



WEO  
The voice of world  
endoscopy

# Green Endoscopy and Sustainable CRC Screening

*Why we need to change our approach to CRC  
prevention and how*

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# Conflict of interest statement

Research Grants: Steris, Cosmo Pharm.

**Carbon Footprint (travel): 1.8 tCO<sub>2</sub> eq.**





Vermeer  
Girl with a Pearl Earring  
1665







Landfill waste generated during endoscopy  
VA WRJ and DHMC 2020



## The 2021 report of the *Lancet* Countdown on health and climate change: code red for a healthy future

The Lancet Oct 2021

“Climate change is the greatest global health threat facing the world in the 21st century”



# Mortality worldwide

- **Colorectal cancer (2020)** **0.9 M**
- Cancer (2020) 9.5 M
- Ischemic heart disease (2019) 8.9 M
- **Related to air pollution (2019)** **8.7 M**
- Stroke (2019) 6.5 M
- Covid-19 (2020) 3.7 M
- Diarrhea (2017) 1.7 M, 0.9 M children
- Diabetes (2019) 1.5 M



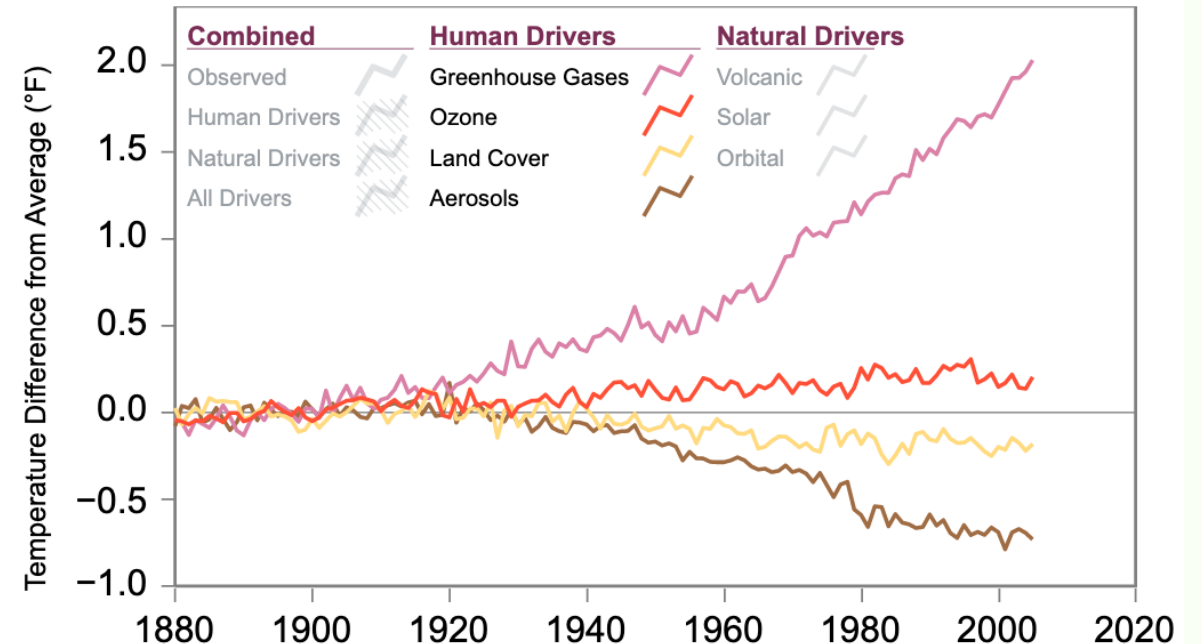
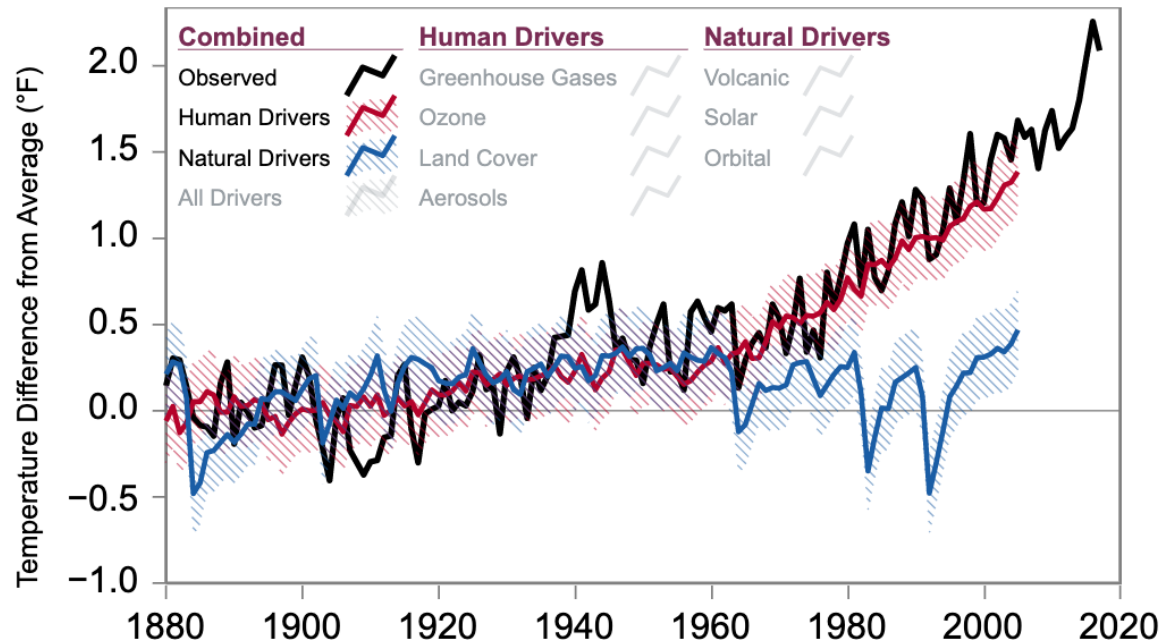
# Drivers of Climate Change?



