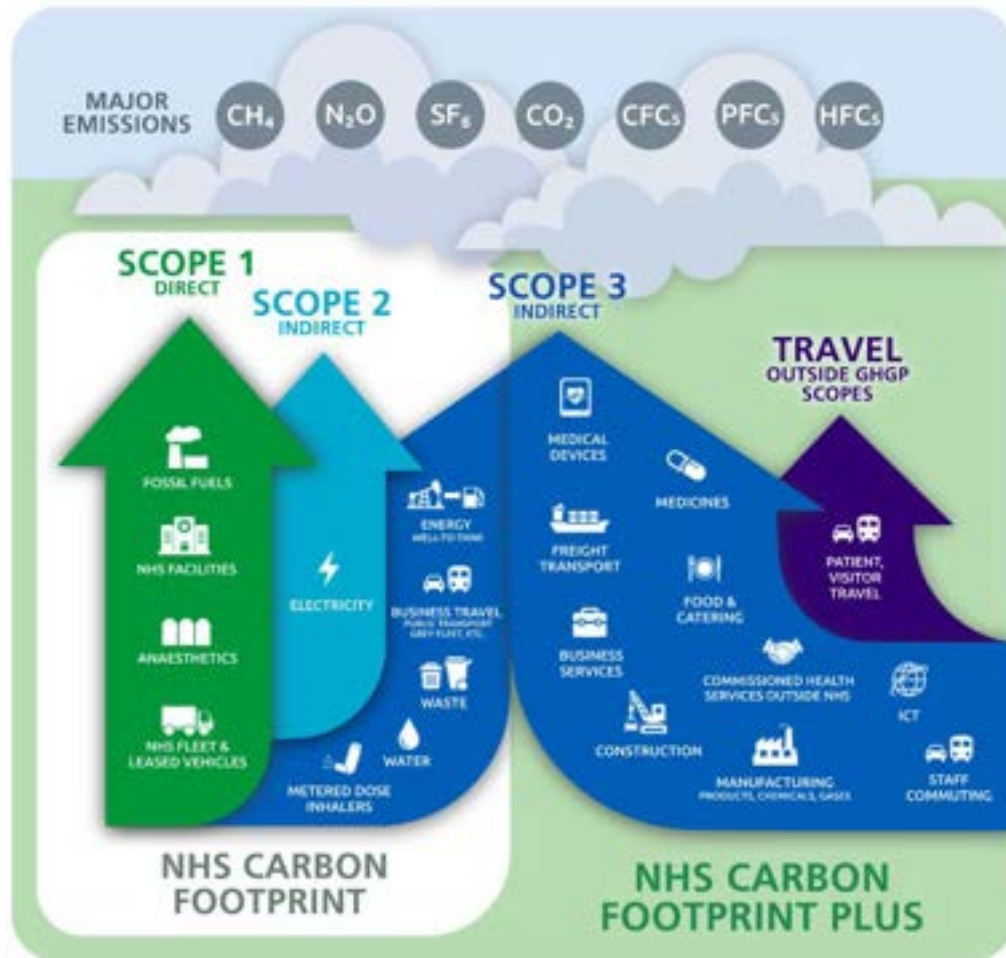


- CO₂ vs other greenhouse gases – some gases are much more potent, for example some anaesthetic gases
- CO₂ vs CO₂e – creating one currency
- Direct/indirect emissions and scopes
- You can also calculate your personal footprint

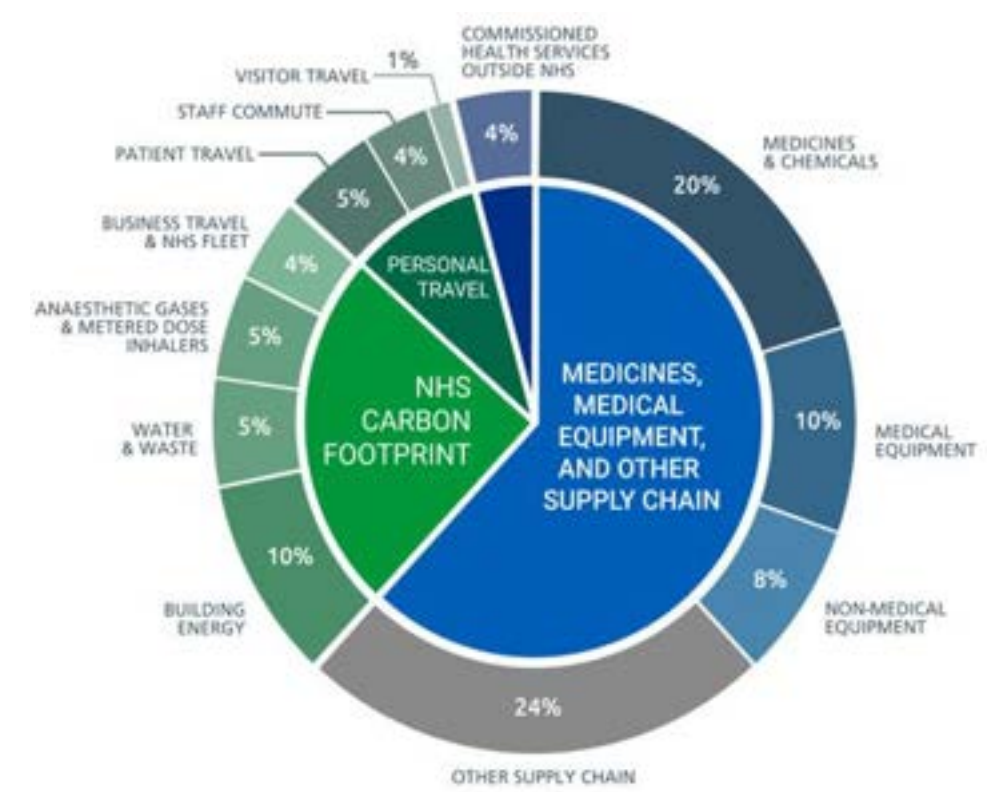
England's NHS became the world's first health system to commit to reaching net zero carbon

In October 2020, the NHS stepped up once more and committed to two ambitious but evidence-based targets:

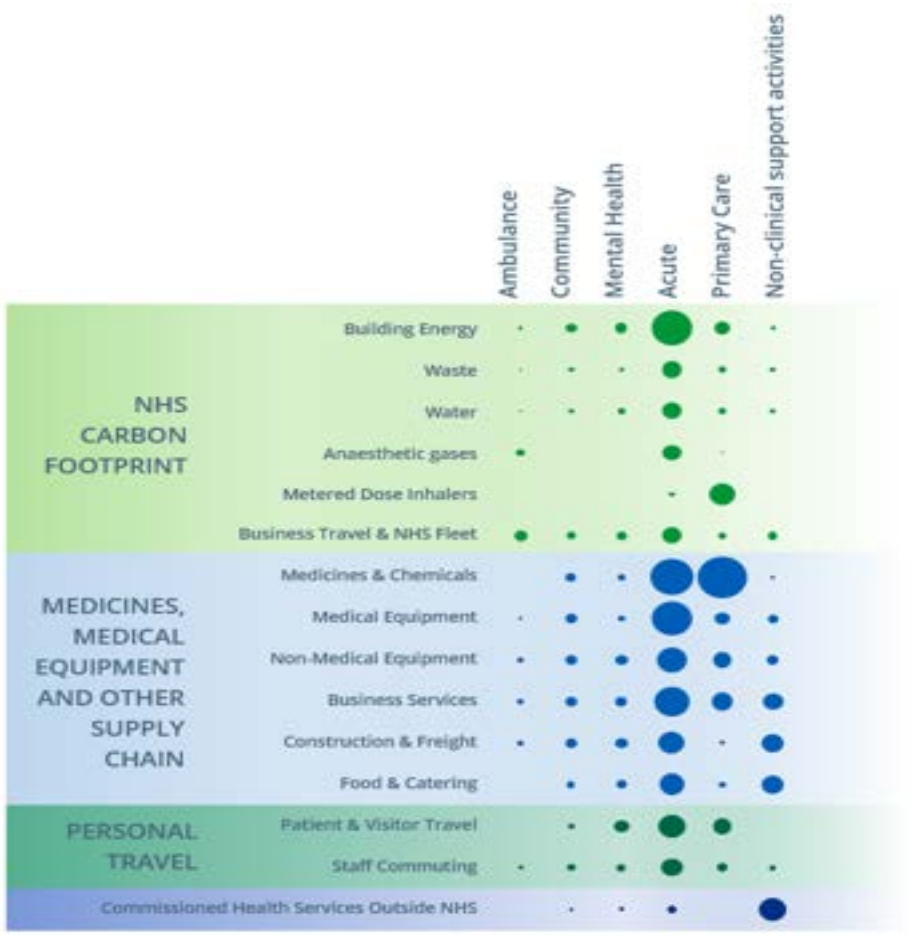
1. **Carbon Footprint:** for the emissions we control directly, net zero by 2040.
2. **The NHS Carbon Footprint Plus:** for the emissions we can influence, net zero by 2045.



Delivering on our goals requires action across every part of the health system



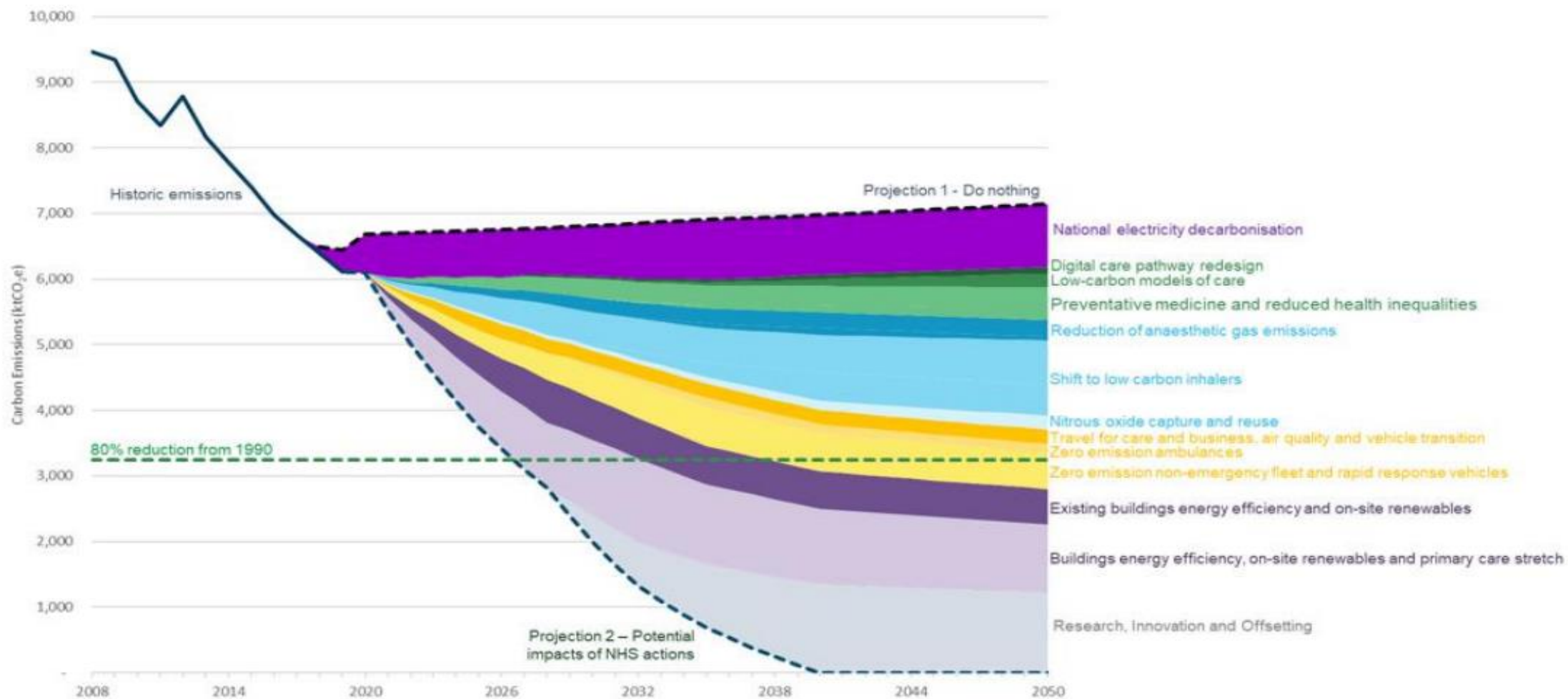
Sources of carbon emissions by proportion of NHS Carbon Footprint Plus



Sources of carbon emissions by activity type and setting of care



Our roadmap to net zero in England's NHS



National electricity decarbonisation
New models of care and preventative medicine
Anaesthetics and inhalers

Travel and Transport
Estates and Facilities



Lower carbon models of care are key to becoming a Net Zero NHS



Everyone has a part to play... meet Jo and her remote Occupational Therapy practice

“It’s a much more environmentally friendly way of working and it’s popular with my patients too – reducing the stress and discomfort of travelling to hospital.”



