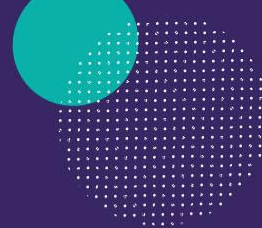


# **D1: A sustainable healthcare system**

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International Forum on  
**QUALITY & SAFETY**  
in **HEALTHCARE**  
**COPENHAGEN**



# Adapting to a changing world: equity, sustainability and wellbeing for all



@QualityForum #Quality2023

**H** Institute for  
Healthcare  
Improvement

**BMJ**

# D1: A sustainable healthcare system

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# Hello!



**Jason Leitch**  
National  
Clinical  
Director



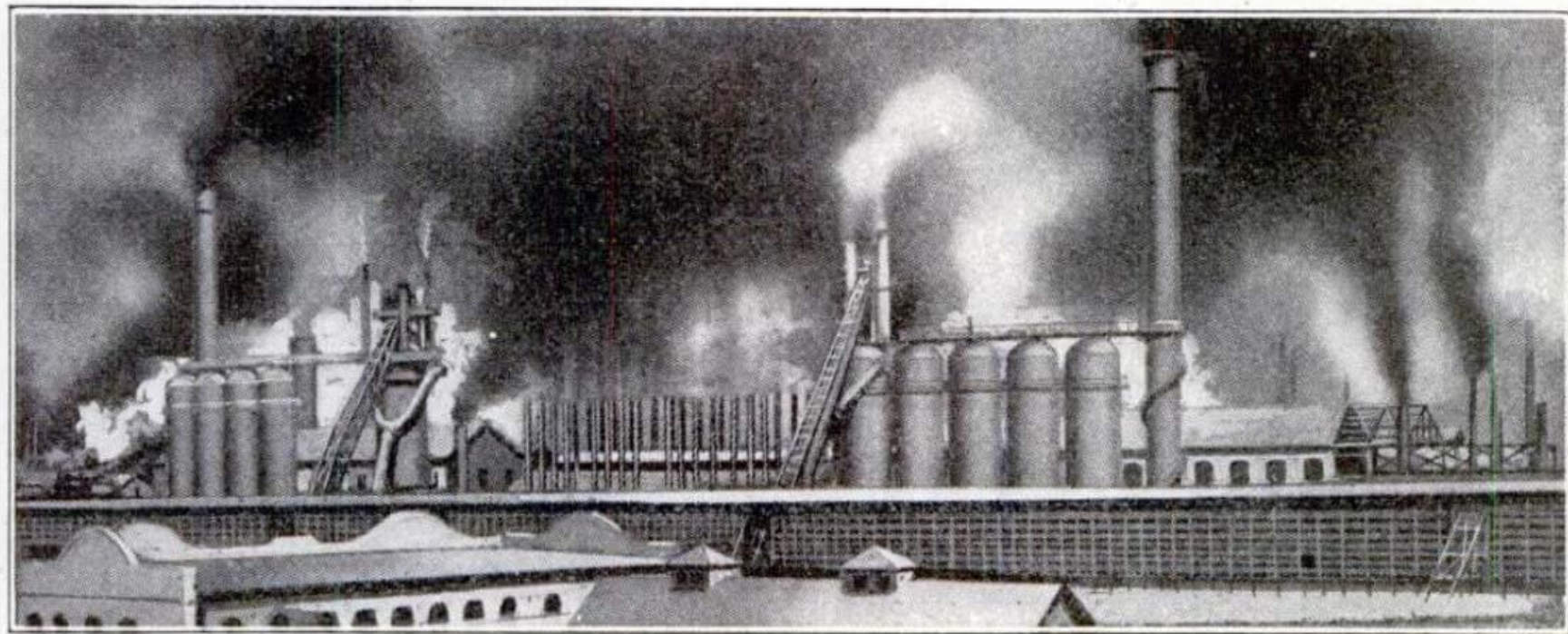
**Stuart Duncan**  
Scottish  
Government



**Laura Wilson**  
Royal  
Pharmaceutical  
Society, Scotland



**Clare Morrison**  
Healthcare  
Improvement  
Scotland



The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.



“If you do not know how to ask the right question, you discover nothing.”