Industrial age

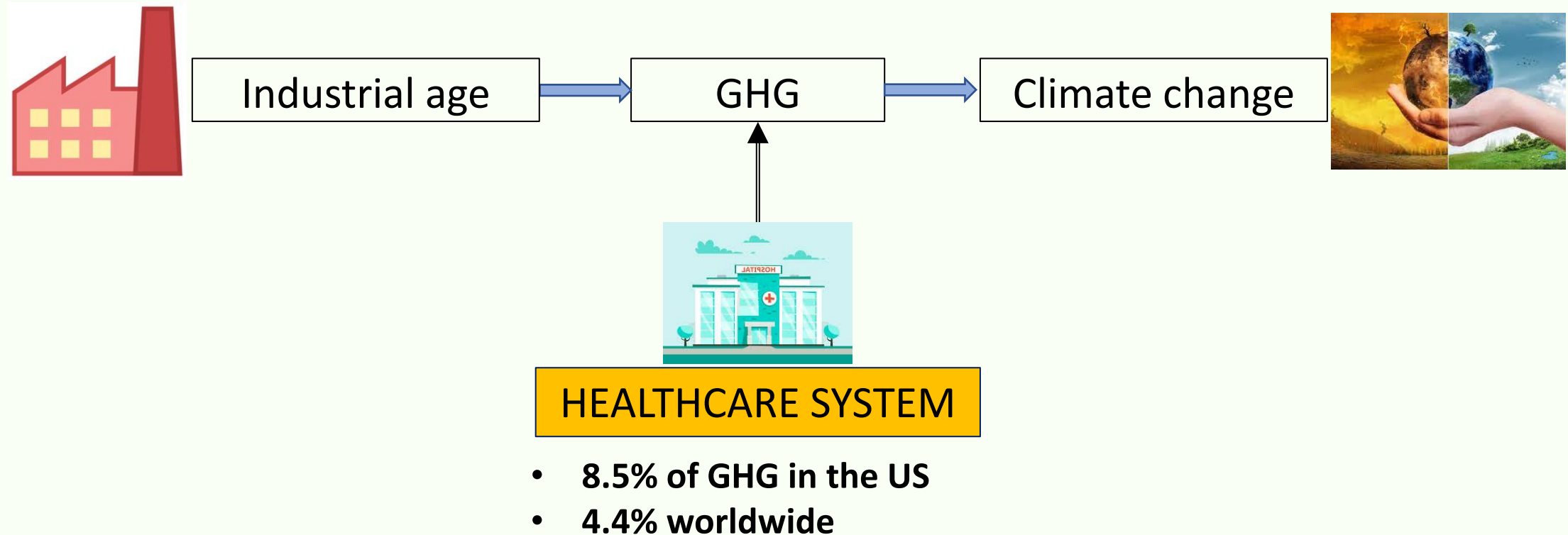
GHG

Climate change





# Drivers of Climate Change?



*If Healthcare were a country, it would be the fifth largest GHG emitter*



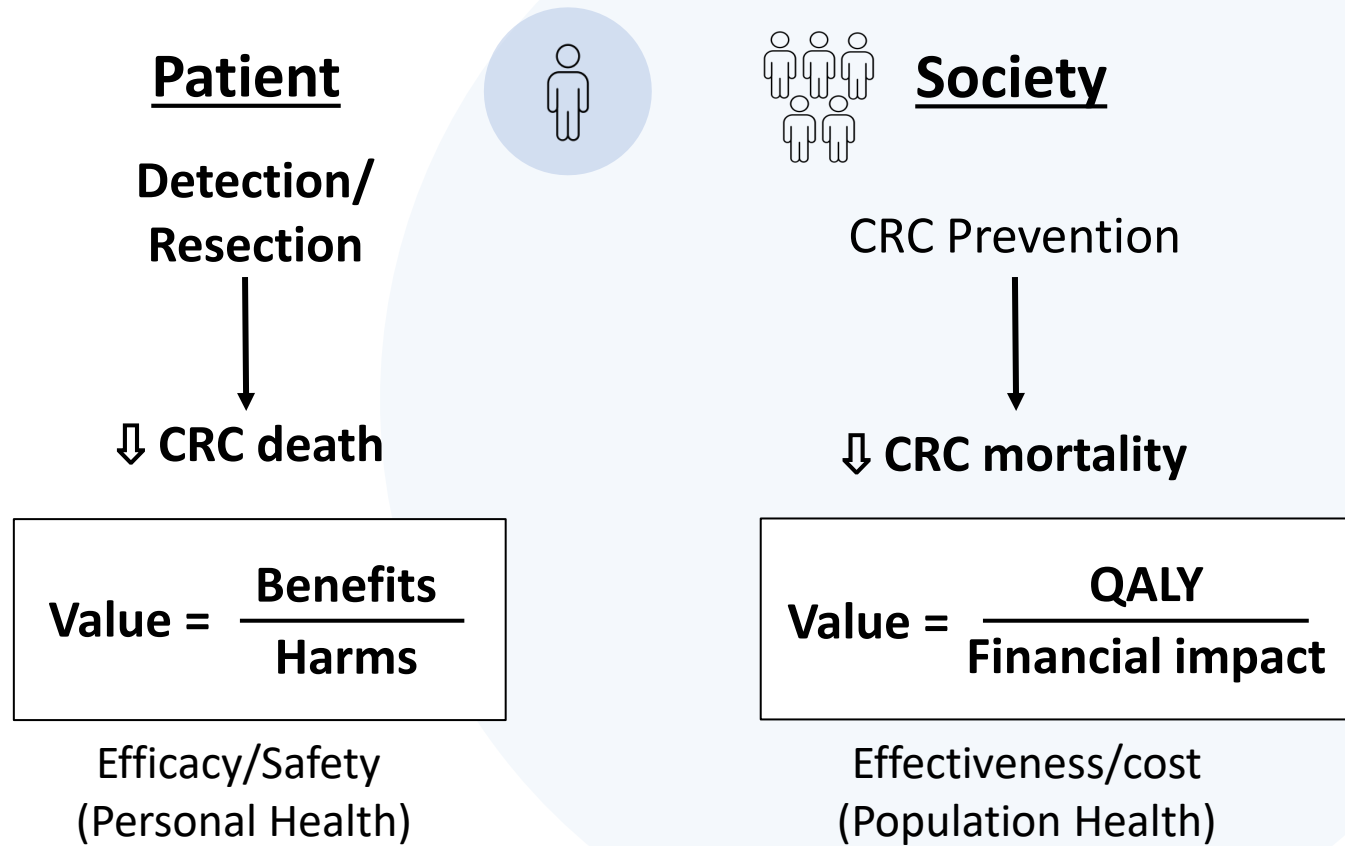
# How do we value CRC screening?

Incidence benefit?

Mortality benefit?