Putting anaesthetic-generated emissions to bed...



Anaesthetic gases are among the single most carbon intensive medicines available, with desflurane among the most intensive.

Anaesthetists are proving that excellent patient care is possible, while being good for the environment.

Their drive to use greener gases and remove the use of any unnecessary gas has seen them reduce their impact significantly, an annualised reduction of 52.9 ktCO₂e, the equivalent of 192 million miles travelled in an average car.

...and inhalers



Representing over 3% of total emissions, optimising the use and prescription of inhalers is an important early step to improving patient care and tackling climate change.

Incentives have been put in place to increase the percentage of inhaled corticosteroid prescribing (ICS, or preventative inhaler). As well as improving patient health this will also include reductions in carbon emissions by improving disease control.

Net zero & wellbeing—why not cycle to work?



- At Sussex Community Trust health visitors are doing their rounds to support new parents and families on electric bikes.
- New parents are happy to see the world around them becoming greener, as it offers hope for the children they have just brought into the world.
- The Trust now have three e-bikes dedicated to specific clinical teams for their sole use as well as a pool e-bike, and have covered around 8,000 miles in total, saving around 2 tonnes of CO2.

Pedal Power Story

<https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D0KY4DLwTTao&data=04%7C01%7C%7C9905184e46f3480cdd5d08d9add621f9%7Cae635716f1924ebca7c071136d785df2%7C0%7C0%7C637731959995270344%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ikk1haWwiLCJXVCI6Mn0%3D%7C3000&sdata=IjjlcSqnRDb%2FH%2FhLsRFR8haZEf4DHZEKFvGrY%2FnQQFs%3D&reserved=0>



Almost two years on, and we are seeing results



Thanks to the support of NHS People up and down the country we are already making progress – reducing harmful emissions while improving patient care and saving money.

Almost 9 in 10 NHS staff support the NHS net zero ambition [YouGov, August 2021]

Since the NHS's commitment to become net zero, we have:



Ensured that 100% of trusts and ICS have net zero strategies and board-level leads, to support and assure the delivery of local net zero plans.



Stimulated £31m innovation, to decarbonise care pathways



Delivered the world's first net zero ambulance, emergency rapid response vehicles and the UK's first HGV electric truck, reducing air pollution to protect our patients from increased risk of major health conditions.



Secured over £677m of government funding for the NHS, to decarbonise the estate and capture long term revenue savings to fund care for our patients.



Signed up 15 suppliers to match NHS net zero commitments, with combined emissions the size of the country of Belgium, and **embedded a 10% carbon weighting into all procurements**, using the NHS' size and purchasing power to maximise our impact.



Chief Sustainability Officer's clinical fellowship scheme was launched, to embed sustainability at the heart of clinical leadership.



Built international support, with the US, Germany, France, and 17 other countries aligning to the NHS trajectory.

Resources...and please contact us

Contact us: james.mountford@nhs.net

- Eckelman MJ, Sherman JD. Estimated Global Disease Burden From US Health Care Sector Greenhouse Gas Emissions. *Am J Public Health*. 2018;108(S2):S120-S122. doi:10.2105/AJPH.2017.303846
- Sherman JD, Lagasse R. How Healthy Is Health Care? *JAMA Netw Open*. 2018;1(4):e181000. doi:10.1001/jamanetworkopen.2018.1000
- [COP26 Special Report on Climate Change and Health \(who.int\)](#)
- [Country Commitments \(who.int\)](#)
- [Health care's response to climate change: a carbon footprint assessment of the NHS in England \(thelancet.com\)](#)
- [The Lancet Countdown on health and climate change](#)
- [Healthcares climate footprint - Arup](#)



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Group Work 1

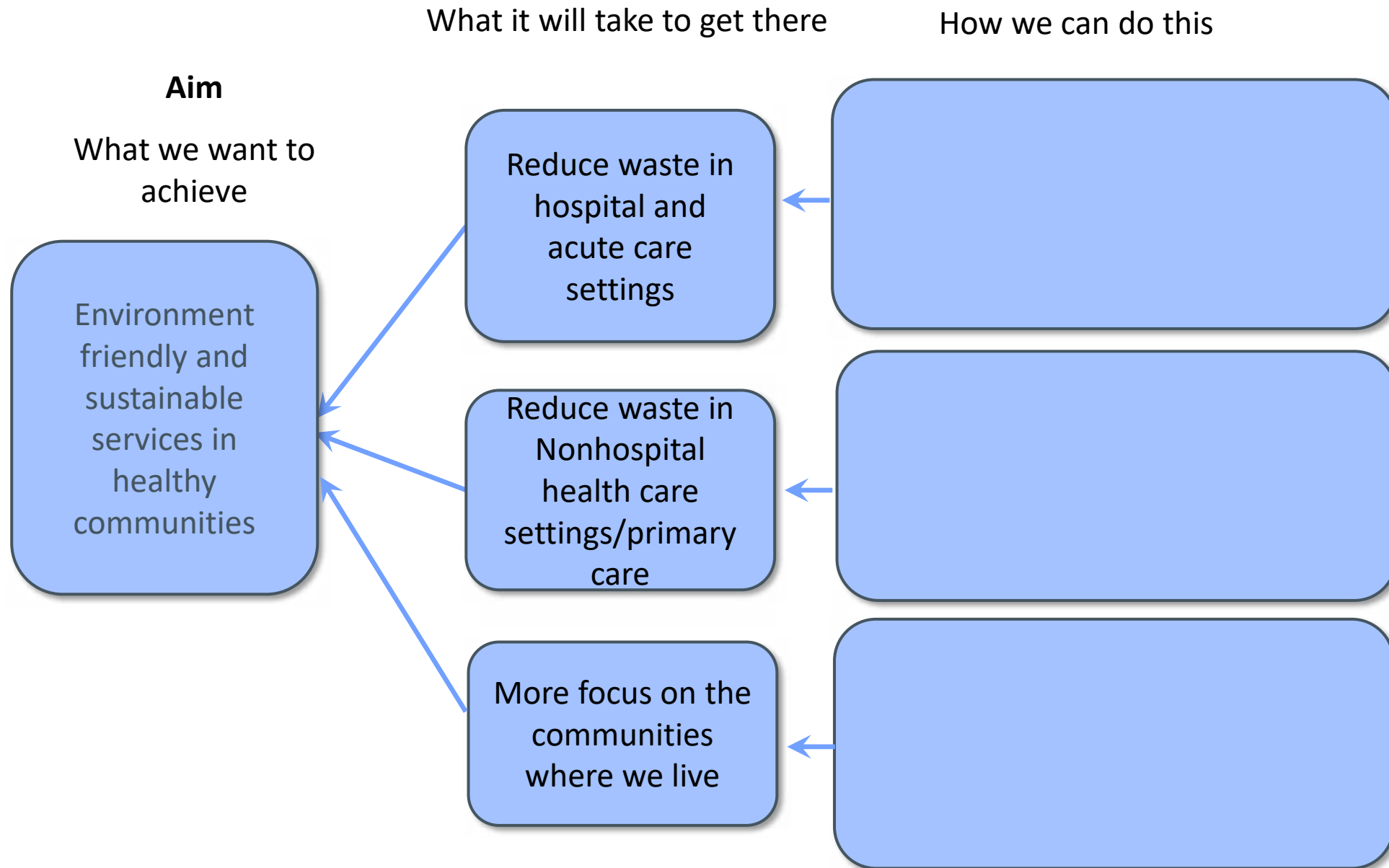
Put your *Muda* glasses on!



- You are all invited to take part in table discussions
- Each group has a facilitator from the presenting team
- You have 15 mins to explore actions you/your organisation can take to reduce muda related to Acute Healthcare or Community Healthcare
- Seek a volunteer in your group who can provide some feedback when you rejoin the plenary

Now – go get your glasses on!!!

Driver Diagram – Reducing Waste and Improving the Environment





Gothenberg Waste Quiz Part I

Saving the planet - reducing
healthcare waste to improve
environmental impact



Now come on a climate
awareness journey with
us and have some fun!



Convention is to express a carbon footprint in terms of carbon dioxide equivalent. (CO₂e)

This means the total climate change impact of ALL the greenhouse gases caused by an item or activity expressed in terms of the amount of carbon dioxide that would have the same impact over a 100 year period





What is the average carbon footprint per person in the UK, per year in tonnes of CO₂e?



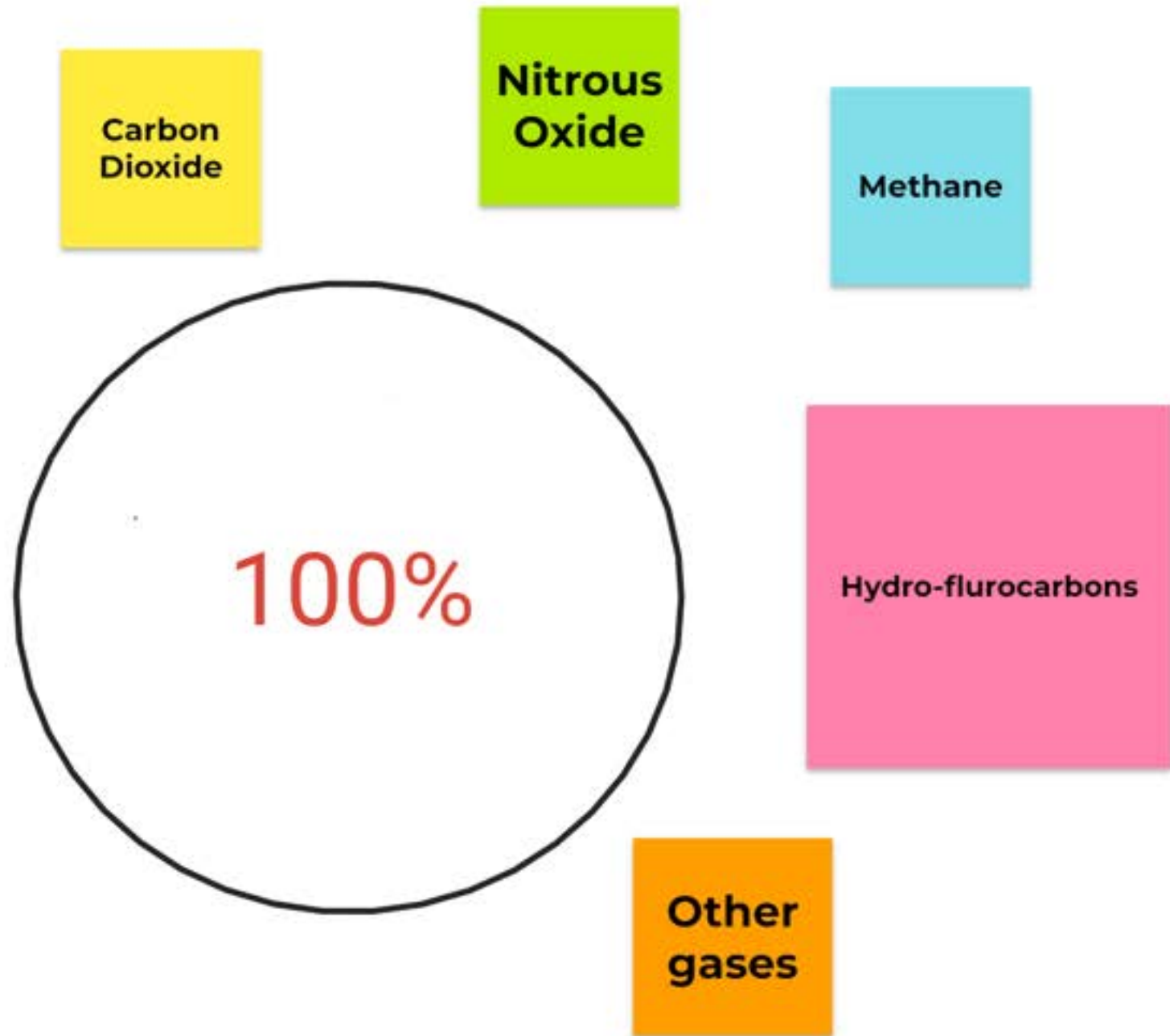
The average carbon footprint per person in the UK, per year, is 12.7 tonnes CO₂e.