WE Deming







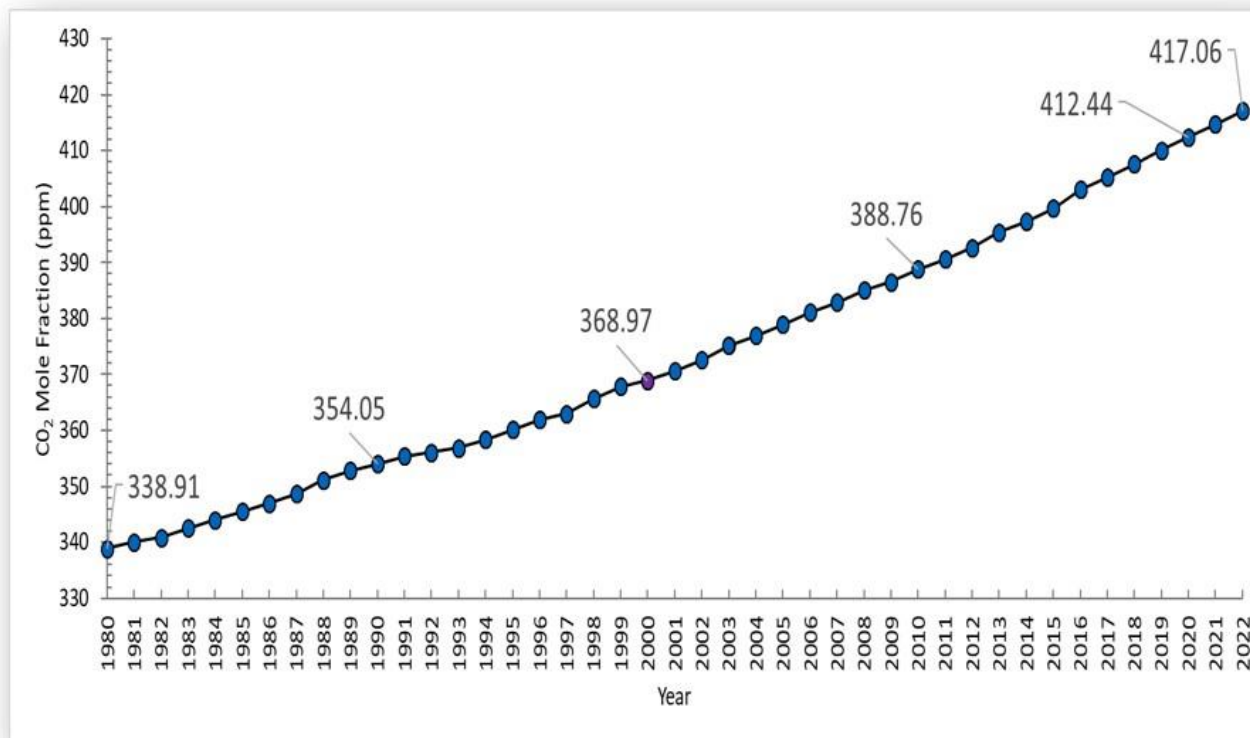




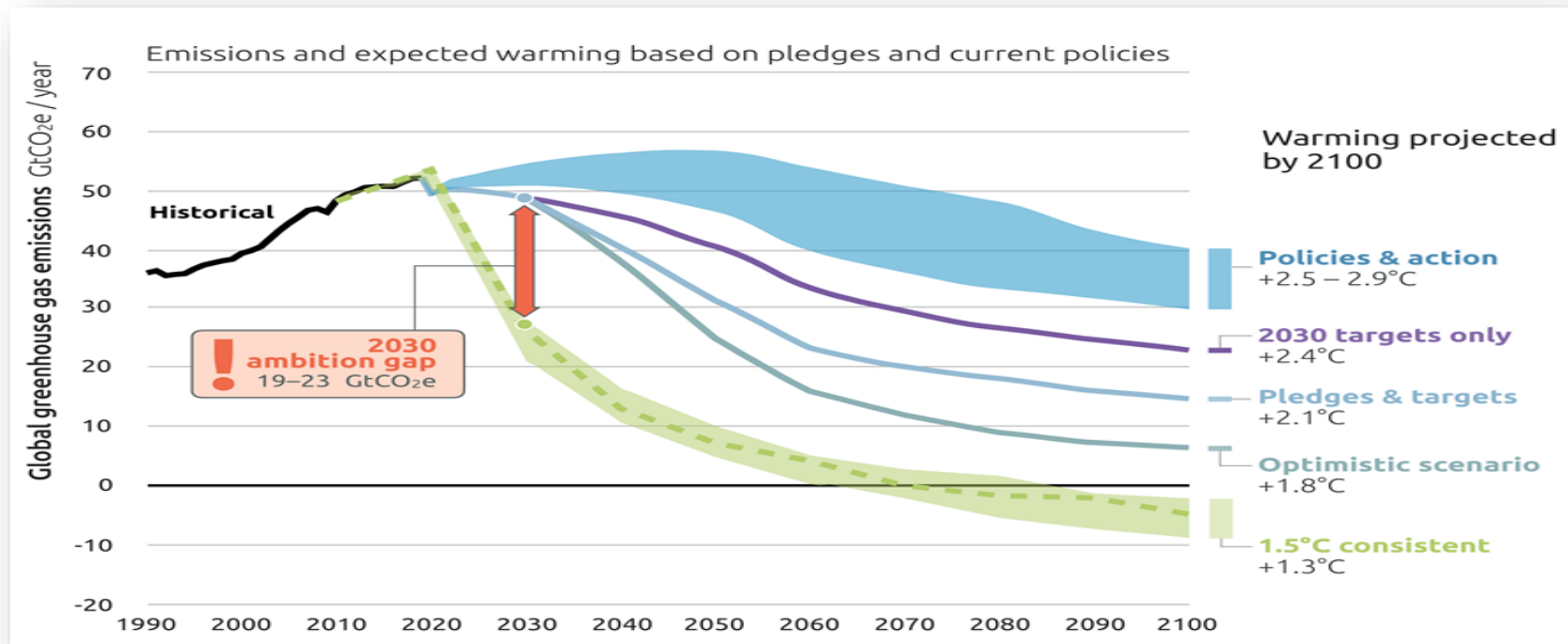
# 1. Why?

Why do we  
need to act?

# Global monthly atmospheric CO<sub>2</sub> mean



# 2100 Warming projections



Source: Climate Action Tracker, November 2021 update

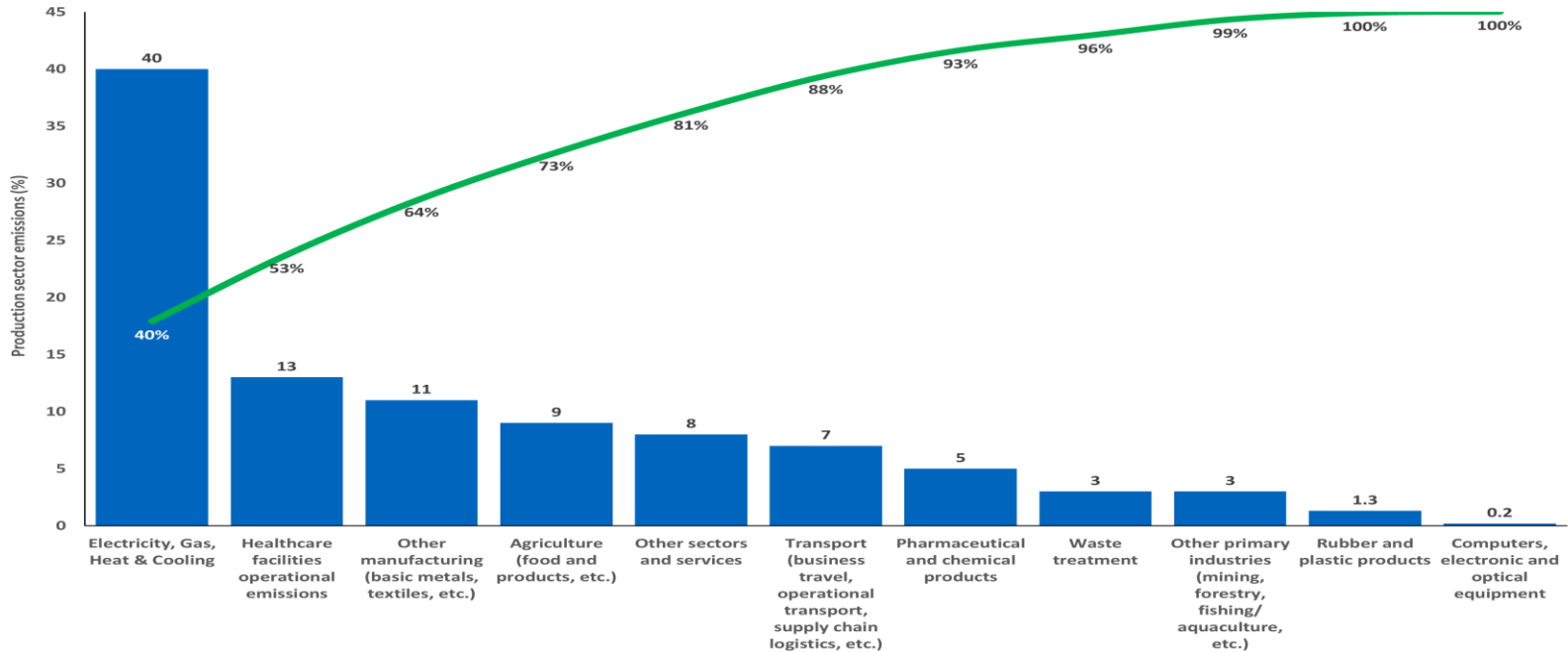


# Healthcare as % of national footprint

World	4.4%
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UK	5.4%
----	------

# Healthcare global climate footprint



Source: HCWH / ARUP Climate-smart health care series, Green Paper #1, Figure 6, Sept. 2019



# +100,000

Single trips  
annually

Carbon equivalent of medical gases & MDI propellants  
alone





**Ella Kissi-Debrah**  
**2004 - 2013**

Photograph: Handout/PA

**LW**

What impact do  
medicines have on  
the environment?



# The triple planetary crisis



1. Climate (change) – net zero
2. Nature/ Biodiversity
3. Pollution



# Triple planetary crisis



## Climate

Medicines account for 25% of total NHS carbon emissions

## Biodiversity

Pharmaceuticals in the water system

## Pollution

Medicines packaging

A stylized map of Europe in a dark grey color. Scotland is highlighted with a yellow location pin. The word "Scotland" is written in white text to the left of the pin.