# Current Value of Care



# WEO CRC Screening Committee

- FIT for Screening
- Approach to surveillance
- Interval cancers
- Image enhanced endoscopy
- Screening trials
- Reduce inequities

## The GOOD:

- Efficacy
- Effectiveness
- Safety
- Equity

## The BAD: → **We assume**

- **For all now and ever**
- **Unlimited resources**
- **National perspective**

**Solution? Global/planetary perspective**



# Sustainable Value of Care

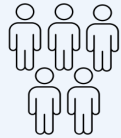
## Patient

Detection/  
Resection

↓  
↓ CRC death

$$\text{Value} = \frac{\text{Benefits}}{\text{Harms}}$$

Efficacy/Safety  
(Personal Health)



## Society

CRC Prevention

↓  
↓ CRC mortality

$$\text{Value} = \frac{\text{QALY}}{\text{Financial impact}}$$

Effectiveness/cost  
(Population Health)



## Global

CRC Prevention for all

↓  
↓ Global CRC mortality

$$\text{Value} = \frac{\text{Patient \& Population outcomes}}{\text{Environmental + Social + Financial impacts}}$$

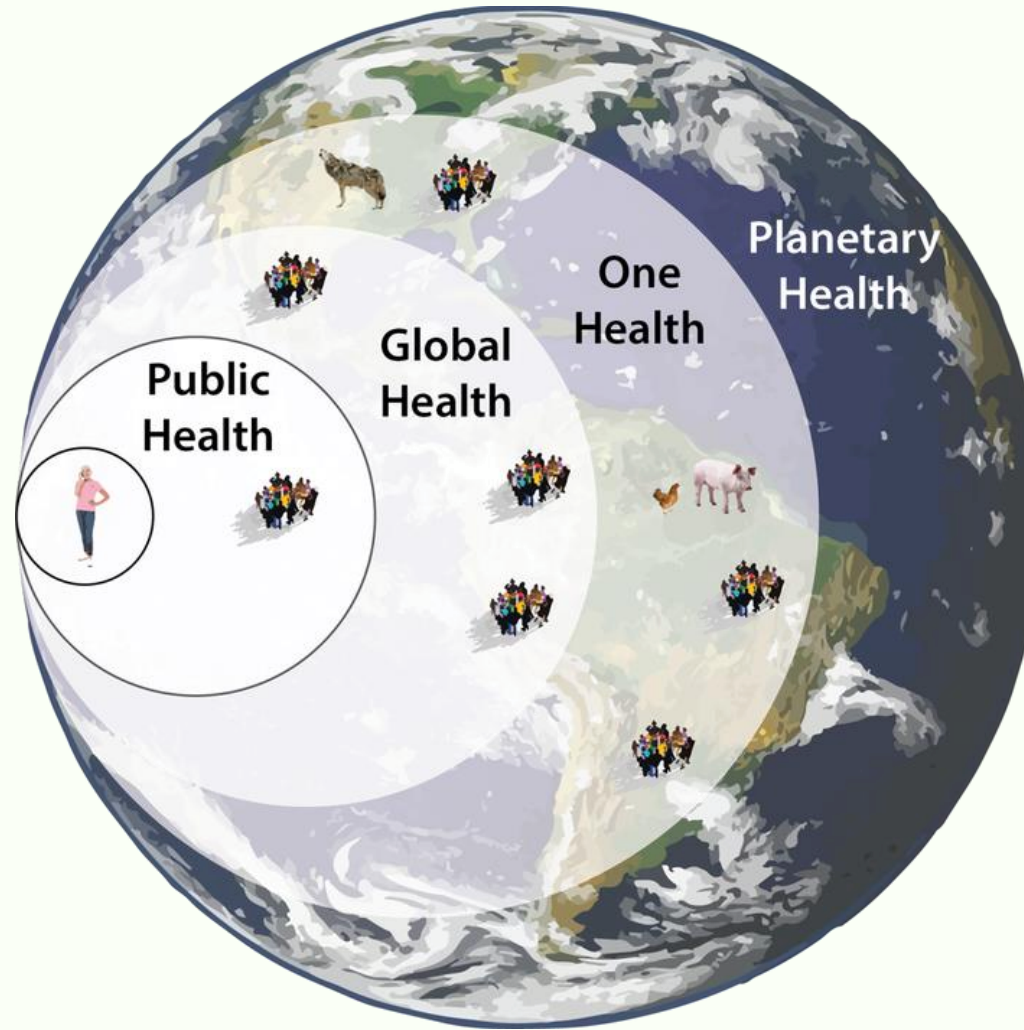
Sustainable effectiveness/global harms  
(Global, planetary Health)