We need to move to a 5-tonne lifestyle

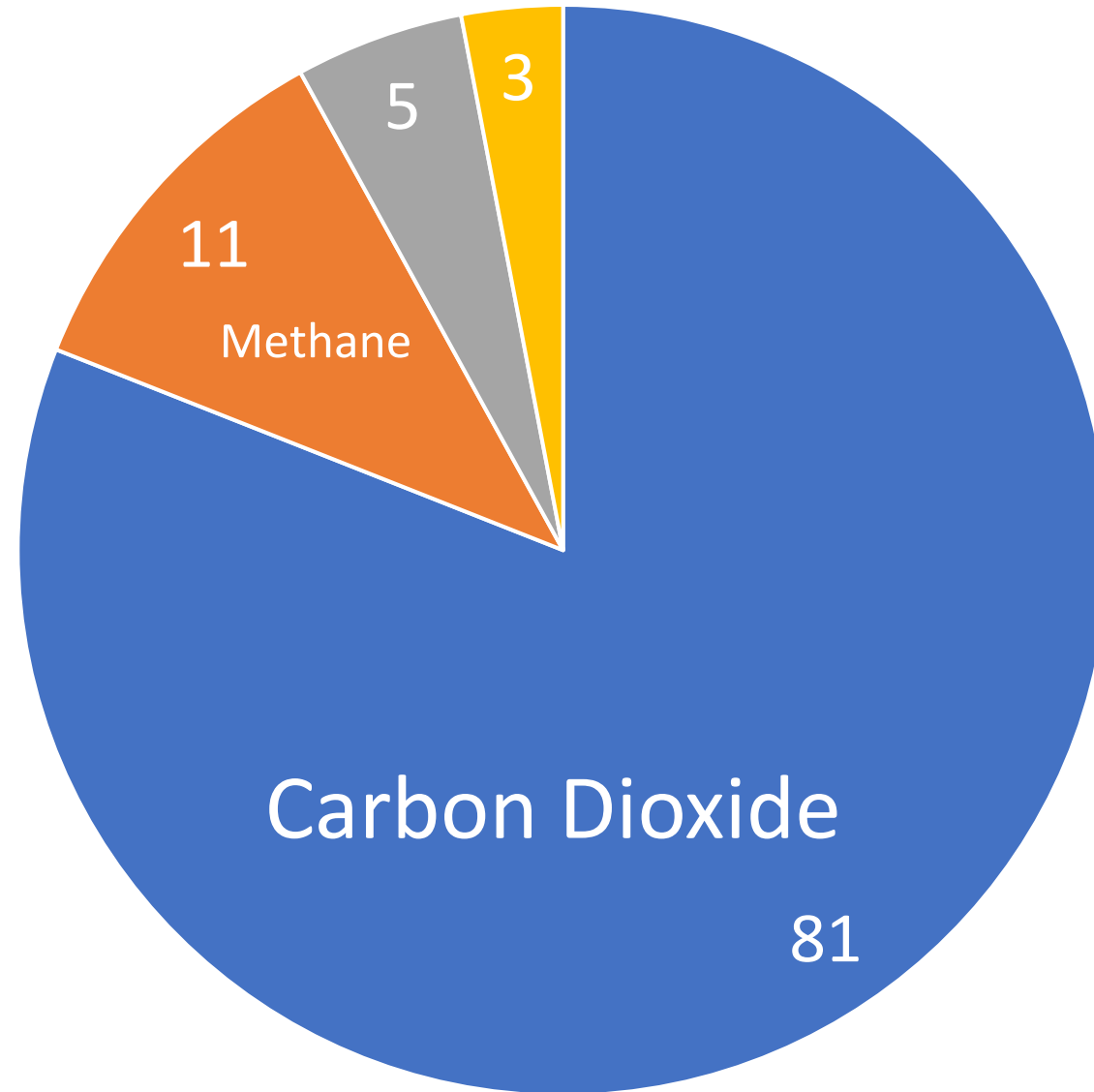
You would need to drive 23,000 miles in the average car to emit 12.7 tonnes of CO₂e (that's once around the world).



In the UK, what is the percentage breakdown of the carbon emissions of Carbon Dioxide Methane Nitrous Oxide Hydrofluorocarbons (HFCs) and Other gases



Percentage breakdown of carbon emissions



■ Carbon Dioxide ■ Methane ■ Nitrous Oxide ■ HFCs and others



In the UK the breakdown of our CO₂e gas emissions is approximately 81% Carbon Dioxide, 11% Methane, 5% Nitrous Oxide, Hydrofluorocarbons (HFCs) and other gases 3%



What percentage of world CO₂ emissions can be attributed to healthcare delivery and supply?



4-6% of world CO₂ emissions can be attributed to healthcare delivery and supply



Match the Greenhouse gas protocol scope with the description

GHGP
Scope
1

**All other indirect
emissions that
occur in producing
and transporting
goods and services,
including the full
supply chain**

GHGP
Scope
2

**Indirect emissions
from the generation
of purchased
energy, mostly
electricity**

GHGP
Scope
3

**Direct emissions
from owned or
directly controlled
sources, on site**

Greenhouse gas protocols

SCOPE 1
Direct emissions
from owned or
directly controlled
sources, on site

Anaesthetic gases,
food waste, fuel
for fleet transport

SCOPE 2
Indirect emissions
from the generation
of purchased
energy, mostly
electricity

Use of electricity in
hospitals and clinics

SCOPE 3
All other indirect
emissions that
occur in producing
and transporting
goods and services,
including the full
supply chain

Production of
pharmaceuticals,
medical devices



Gothenberg Waste Quiz Part II later!

Saving the planet - reducing
healthcare waste to improve
environmental impact



Please enjoy your
break and return for
part 2 at 3.15pm

Pecha Kucha

A Story of Putting waste reduction into practice

Gill Smith





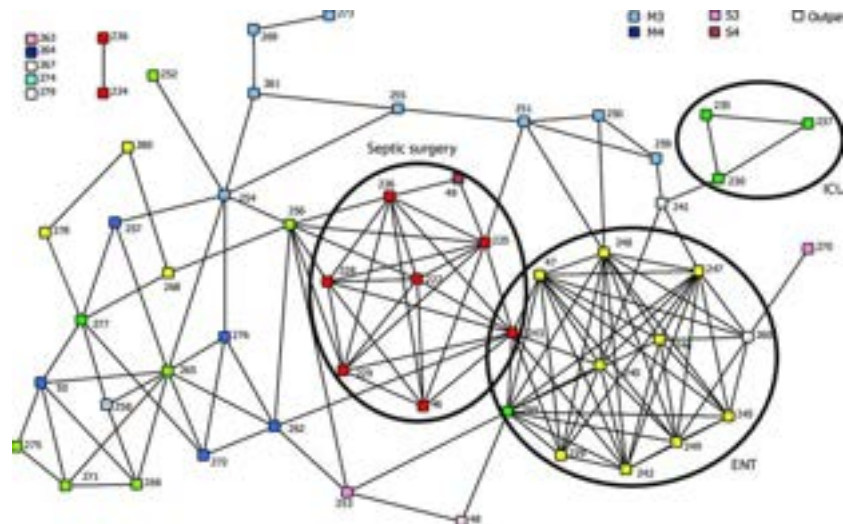


Better
Health
for the
Population

Better
Care
for
Individuals

Lower Cost
Through
Improvement







Health
Improvement
Alliance Europe

MEMBER



NAME LASTNAME
Street Address
City, State 00000-0000

PAY TO THE
ORDER OF



NAME BANK
www.bank.com

FOR

1210428820 9687421684 00483

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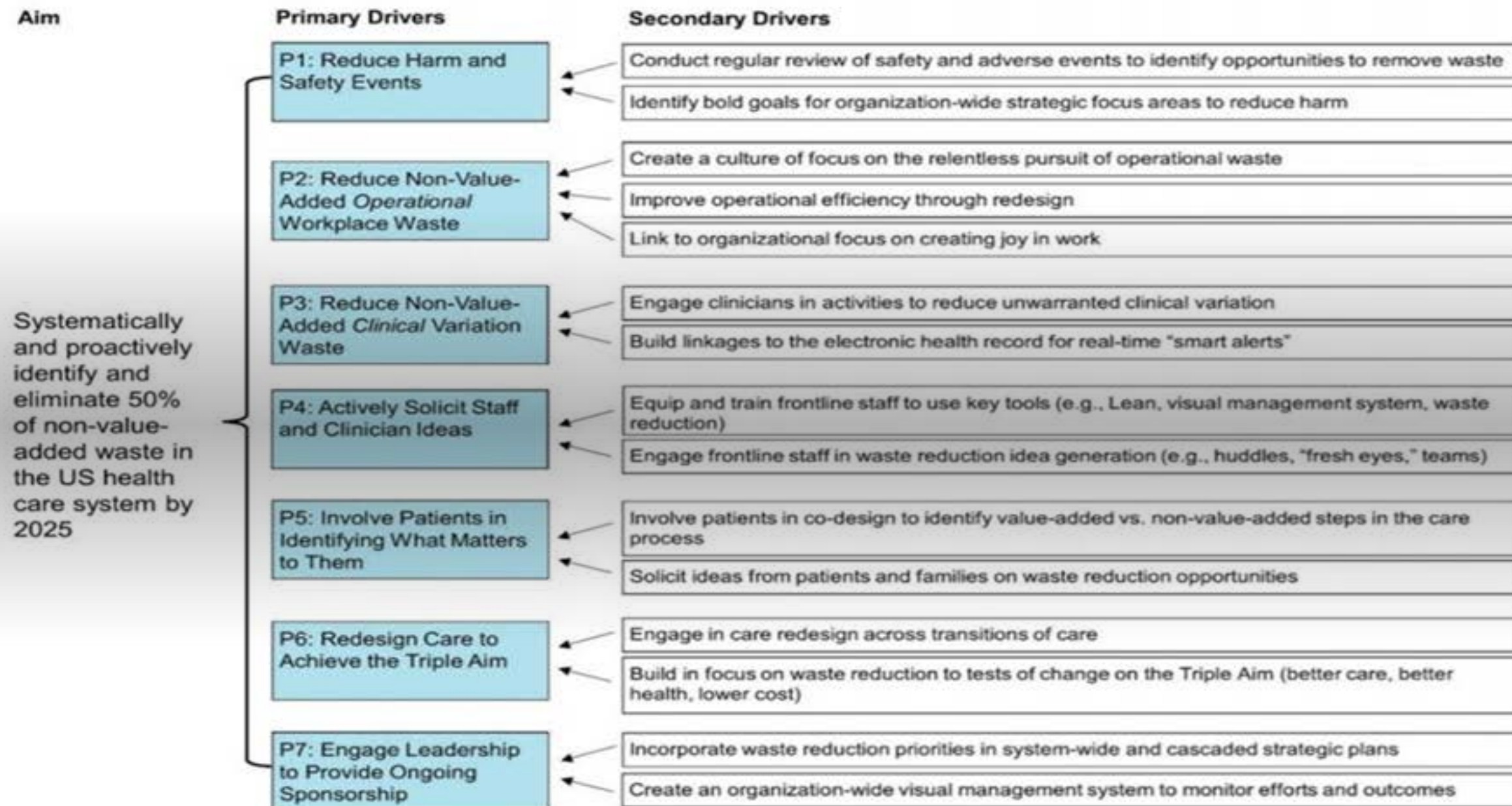
DATE

\$

DOLLARS



Figure 1. Driver Diagram for Reducing Waste and Cost in the US Health Care System







Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	1	2	3	4	5
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	1	2	3	4



TIME is the most important currency to patients & staff

Don't WASTE What can't be REPLACED

Frustrations of waste



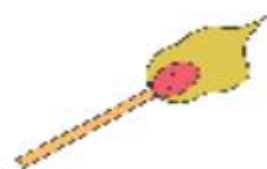
Patients and loved ones have "sleepless" nights worrying and waiting for results



Patients are wasting time away from family due to unnecessary delays in care



Staff are exhausted from non-value tasks that lead to a waste of their talent



Disjointed teams can lead to duplication and burnout.