Scotland

7,000,000 Inhalers

4,500,000 MDIs

Scotland's Inhaler carbon footprint

# Challenges with inhalers

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Adherence

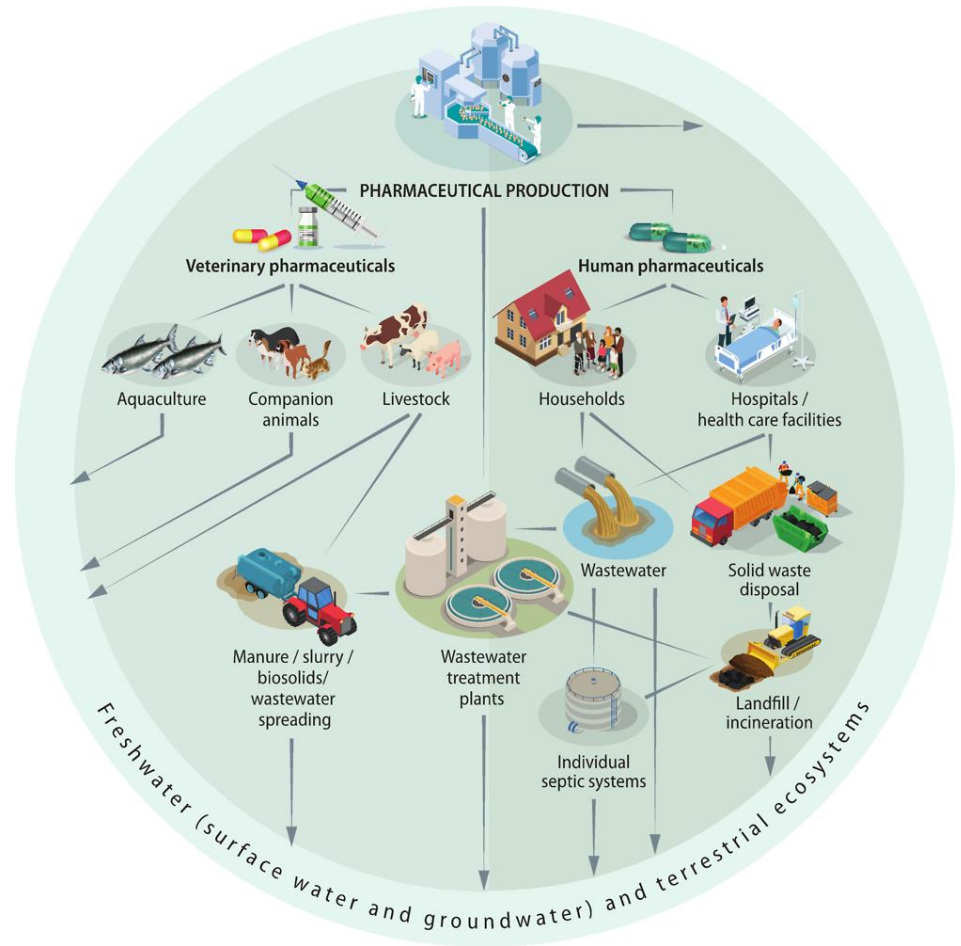
Dose counters

Wastage

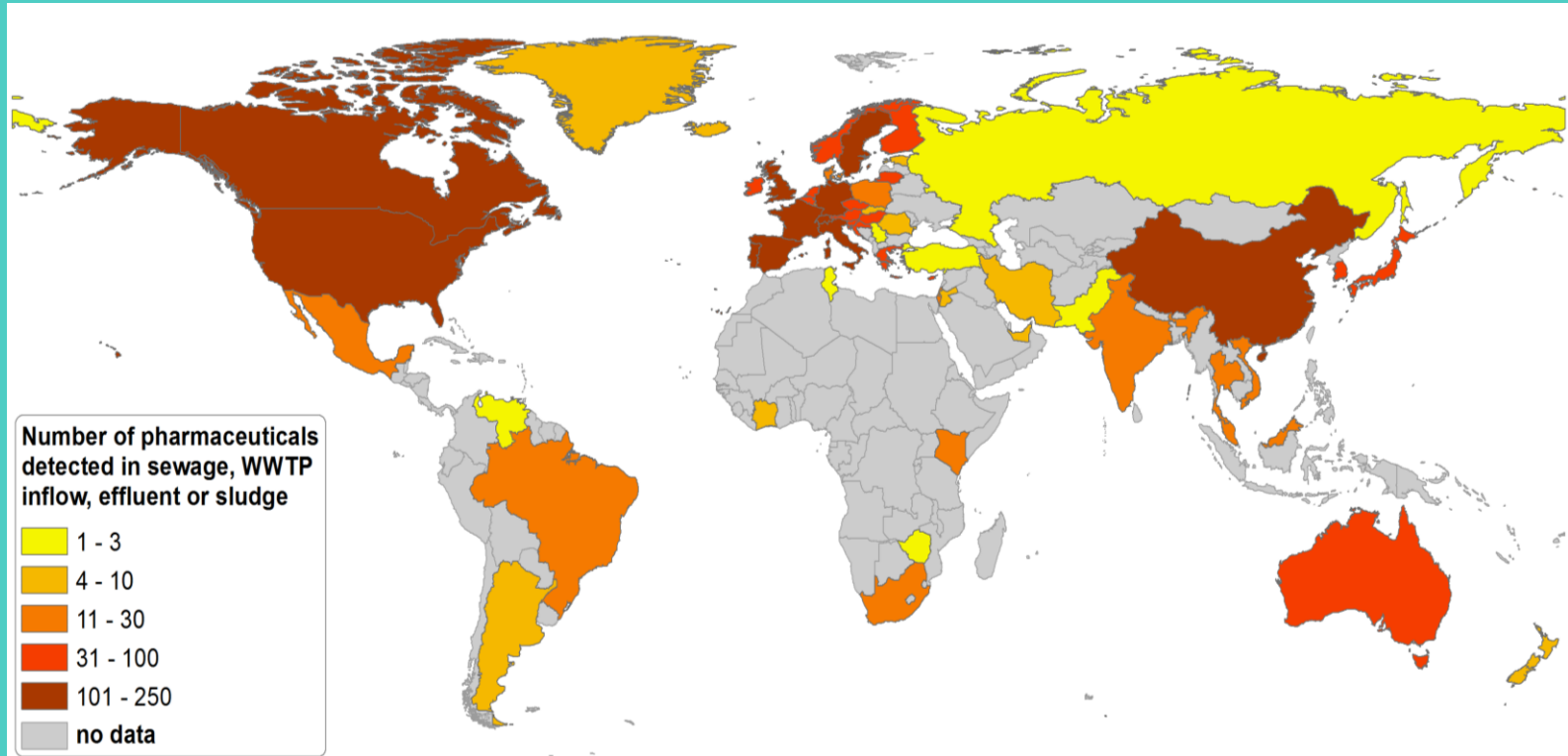
Inhaler technique

Overuse

# Routes of medicines into the environment



# 600 Pharmaceuticals in sewage worldwide





# Impact of pharmaceuticals in our watercourse

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Biological effect

Aquatic life

Persistence

Unknowns

Waste plants

# What do we know about environmental impact?

**Fathead minnow**



**Leopard frog**



**Cyanobacterium & Duckweed**





# Paracetamol

Toxicity



# Ibuprofen

Toxicity

# 2.

## What?

What are we  
doing about it?

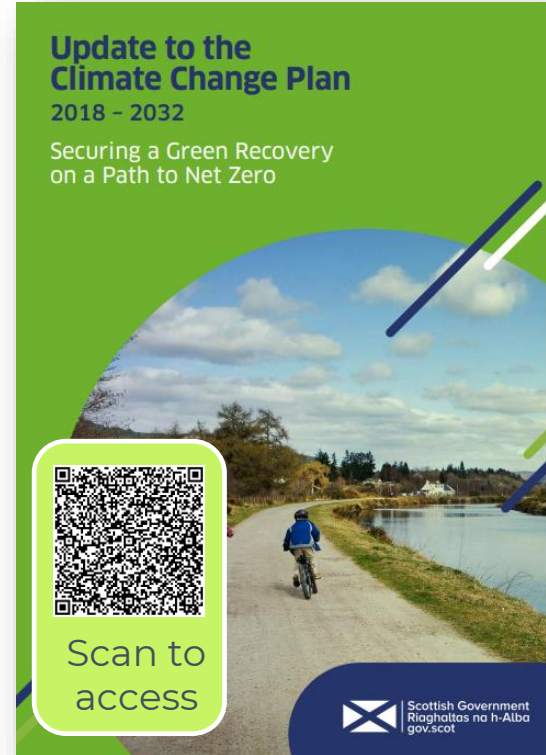


# Scotland's national climate plan

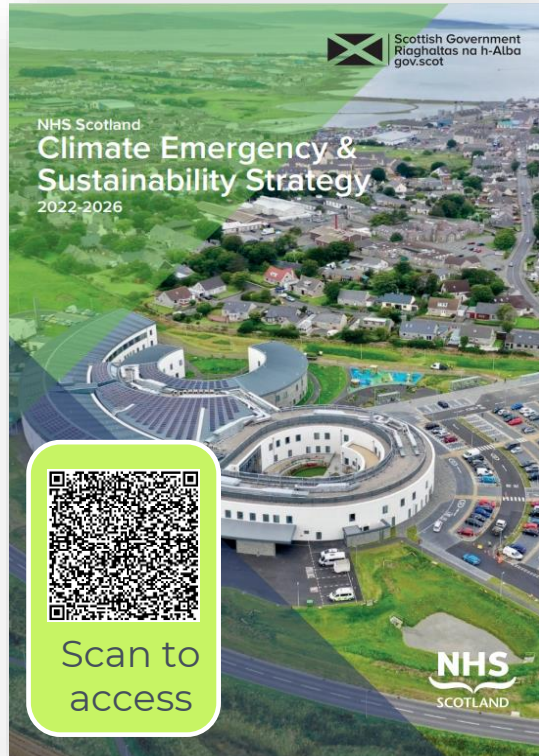
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# 2040

Scotland's target date for net zero emissions of all greenhouse gases



# NHS Scotland's climate plan



Part of a multi-country coalition committed to developing low carbon healthcare systems

“This will require  
unprecedented  
change in how we  
work.”