*Goal: to reduce CRC death for all and be able to afford it! ⇒ Sustainability*









# Sustainable Care needs to include Planetary Health



# Principles of Sustainable Healthcare

|   |   |
|---|---|
|  <p><b>Patient empowerment and self-care</b></p> <p>Support patients to take a bigger role in managing their own health and healthcare</p>   | <p><b>Prevention</b></p> <ul style="list-style-type: none"><li>&gt; Promoting health</li><li>&gt; Preventing disease</li><li>&gt; Reduce the need for healthcare</li></ul>   |
|  <p><b>Lean service delivery</b></p> <ul style="list-style-type: none"><li>&gt; Services where people need them</li><li>&gt; Streamlining care to minimise low value activity</li></ul> | <p><b>Low carbon alternatives</b></p> <ul style="list-style-type: none"><li>&gt; Preferential use of effective treatment and medical technologies with lower environmental impact</li><li>&gt; Minimising waste of medications, consumables and energy</li></ul>  |



# UK NHS – its strategy towards sustainable care

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- Single largest payer healthcare system in the world
- Directly controlled net zero by 2040
- 2030 no purchase from suppliers that do not meet our commitment to net zero.

## Core components

- Getting it Right First Time (GIRFT) approach
- Prevention
- Addressing inequality of care