Too many steps are wasted on things that are not beneficial e.g. paper forms



Precious time is wasted on things that can lead to defects/errors

Expected benefits



By reducing waste, you can improve your enjoyment at work



Working together to understand what matters to staff & patients



Improving quality & reducing waste naturally leads to efficient use of resources



Involving you can lead to changes that make a difference to you



Free up staff time, effort, energy and focus more on what matters most



You clear the runway – people spend too much time on things that don't matter

What HIAE did



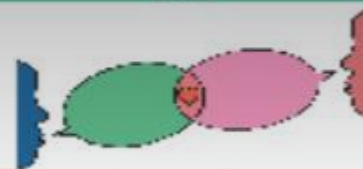
Alliance members working together to improve value and eliminate waste



Be more green! Waste has an impact on all of us. We all contribute to or create waste



Focused on creativity, positive energy, celebrating success and enjoying work



Focused on understanding "what matters to you" & learning from each other



Had a QI based approach for learning. Examples of reducing waste are in this playbook

Some tips for you



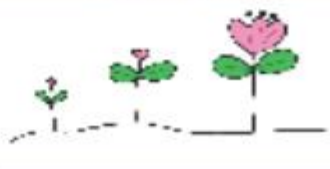
Use the right language to connect with a wide range of people & create inclusion



Co-produce with patients & the community, be open and honest with them



Focus on understanding what matters most, we can all learn from each other's experiences



Don't let waste go unchallenged. It will take time to make the changes happen

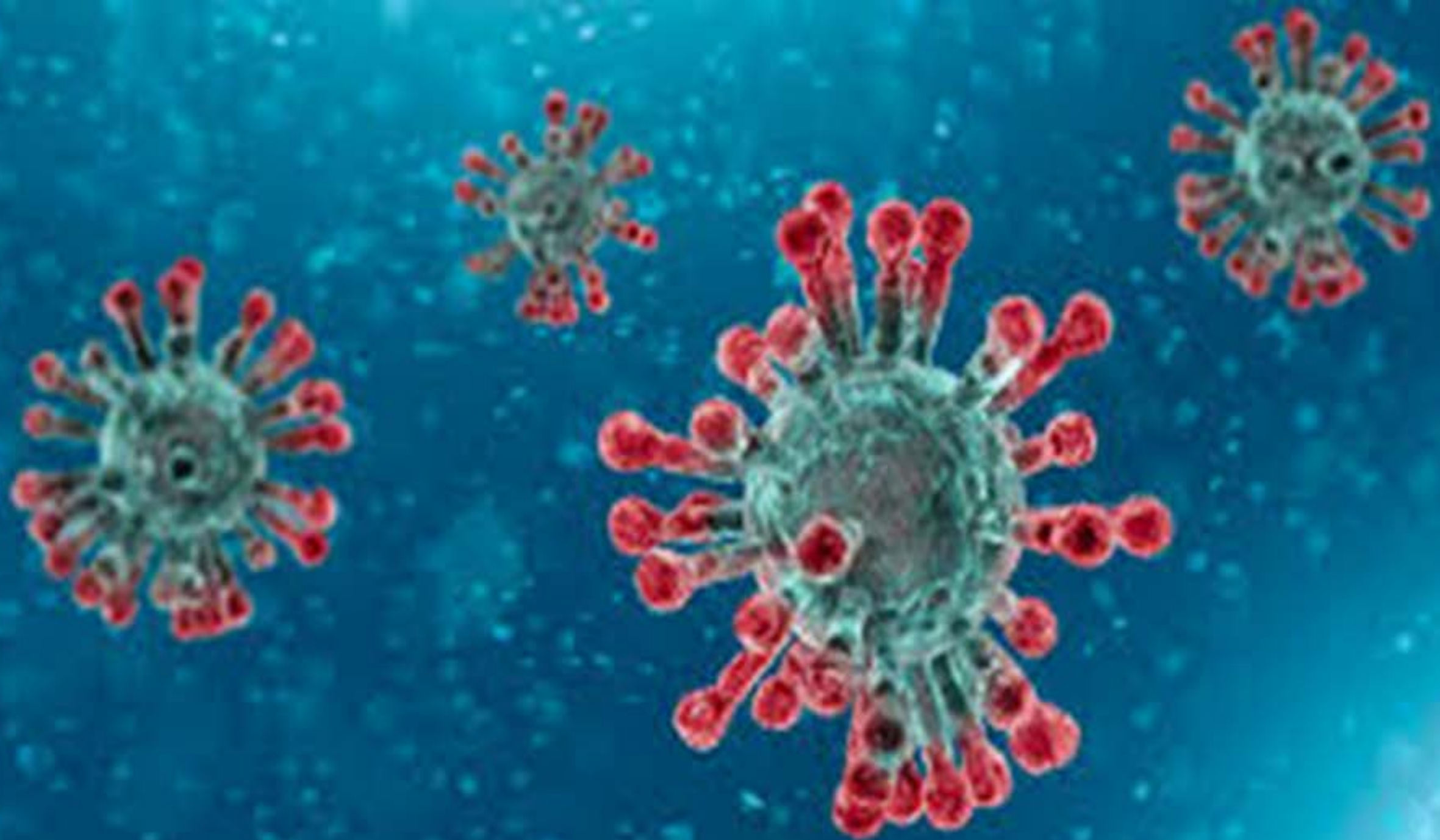


When you put quality first, cost reductions can often follow



Significant learning can be gained from visiting other hospital sites



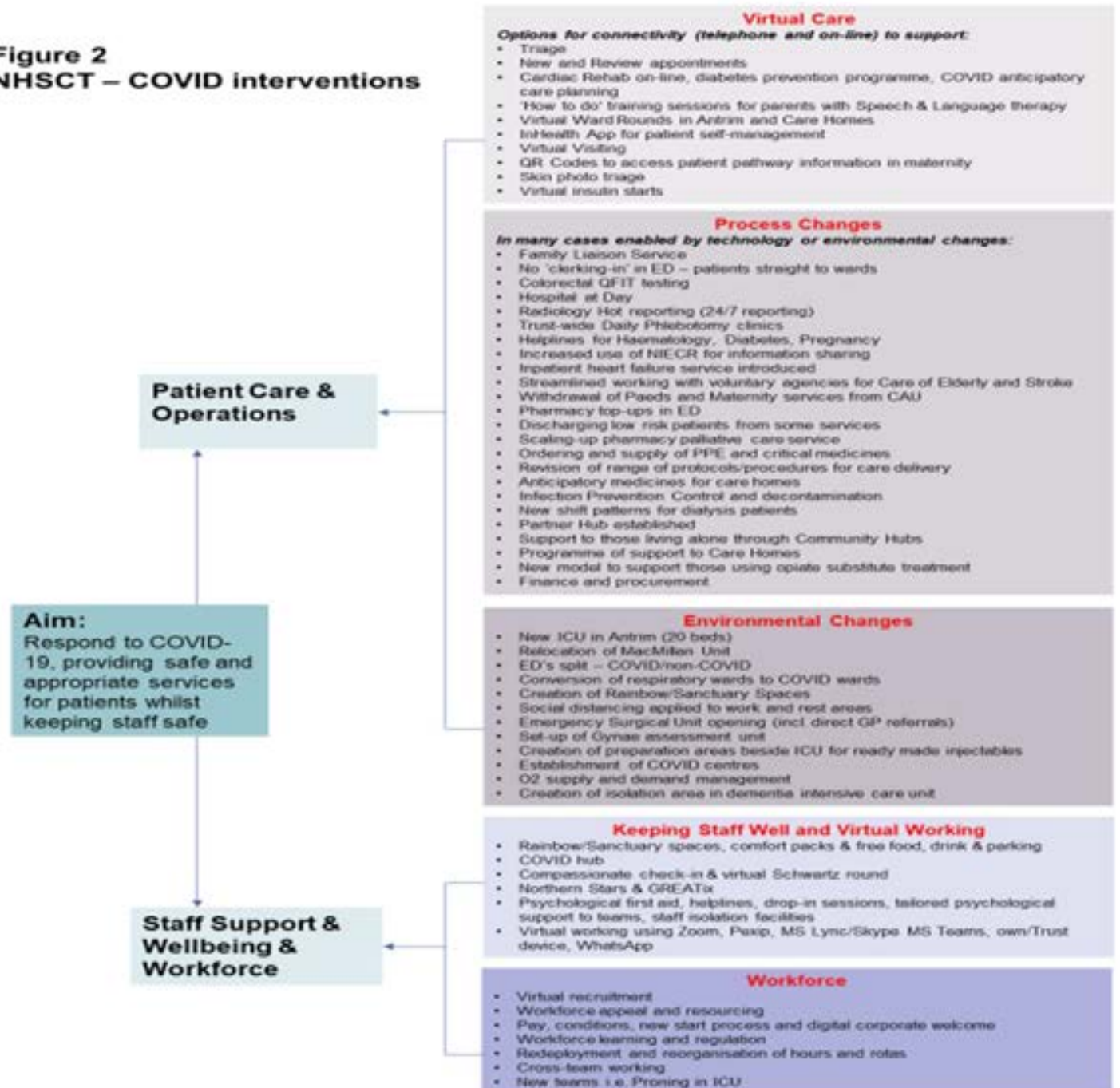




Changes during Covid

- Virtual care
- Process changes
- Environmental changes
- Keeping staff safe & working
- Workforce

Figure 2
NHSCT – COVID interventions



EXNOVATE TO INNOVATE



VIRTUAL WORKING FREES UP.....

Office space, travel, staff time,
reduces Co2 omissions, reduces
DNA's, save patients time, reduces
issues of childcare/time out of work



COMMUNICATIONS & TECHNOLOGY HELP US TO.....

Improve contact with families, reduce
interruptions on ward, reduce paper
(NIECR), promote self-care (InHealth),
empower parents, access info (QR
codes), access training, remote triage
(dermatology), support tissue
viability team