Humza Yousaf

Scotland's First Minister

Former Cab. Sec. for Health & Social Care



# NHS Scotland



5.4 Million people

£13 Billion +

3 Regions

14 Health Boards

8 Support Boards

Health & Social Care  
integration since April 2016

# Core themes

**NHS Scotland Climate Emergency & Sustainability Strategy**

Sustainable Care

Sustainable  
Goods &  
Services

Sustainable  
Communities

Sustainable  
Buildings &  
Land

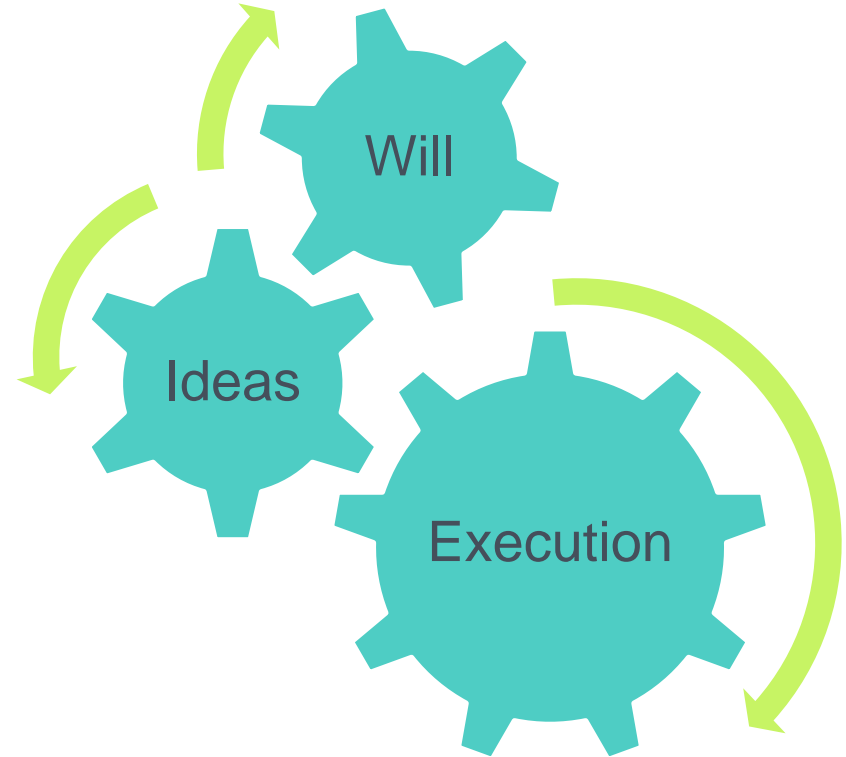
Sustainable  
Travel

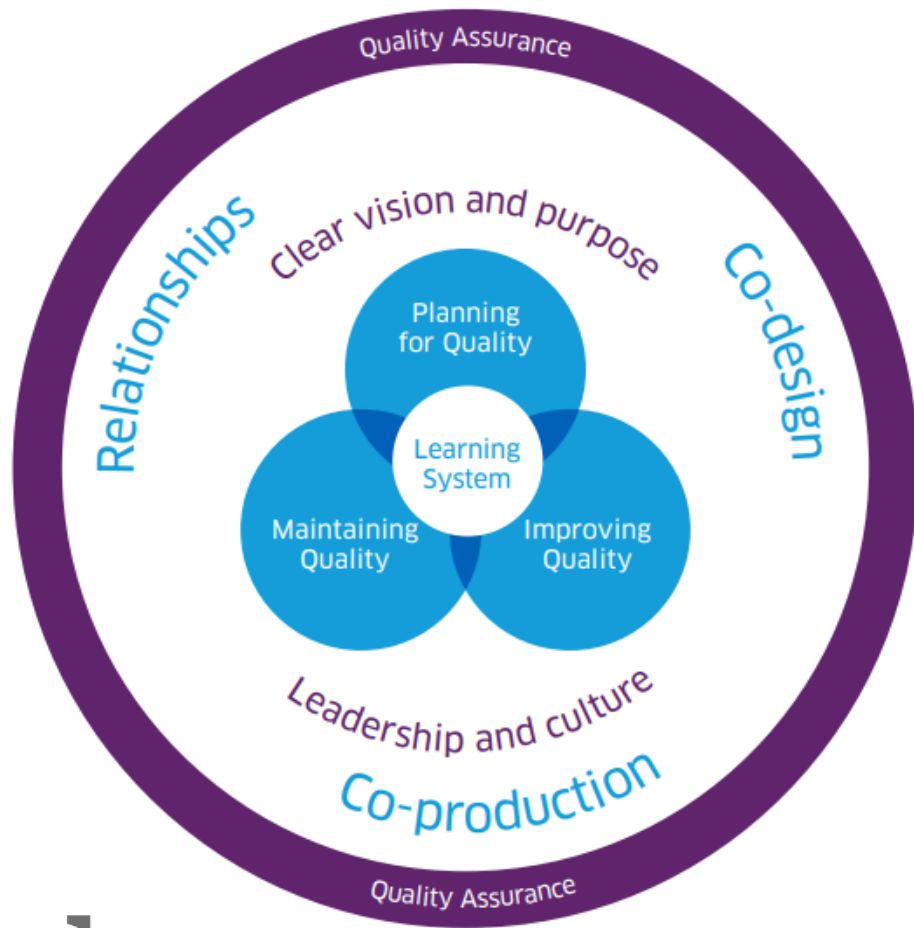


# Quality Improvement

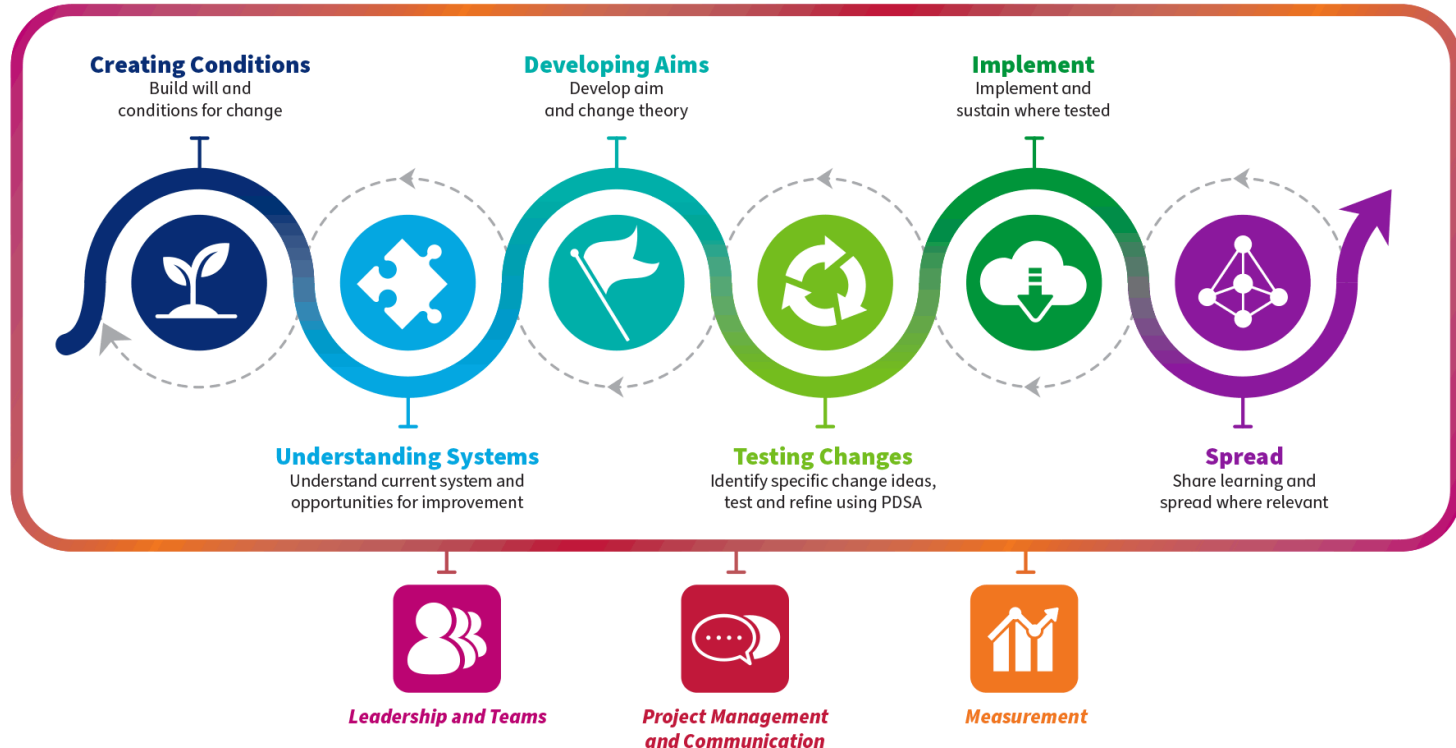
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Implementing all  
this at scale – can  
it be done?





# Scotland's Quality Improvement Journey





“All improvement happens project by project and in no other way.”

WE Deming

# Sustainable Care

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# Change

Creating a national movement on sustainable  
prescribing

# NHS Scotland

Clinician's decision





# Pharmacy's Role in Climate Action and Sustainable Healthcare

The Royal Pharmaceutical Society is committed to tackling the climate and ecological emergency.

In September 2021, we formally recognised the scale and importance of the situation by publishing a climate declaration. Climate change is the most significant health threat modern society has ever faced: it affects clean air, safe drinking water, food and shelter.

Combine this with the increasing demand for health services and the fact that medicines are the most common intervention in healthcare, and the role for pharmacy is clear. Medicines account for about 25% of carbon emissions within the NHS.

This policy deliberately focuses on reducing the environmental harm from medicines, rather than the wider climate and ecological emergency. As experts in medicines, pharmacists have a professional responsibility to take a leading role in reducing the environmental impact of medicines use.