## Delivering a 'Net Zero' National Health Service

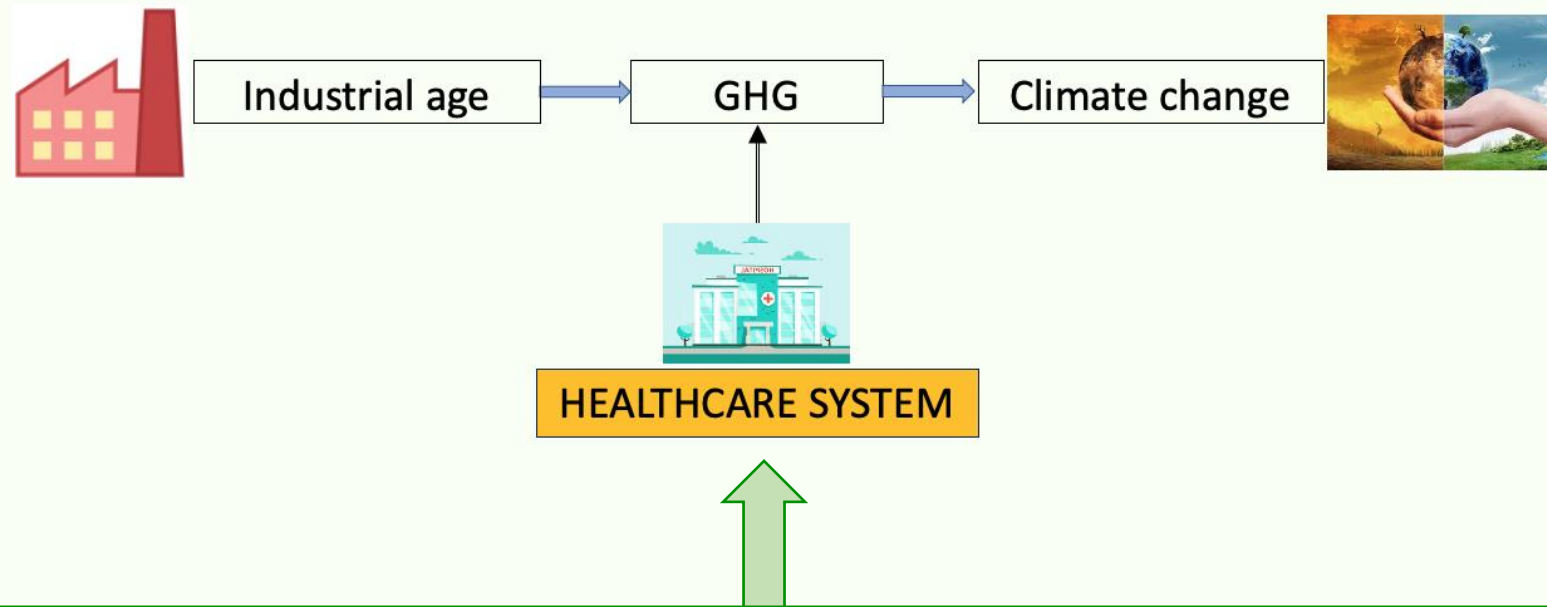
**By 2045**



<https://www.NHS.NetZero.2020>