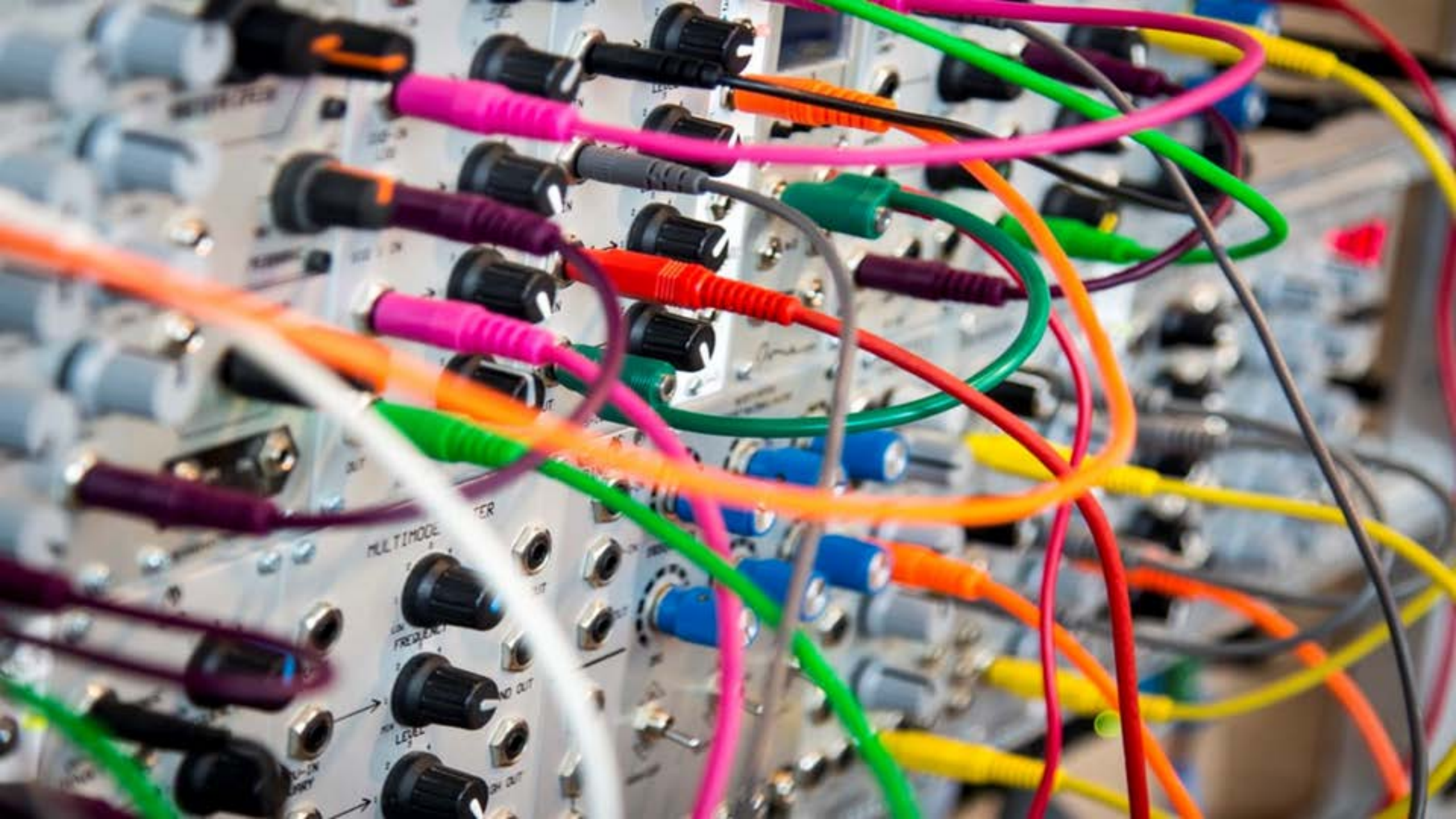


PRECISE DATA HELPS US

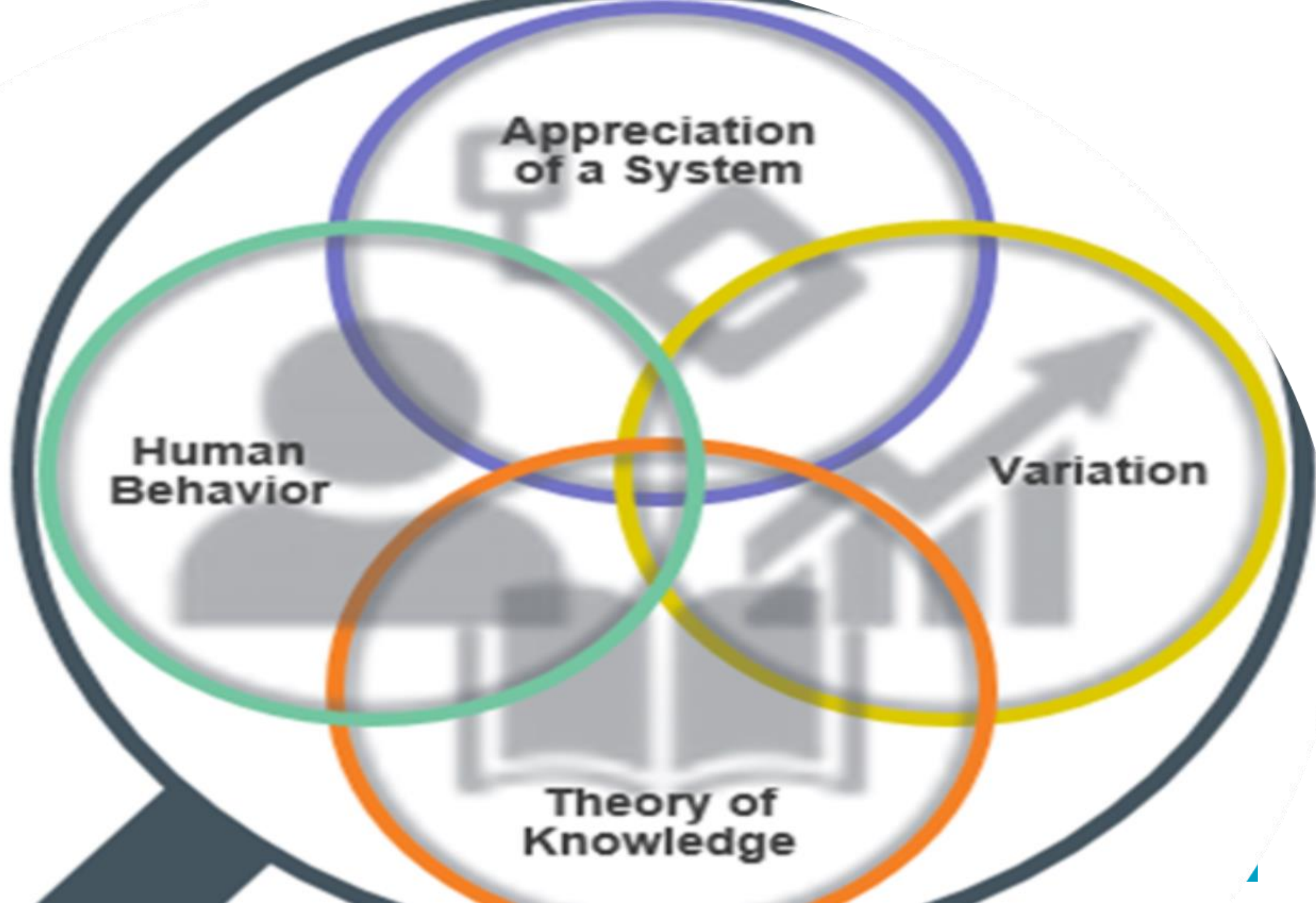


NEW MODELS OF SERVICES











The challenge we face and the difference you can make

Elaine Mead



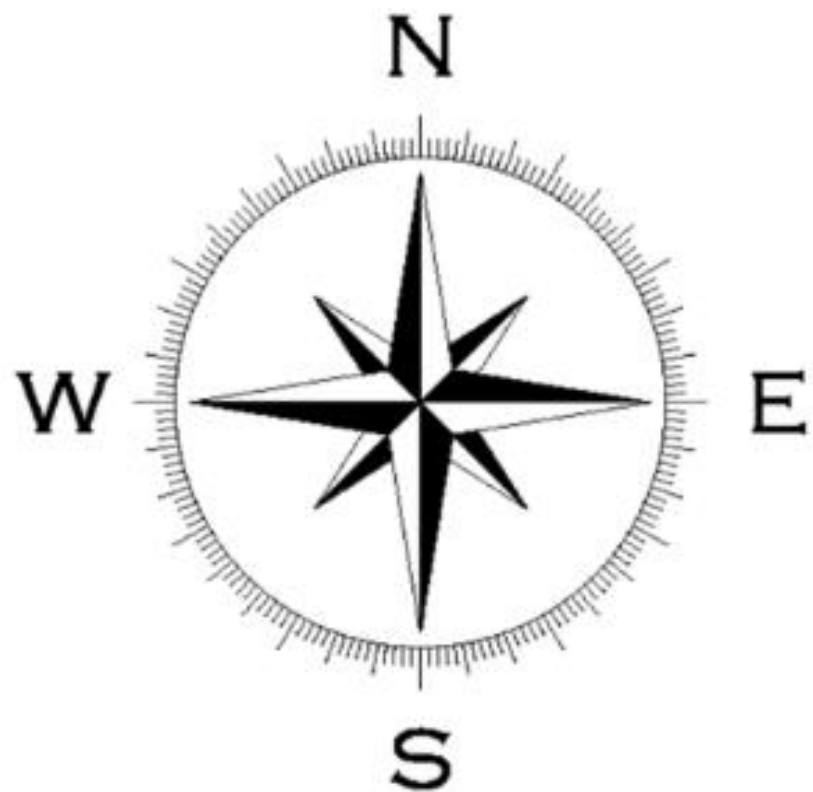
Connecting people around ideas





Healthcare
organisations
have social,
economic
and
environmental
responsibilities





TRUE
NORTH

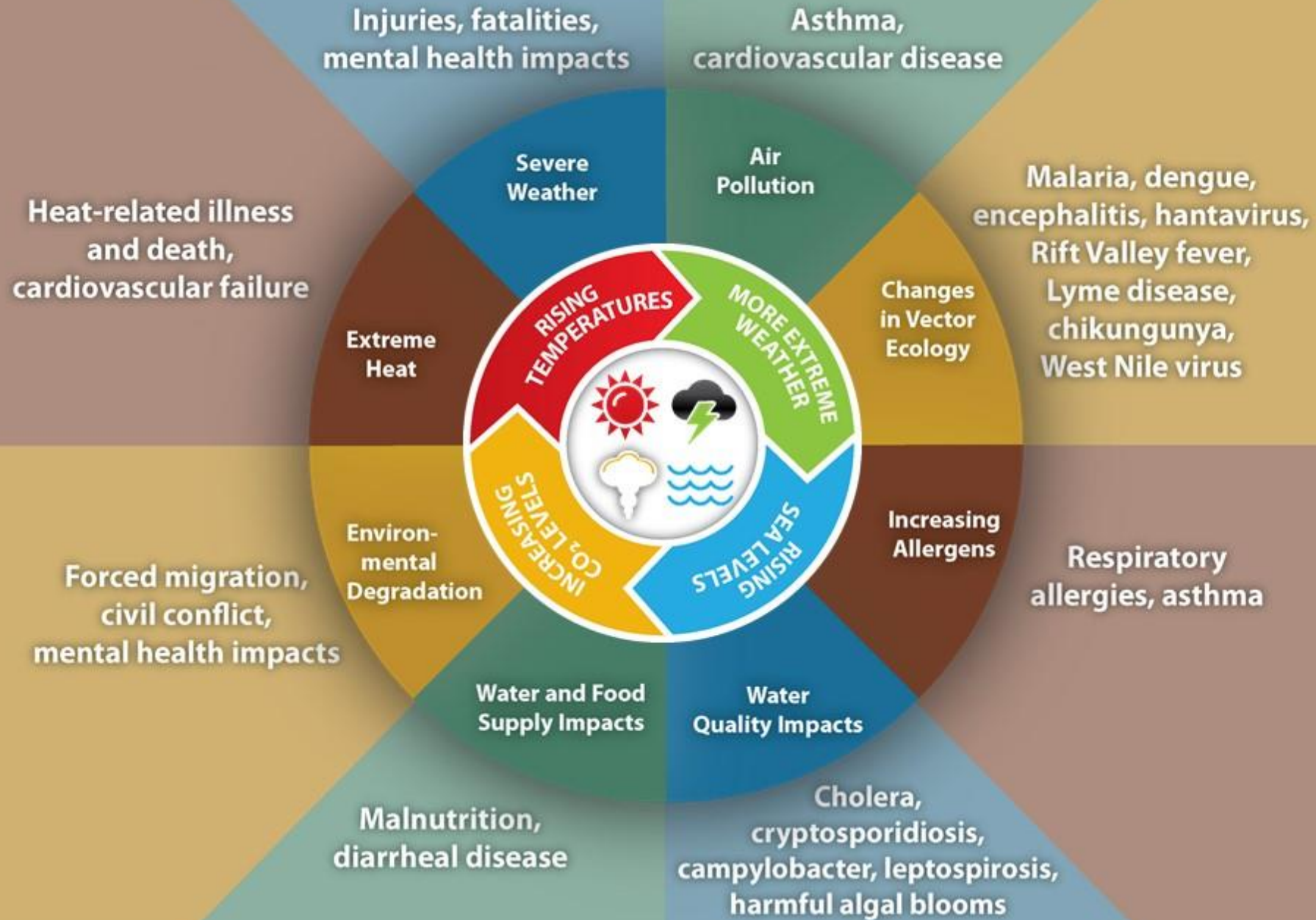
LOOK
AFTER
MY PEOPLE

USE WHAT
I KNOW
TO HELP
OTHERS

LOOK
AFTER
MY PLANET

BE
MY BEST
SELF

Impact of Climate Change on Human Health





New Orleans – Memorial Hospital
Hurricane Katrina 2005

London - Whipps Cross Hospital July 2021



1 months rainfall in 1 day
No power to some areas
Critical incident declared
100 patients transferred

What do I know?

What can I do?

A photograph of a grassy field with numerous white plastic bags scattered across it, suggesting a problem of litter or pollution. The text is overlaid on this image.

What do I know?

**Someone else is bound to
be doing something
to sort it out**

What can I do?