However, pharmacy cannot do this alone.

So, we are calling on the pharmaceutical industry, governments across GB and other stakeholders to work with us to make the changes that are needed to tackle the climate emergency.



For more detail [read our Expanded Introduction below](#)

## Four Policies

Our four policies on Sustainability.



## Our Sustainability Declaration

Our Declaration on the climate and ecological emergency.



## Case Studies, Blogs, & Useful Links

A collection of case studies, blogs and useful links relating to RPS Sustainability policy.



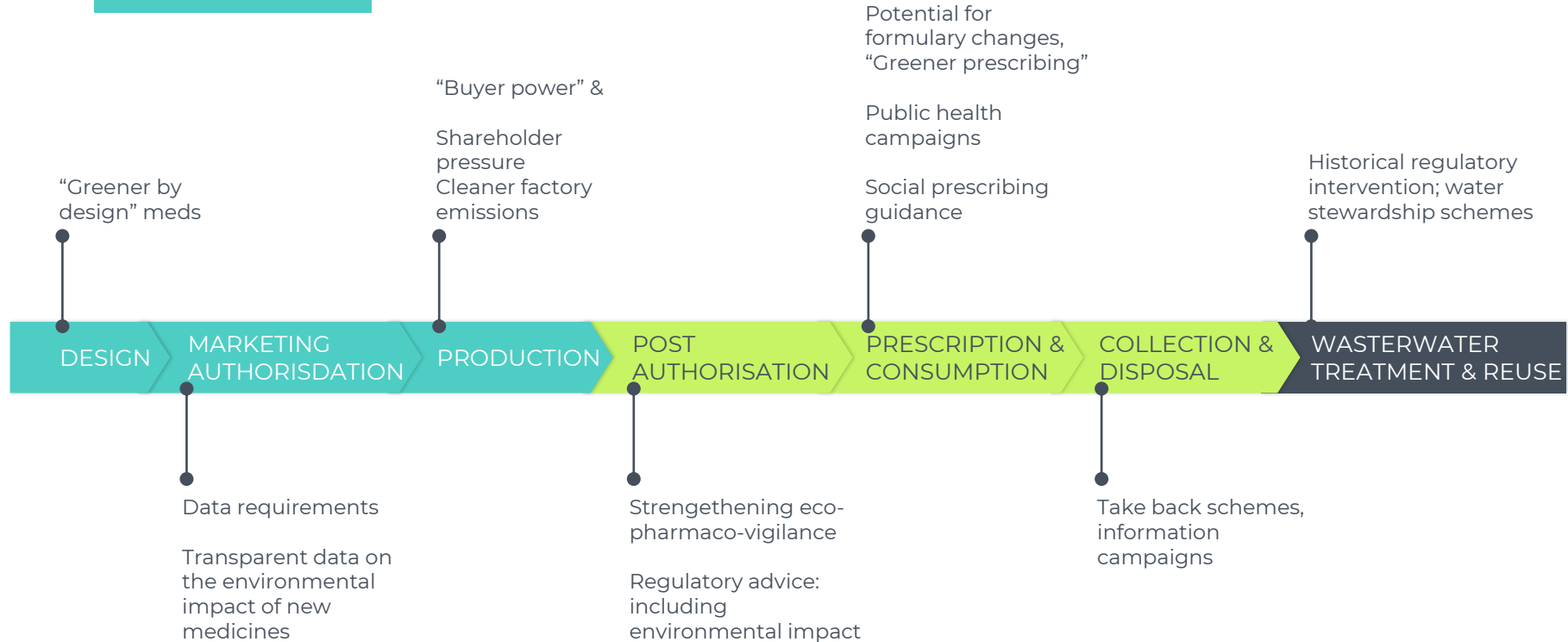
## Our Commitments

RPS – a sustainable organisation.





# Pharmaceutical lifecycle: potential intervention points





# Joint Statement

“As professional leadership bodies in Scotland for prescribers, we are committed to reducing the environmental impact of prescribing and medicines use.”

# 3.

## How?

How are we  
delivering  
change and  
sustained  
improvement?

# Green Theatres





# GREEN THEATRE PROJECT

RAIGMORE HOSPITAL INVERNESS



NHS  
Highland

## 1. LOW-FLOW ANAESTHESIA DESFLURANE; OFF-STOCK



4.5%

reduction in  
total hospital  
CO<sub>2</sub>e emissions

>50%

reduction in  
volatile agent  
spend

**N<sub>2</sub>O** – abandon routine use in anaesthesia – potent and persistent greenhouse gas.

## 3. WASTE SEGREGATION AT SOURCE



### LEGAL REQUIREMENT

Compliant with Waste Scotland Regulations 2012.  
Increased recycling and reduced disposal costs.  
Increase in staff participation - Contributes to positive organisational culture change.

## 2. SURGICAL FLUID SUCTION AND DISPOSAL



Closed systems now available where fluid goes to dirty water system. Small filter is only consumable.

No requirement for storage, transport and high temperature incineration of filled Wiva bins.