Global warming: Blue Green issues

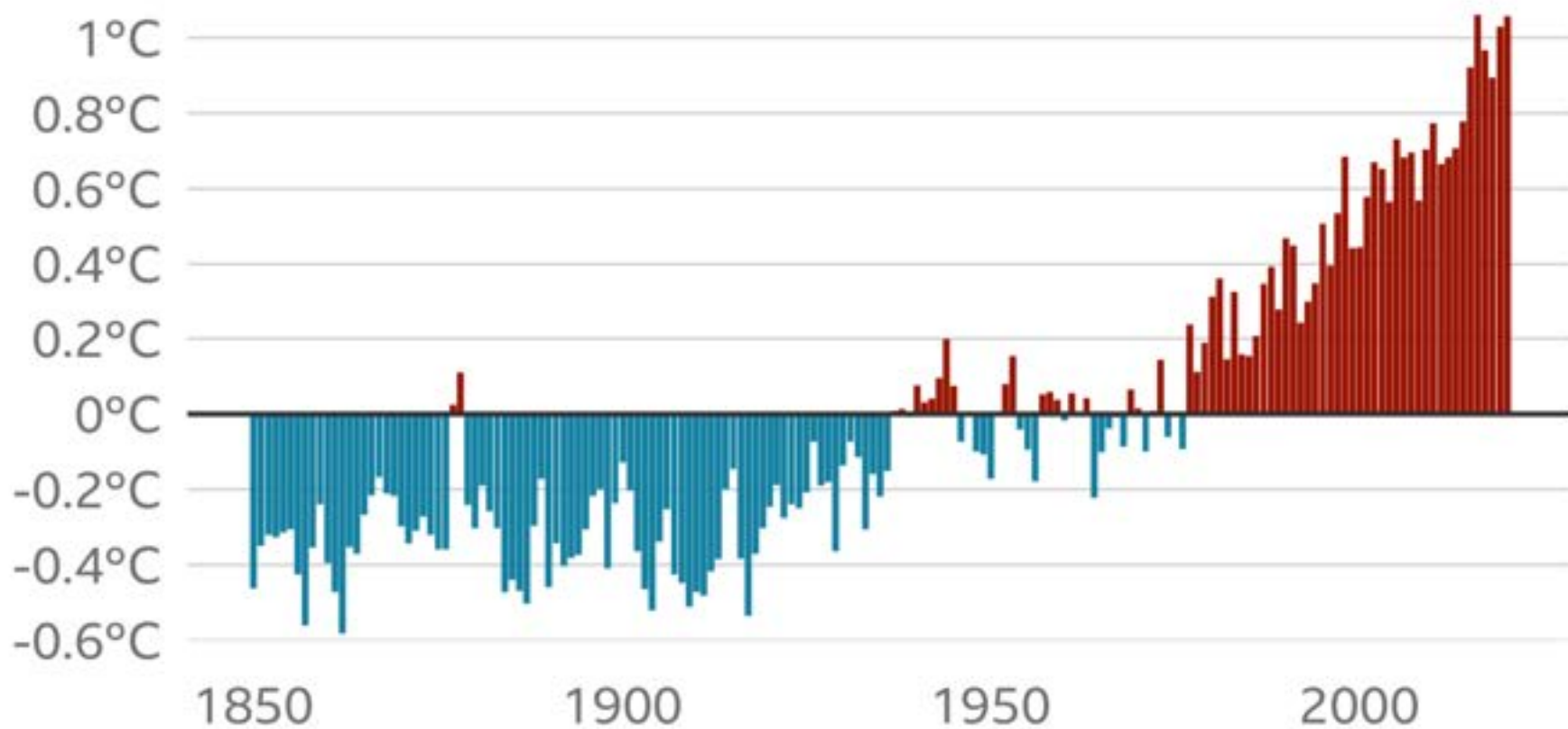
WHAT'S THE PROBLEM?

Increased greenhouse gases are warming our planet and changing the chemistry of our oceans.



The world is getting warmer

Annual mean land and ocean temperature above or below average, 1850 to 2020

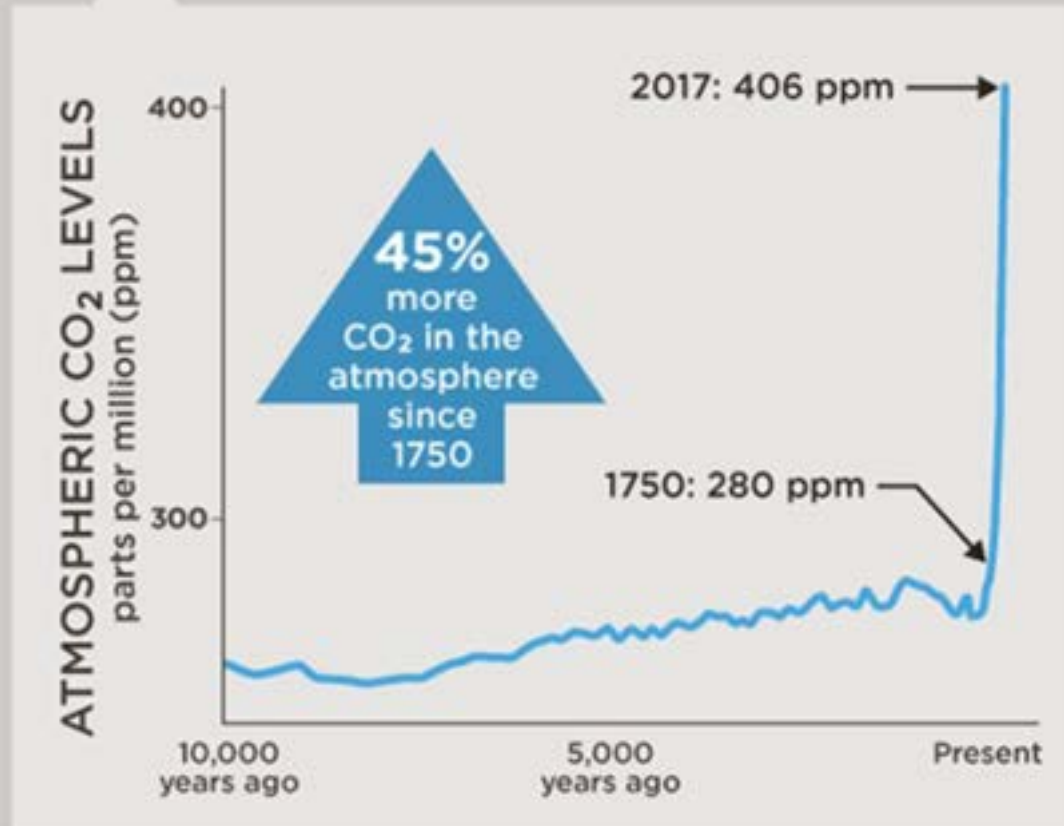


Note: Average calculated from 1951 to 1980 data

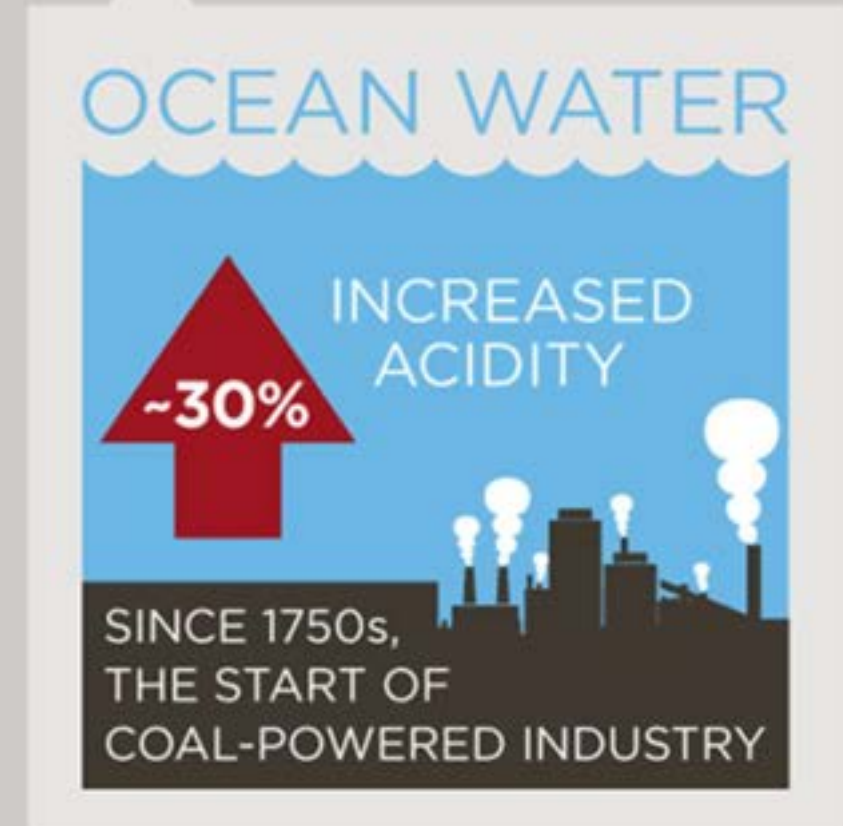
Source: University of California Berkeley

Impact of global warming

CARBON DIOXIDE (CO₂) LEVELS ARE THE HIGHEST IN THE LAST 800,000+ YEARS.




RIISING CO₂ LEVELS ARE CHANGING THE CHEMISTRY OF THE OCEANS.





First hospital in the world to achieve
Alliance for Water Stewardship certification





Not only has humanity used up a third of nature's resources. We keep on consuming them. At an increasing rate. Today we need about 1.75 planets to provide the resources for our consumption and absorb our waste. **By 2030, we will need 2 planets.** We only have one.

<https://www.theworldcounts.com/>



The Healthcare Quality Strategy for NHSScotland

The Scottish Government, May 2010

However, we also need to do some new things, to do some things differently, **to stop wasteful activity**, and to focus on evidence-based activities which yield the maximum benefit. We will have to **reduce unjustified variation** to minimise the potential for harm.

Health-care waste key facts



- Of the total amount of waste generated by health-care activities, about 85% is general, non-hazardous waste and 15% is considered hazardous material that may be infectious, toxic or radioactive
- Every year an estimated 16 billion injections are administered worldwide, but not all of the needles and syringes are properly disposed of afterwards
- Open burning and incineration of health care wastes can, under some circumstances, result in the emission of dioxins, furans, and particulate matter
- Measures to ensure the safe and environmentally sound management of health care wastes can prevent adverse health and environmental impacts from such waste into the environment thus protecting the health of patients, health workers, and the general public

Carbon dioxide emissions attributable to the NHS in England are greater than the annual emissions from all aircraft departing from Heathrow Airport.



Source: Naylor C, Appleby J (2012)
[Sustainable health and social care:
Connecting environmental and financial
performance](#)

Up to 90% of orally administered pharmaceuticals are excreted into wastewater as active substances in the faeces and urine of patients



<https://noharm-europe.org/documents/pharmaceutical-residues-hospital-wastewater>

Healthcare waste

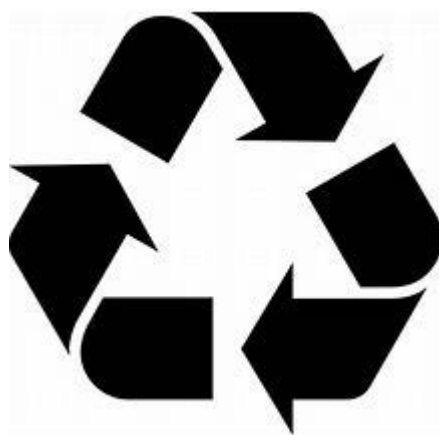


SOMETHING





Ease of use



Ability to recycle

The humble giving-set



such controversy



Long term impact



Cost



“By early 2012, we were able to convert virtually all of our IV medical equipment, including more than 9 million solution bags to PVC- and DEHP- free alternatives”

Cathy Gerwig
Greening Health Care



France

Austria

Denmark

Sweden

Czech Republic

Slovakia

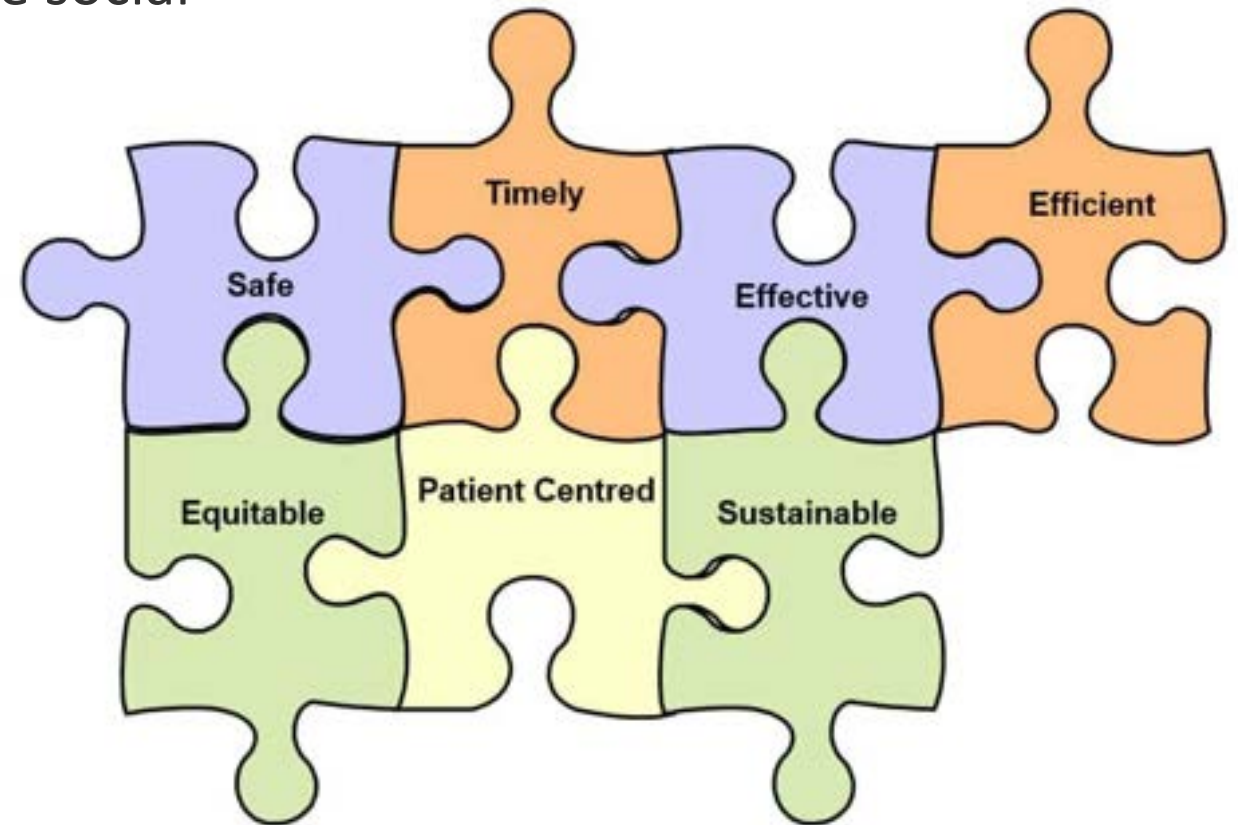
Italy

Netherlands



“Sustainability is an important and legitimate domain of quality in healthcare, which calls for the redefinition of value to incorporate social and environmental costs.”

Sustainability in quality improvement: redefining value
Authors: Frances Mortimer et al
Future Healthcare Journal 2018 Vol 5, No 2: 88–93



Source : Atkinson S, Ingham J, Cheshire M, Went S. Defining quality and quality improvement.

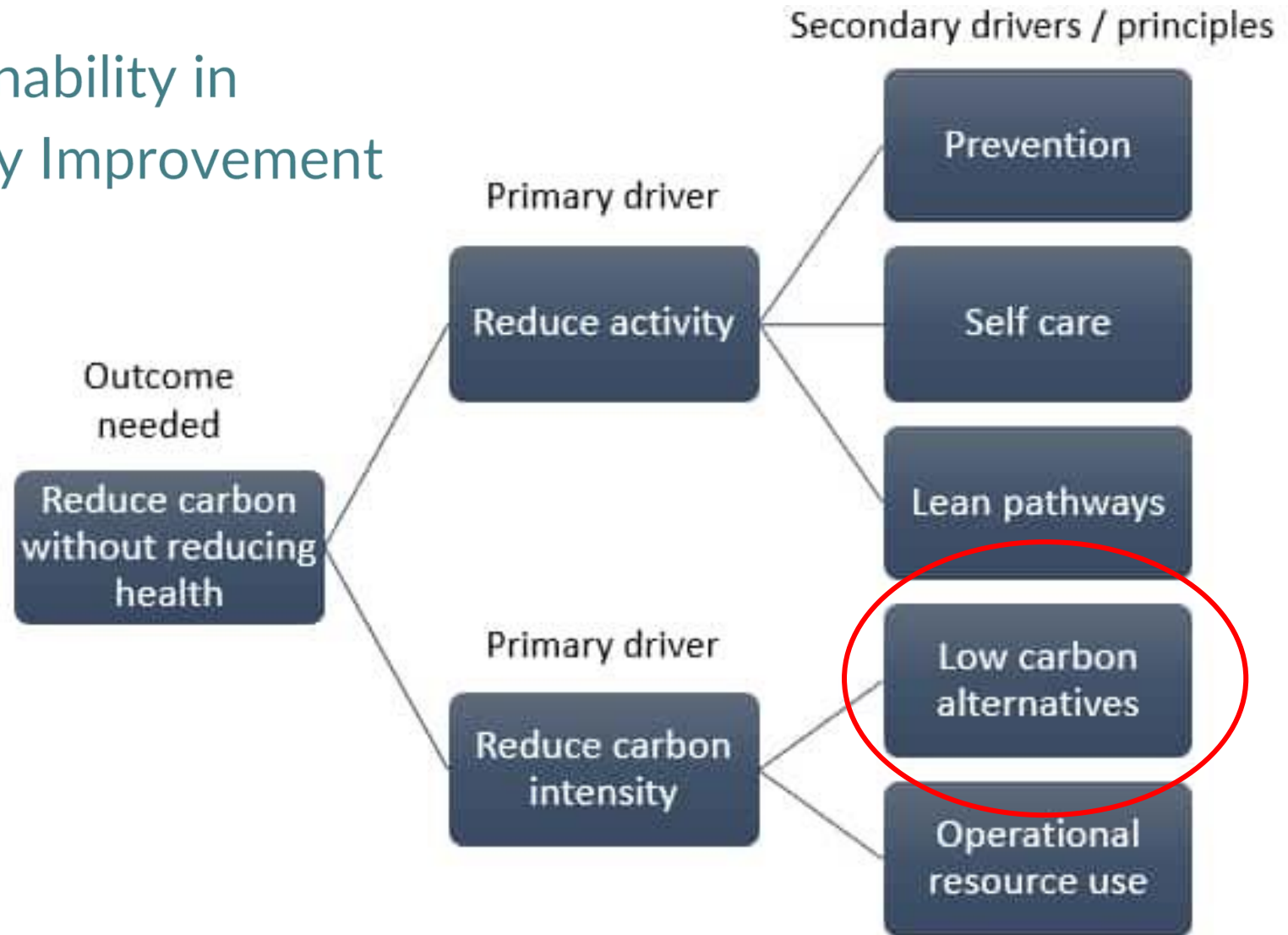
Clinical Medicine. 2010 Dec;10(6):537.

$$\text{Sustainable value} = \frac{\text{Outcomes for patients and populations}}{\text{Environmental + social + financial impacts (the 'triple bottom line')}}$$

Source - Mortimer F, Isherwood J, Wilkinson A, Vaux E.
Sustainability in quality improvement: redefining value.
Future Healthcare Journal. 2018 Jun;5(2):88-93



Sustainability in Quality Improvement



Carbon footprint (kg CO₂e) = activity or resource use
x GHG emissions factors

- GP appointment: 6 kgCO₂e (including pharmaceuticals is 18 kgCO₂e)
- Acute sector outpatient appointment: 23 kgCO₂e

Source: Carbon Hotspots update for the health and care sector in England 2015 (Sustainable Development Unit, 2016)

- Inpatient bed day – low-intensity ward – 37.9 kgCO₂e/ bed day
- Inpatient bed day – high-intensity ward – 89.5 kgCO₂e/ bed day
- A&E (emergency department) visit: 13.8 kgCO₂e
- Surgical procedure (66 minutes): 35.1 kgCO₂e

Source: Care pathways guidance on appraising sustainability (Sustainable Development Unit, 2015)



Clare Morrison
RPS Director for Scotland



A system to make it easy for clinicians and clinic staff to say,

"Yes, you *can* attend via a video call."

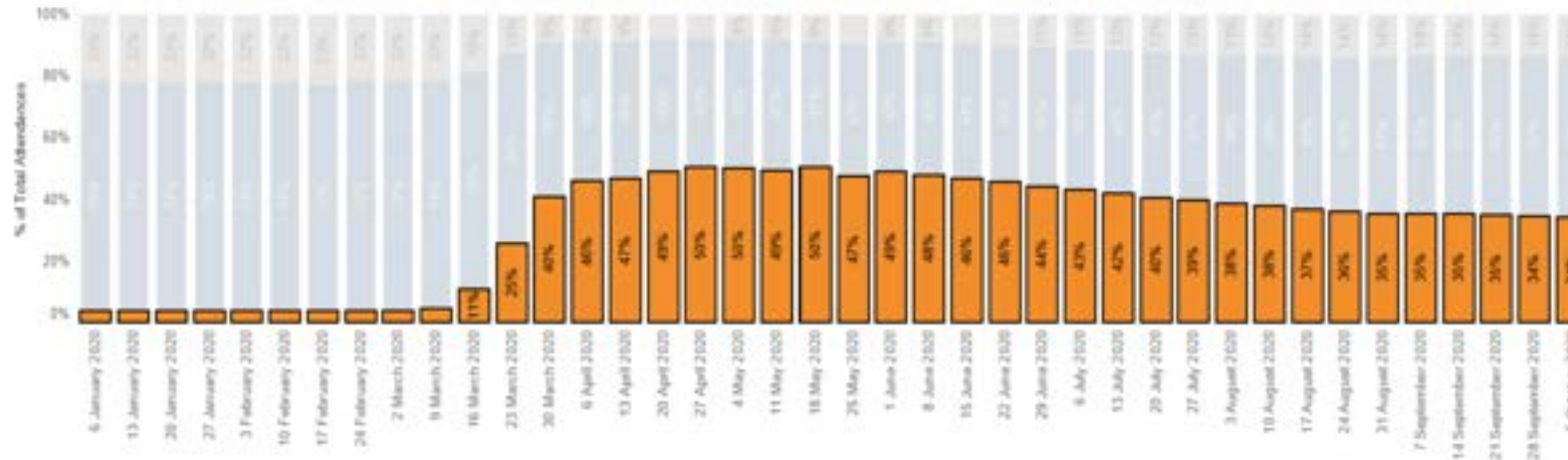


Rapidly rolled out remote consultations



100% of trusts in England now have access to a video consultation platform with +13,000 video consultations taking place every working day.

Remote consultations performed from January to September 2020



8.4 million adults avoided the need to travel.
Total time saving of over 6.6 Million hours.



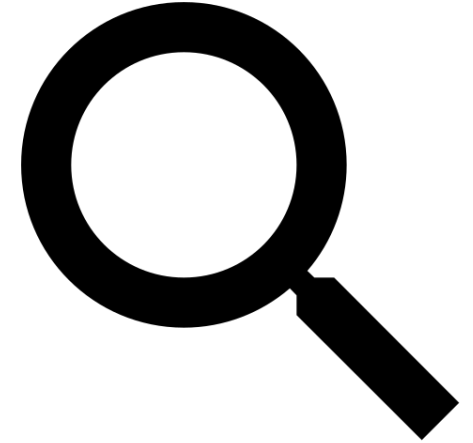
18,500 tonnes of CO2 emissions from patient travel.
Carbon capture of over 24,000 acres of forests per year.



Avoided patient journeys totaling over **136,000,000 miles**.
Flying around the world 5,500 times.



Sustainability in Quality Improvement



“In order for the NHS to reduce its greenhouse gas emissions to net zero by 2050, carbon needs to become an additional **currency** alongside money, understood by all working in the health system.”

Consider environmental and social impacts
as part of **every** quality improvement project
and develop new ways to measure them

**HEALTH
DECLARES**



CENTRE *for*
SUSTAINABLE
HEALTHCARE
inspire • empower • transform

NHS



1.3 million staff England



Do we consider environmental and social impact in our personal life?

Are you getting ready for your holidays?



Sea anemones lacking algae died around a week after exposure to oxybenzone and sunlight

Conversion of oxybenzone sunscreen to phototoxic glucoside conjugates by sea anemones and corals

Djordje Vuckovic et al

Department of Civil and Environmental Engineering, Stanford University, Stanford, CA, USA.

SCIENCE

5 May 2022

Vol 376, Issue 6593

pp.644-648



SUNSCREEN CHEMICALS AND MARINE LIFE

How sunscreen chemicals enter our environment:



How sunscreen chemicals can affect marine life:



GREEN ALGAE: Can impair growth and photosynthesis.



CORAL: Accumulates in tissues. Can induce bleaching, damage DNA, deform young and even kill.



MUSSELS: Can induce defects in young.



SEA URCHINS: Can damage immune and reproductive systems, and deform young.



FISH: Can decrease fertility and reproduction, and cause female characteristics in male fish.



DOLPHINS: Can accumulate in tissues and be transferred to young.

Here are a few ways to **protect ourselves and marine life:**

Consider sunscreen without chemicals that can harm marine life, seek shade between 10 am & 2 pm, and use Ultraviolet Protection Factor (UPF) sunwear.