## 6. AGSS SWITCH

AGSS switch off out of hours



550w-  
1200w

PER THEATRE

## 5. EFFICIENT FLUID WARMING



Electricity use varies from -

100w/  
UNIT

900w/  
UNIT

Consider plastic use and costs.

## 4. CONDUCTIVE VS CONVECTIVE PATIENT WARMING

10x



reduction in electricity  
with underblanket compared to  
current forced air warmer  
(50W cf 550-760W).

No plastic disposables and reduced cost.

## 7. THEATRE VENTILATION

Theatre Ventilation set back out of hours

4000w

PER THEATRE



## 8. DISPOSABLE CUP AND PLASTIC CUTLERY BAN



## 9. NON-STERILE GLOVE REVIEW

1.4 billion gloves are used across the NHS each year.  
[www.gosh.nhs.uk/news/gloves-are-off](http://www.gosh.nhs.uk/news/gloves-are-off)





# Anaesthetic gases



**2,300 kg** Anaesthetic gas waste

**230 kg** Sharps waste

Operating theatre waste per annum









# 4,944 km

In a petrol car



Carbon equivalent of one bottle of vapourised  
Desflurane

# Think Green, Go Yellow

## Minimising the effect of Anaesthesia on the Environment



Desflurane is **extremely harmful** to the environment. It is a greenhouse gas that has a long half life in the upper atmosphere and is many times more potent than  $\text{CO}_2$ .

We used **522** bottles of desflurane

from October 2018 to March 2019 in the South sector.



1 bottle  
of Desflurane produces  
**886 kg**  
of  $\text{CO}_2$  equivalent

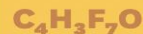
**THIS IS  
THE  
SAME AS**



a passenger on a  
transatlantic flight

or

the annual commute  
to work by car



Sevoflurane produces  
**26 times less**  $\text{CO}_2$  per  
mac hour than Desflurane.

**DID YOU KNOW?**

**Used at low flow for a 3 hour case,  
desflurane has a higher Global  
Warming Potential than driving  
from John O'Groats to Land's End**

JOHN  
O'GROATS

— 874 miles —

LAND'S  
END

Other ways  
to be more  
**Green**

### Avoid Nitrous Oxide

- Depletes ozone layer
- 310 x GWP of  $\text{CO}_2$
- Atmospheric lifetime of 114 years

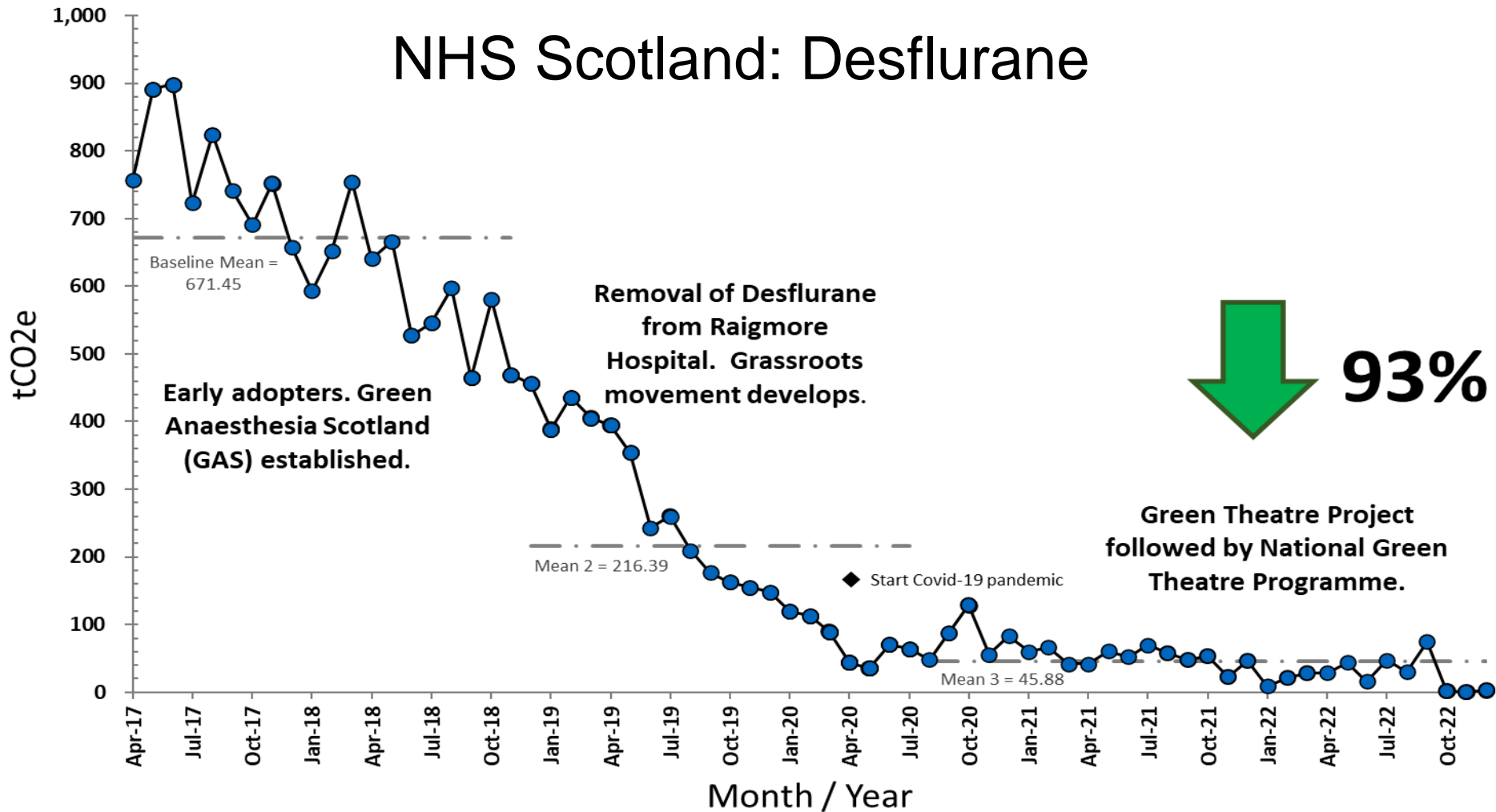
### Use TIVA whenever possible

Greenhouse gas emissions FOUR ORDERS  
of magnitude less than for desflurane

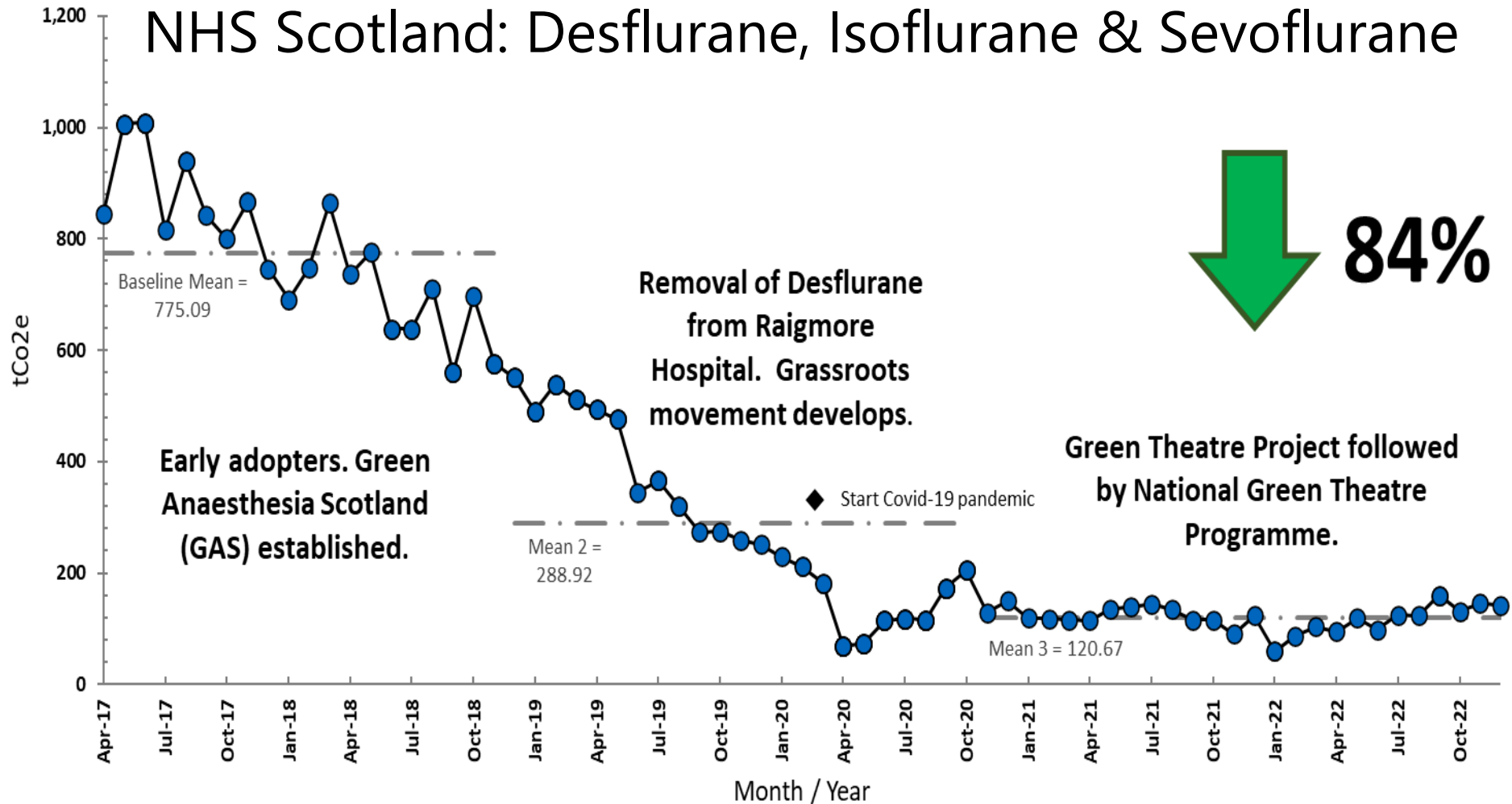
**Regional Anaesthesia  
whenever possible**



# NHS Scotland: Desflurane



# NHS Scotland: Desflurane, Isoflurane & Sevoflurane



## NEWS

[Home](#) | [Cost of Living](#) | [War in Ukraine](#) | [Coronavirus](#) | [Climate](#) | [UK](#) | [World](#) | [Business](#) | [Politics](#) | [Tech](#)[Health](#)

## Scotland first to ban environmentally harmful anaesthetic

03 March 2023

[Climate change](#)

GETTY IMAGES

Scotland has become the first country in the world to stop its hospitals using the anaesthetic desflurane because of the threat it poses to the environment.



# Joint Statement

“We will encourage our professions to take a Realistic Medicine approach to prescribing by involving patients in prescribing decisions.”







# REALISTIC MEDICINE

CAN WE:



BUILD A **PERSONALISED**  
APPROACH TO CARE?



MANAGE RISK BETTER?





Make it easier to  
prescribe in a  
Green way

# NHS Scotland

Clinician's decision







Healthcare  
Improvement  
Scotland

**SIGN**

Evidence-based  
clinical guidelines

# Sustainability into guidelines

# Green prescribing in NHS Lothian



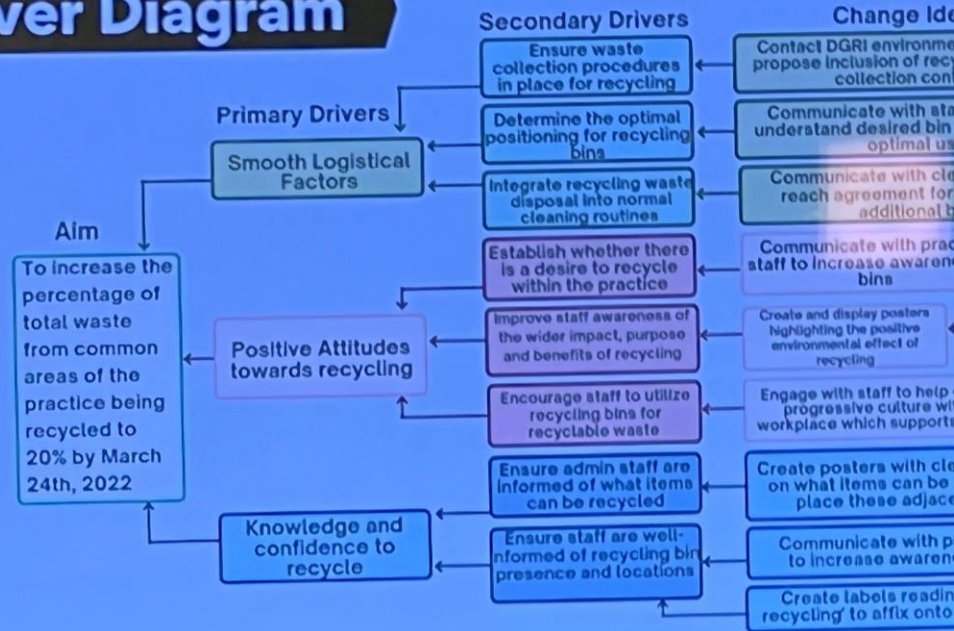
Embedding and  
targetting people  
who can benefit  
the most