Seek shade



Umbrella



Sun hat



Sunscreen



UV Sun glasses



Sun shirt



Leggings



The 'bad' reef toxic 3 O's

Oxybenzone

Oxtocrylene

Octinoxate

Banned for sale in:


Hawaii, US Virgin

Islands, Palau,

Bonaire, Aruba,

Mexico ecotourism





Be curious about what your healthcare organisation is doing to support
climate change

Find new ways to measure environmental impact as a routine
metric of change

Look at all improvement projects through an
environmental impact lens

Commit to change one small thing at
home or at work

Have positive conversations about
climate change

Reduce
Reuse
Recycle



“ You must unite
behind the science.
You must take
action. You must
do the impossible.
Because giving up
can never be an
option.”



Greta Thunberg

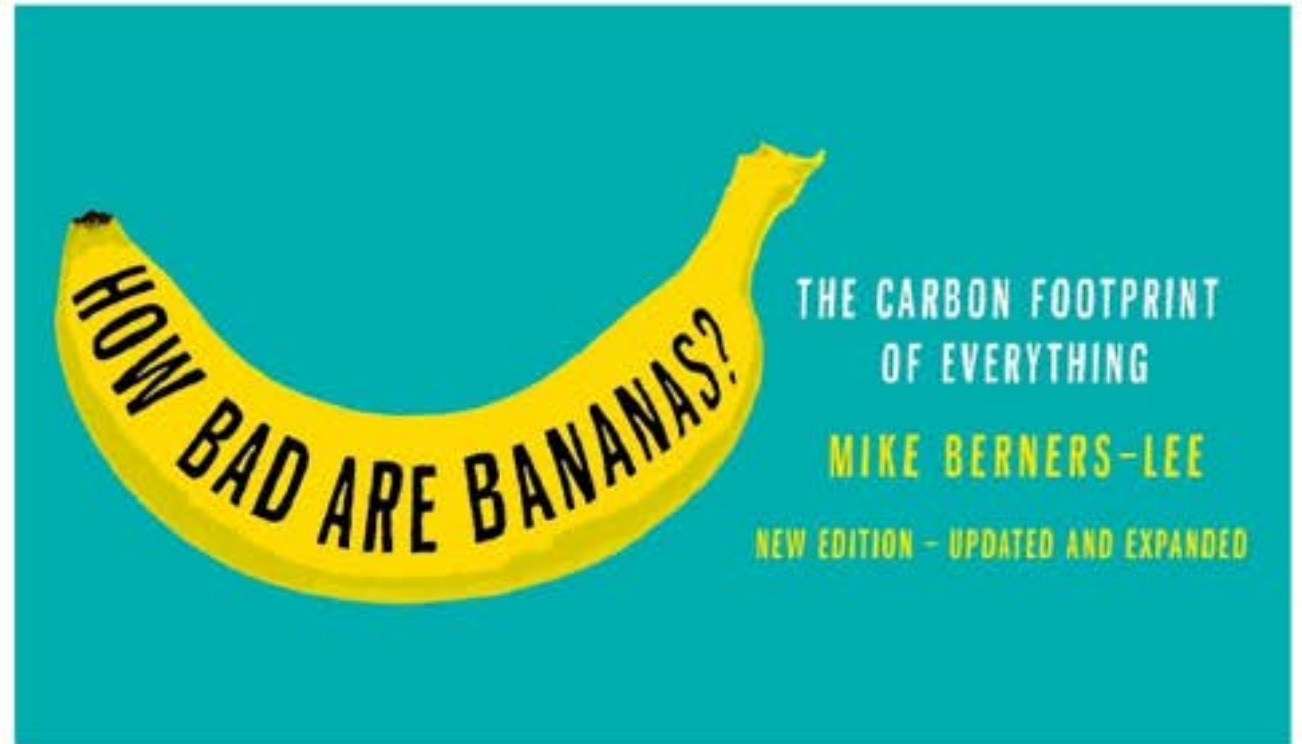
US Congress. Washington DC. 17 September 2019

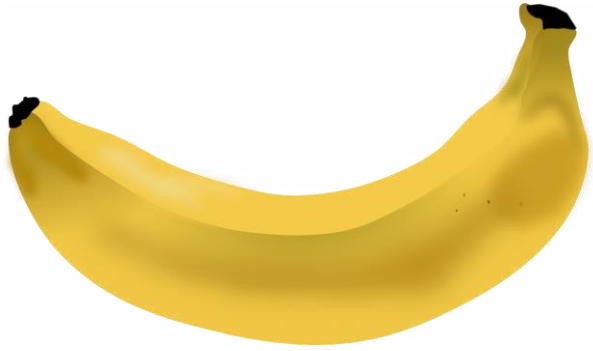


Gothenberg Waste Quiz Part II

Saving the planet - reducing
healthcare waste to improve
environmental impact

To make a difference
we need to know the
carbon equivalent of
some everyday things
so that we can make
good choices





What is the carbon equivalent of:

A banana?

A mile in an average UK car?

A large cow's milk latte?

An instant black coffee?





**80g
CO₂e
each**



**1 mile in average UK
car 530g CO₂e
(including
extraction refining
and transportation
of fuel)**



**552g CO₂e
large
cows milk
latte**



**Black
coffee 87g
CO₂e (49g
instant)**

Inhalation anaesthetics: nitrous oxide, isoflurane, desflurane, and sevoflurane are greenhouse gases and account for 5% of emissions of acute NHS hospitals

Desflurane



Global Warming Potential (GWP) is a measure relating to anaesthesia of the relative contribution of mass of inhalational anaesthetic agents (IAA) to an equivalent mass of CO₂



Put these four drugs in order of their global warming potential

Lowest

Highest

Lowest



Desflurane



Highest



Association of Anaesthetists

	Atmospheric lifetime (years)	GWP100
Sevoflurane	1.1	130
Isoflurane	3.2	510
Desflurane	14	2540
Nitrous Oxide	110	298

Collect some more examples of
healthcare generated carbon emissions

Anaesthetic
gases

?

?

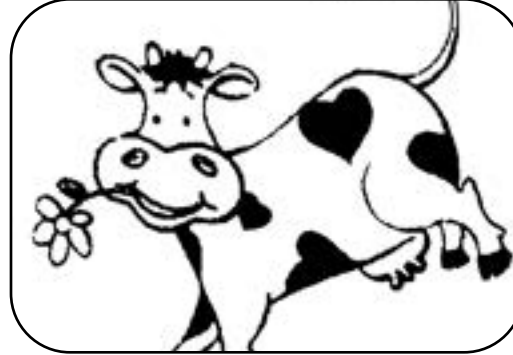


?

?



Manufacture of
drugs



Food waste



Fleet vehicles



Inhaler devices



Energy from
fossil fuels



Medical devices

**In the UK alone
50million inhalers
prescribed a year. The
majority of those
inhalers (approx. 70%)
are pressurised
Metered Dose Inhalers
(pMDIs) containing
propellants called
hydrofluorocarbons
(HFCs).**

280kgCO₂e

0.28kgCO₂e



2.8kgCO₂e

28kgCO₂e

What is the whole
life carbon
equivalent emission
of the most
commonly
prescribed inhaler
in the UK?

These carbon emissions make up 25% General Practice prescribing footprint

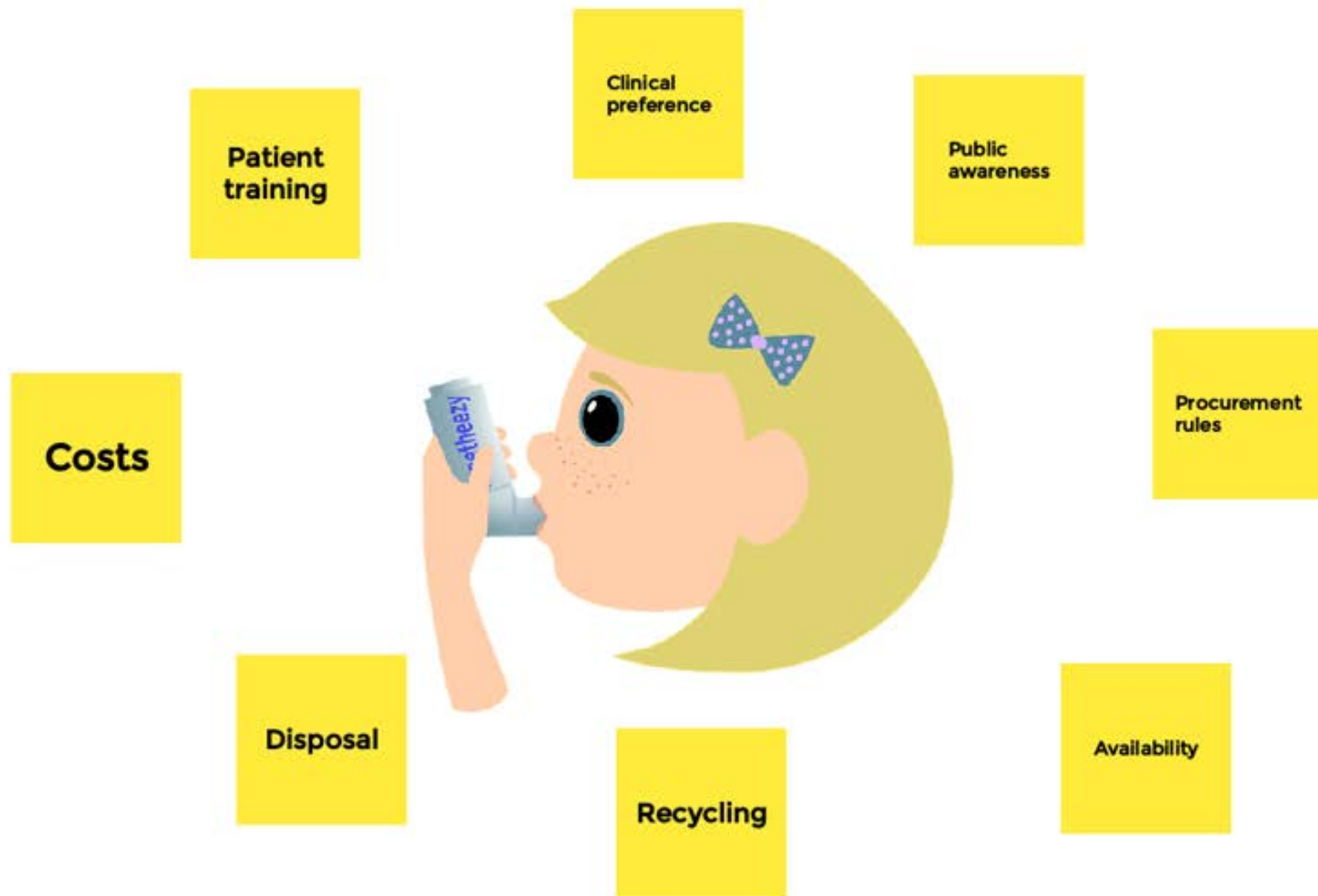
28kgCO₂e

Dry powder inhalers have now been developed reduce the carbon impact of use by 20-30 times



What are the other issues that should be considered here?





Plankton create 50% of our oxygen

How much of the oral dose of a medicine is excreted as an active substance in their urine entering the waste water system as an active metabolite?



© Christian Gunder/BBC News Explains



0.01%-0.5%

0.5%-30%

30%-90%

30%- 90% of oral medicines are excreted as an active substance





Thank you for joining us
for the quiz!

How did you do?



Group Work 2

Put your *Muda* glasses on!

-You are all invited to breakout discussions

Now – go get your glasses on!!!



Your Challenge in the Breakout Groups.....

What else could you do in the communities where we live to address waste and environmental impact?



If not now
when?
If not us
who?

THERE'S
NO PLANET
B!



FEHLENDE
Verkaufen wir
Die
KLIMAKRISE
eher nicht so

Some helpful resources

- **Model to Reduce Waste in Healthcare and Add Value, BMJ Open Quality (2022)** [Model to reduce waste in healthcare and add value | BMJ Open Quality](#)
- **Podcast - Saving the planet – reducing healthcare waste to improve environmental impact** [Stream episode Gill Smith And Elaine Mead by National Elf Service podcast | Listen online for free on SoundCloud](#)
- **OECD (2017), Tackling Wasteful Spending on Health, OECD Publishing, Paris**
[:https://dx.doi.org/10.1787/9789264266414-en](https://dx.doi.org/10.1787/9789264266414-en)



Some helpful resources

- **Delivering a Net Zero NHS** (2020), NHS England and Improvement
<https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2020/10/delivering-a-net-zero-national-health-service.pdf>
- Bueno B, Leo JD, Macfie H. IHI Leadership Alliance. **Trillion Dollar Checkbook: Reduce Waste and Cost in the US Health Care System**. Boston: IHI, 2019 (available at www.ihi.org).
- [Climate Ergonomics - embedding sustainability into everyday business.pdf](#)





**AND THE
WINNER IS...**

Thank you