# 4.

## Case studies

Environmental  
sustainability in  
practice

# Driver Diagram



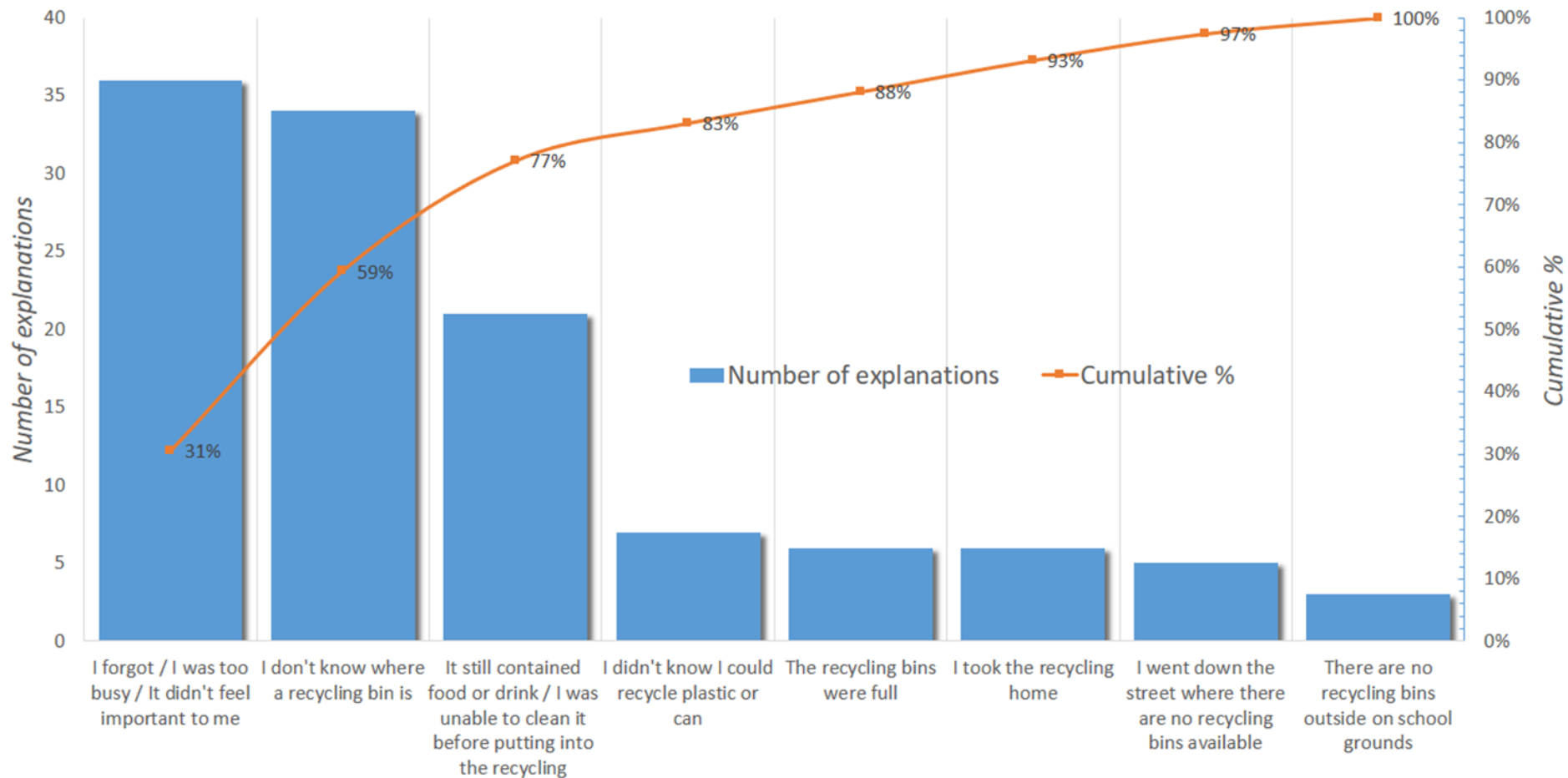
# McLaren High School, Callander

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Presented at CYPIC National Conference, 15 November 2022

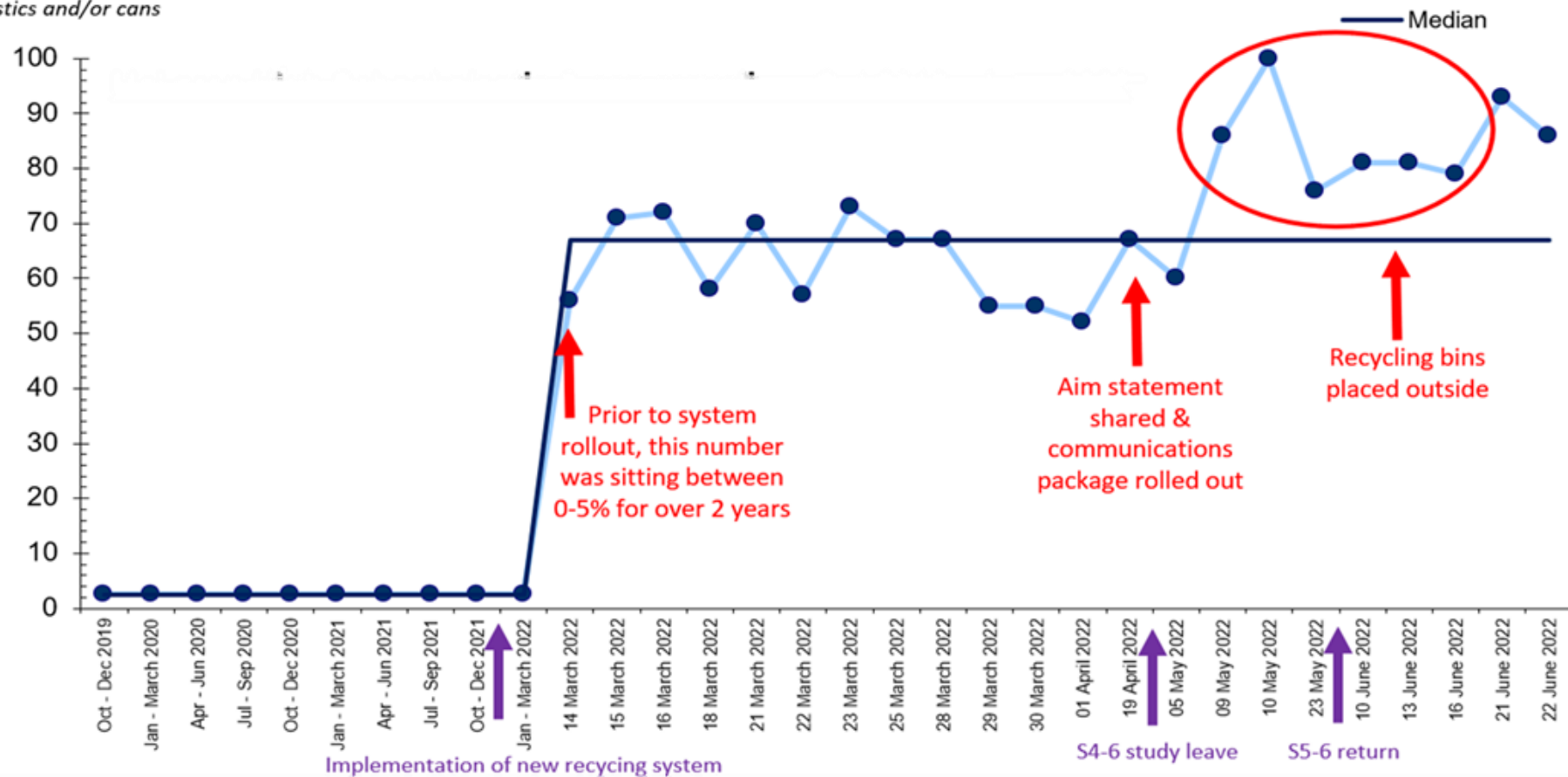
# Explanations for non-recycling





# Plastic & Can recycling (Oct. 2019 – Jun. 2022)

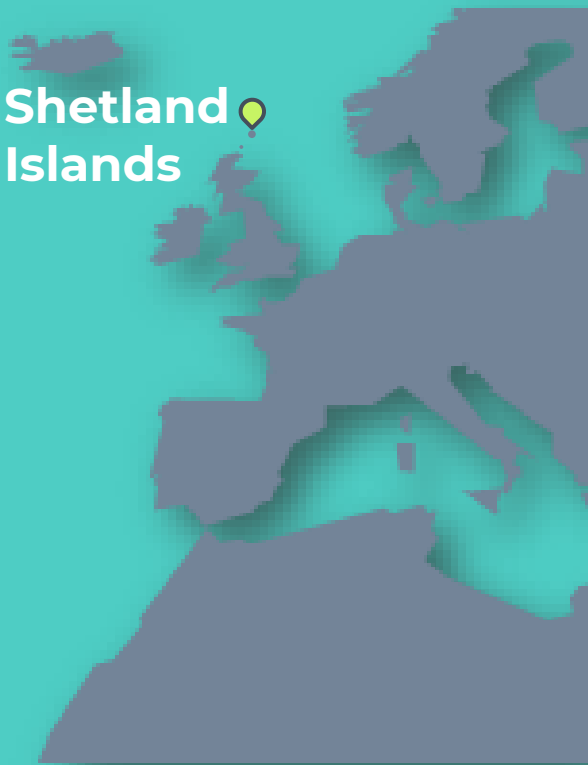
% that recycled all  
plastics and/or cans





**Greener  
Practice**

**Shetland  
Islands**

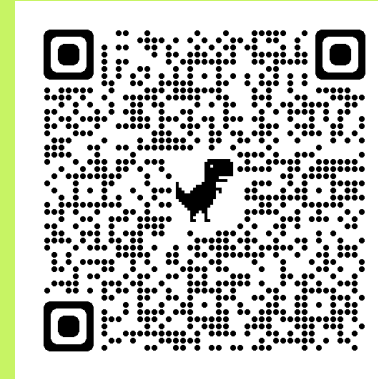




# Sustainable Prescribing Workstream

Developing formulary  
framework

Clinical + Cost +  
Environment



Scan  
to  
access

CM





4.

You

What actions  
will you take?

“It is not necessary to  
change. Survival is not  
mandatory.”

WE Deming





# Our world needs you to act now



1. People
2. Leaders & Policy Makers
3. Health & Care Professionals



# Your Commitment

Join our global movement to make health  
and care more environmentally sustainable

# Thanks!