# In the US Department for HHS:

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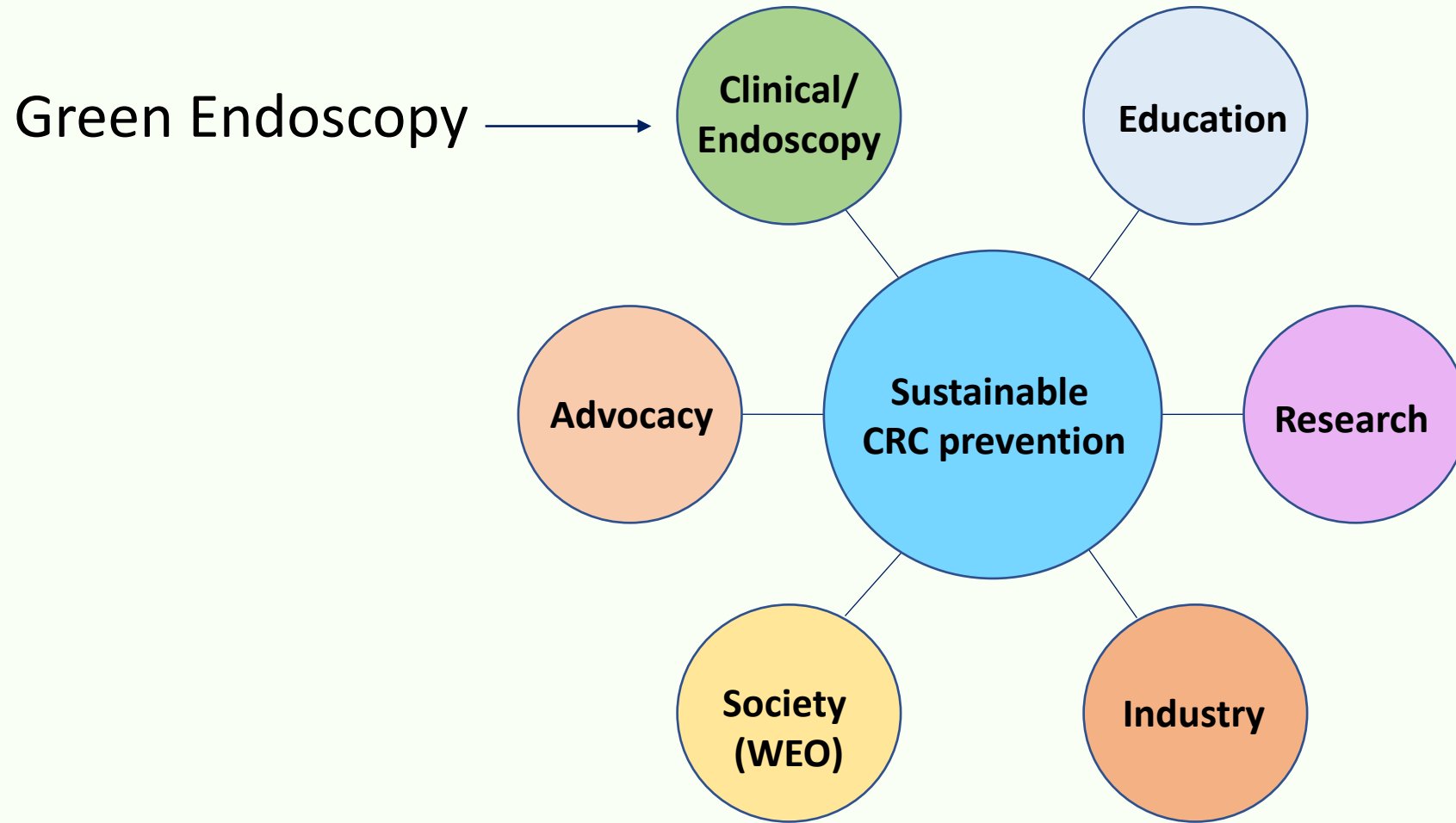


**“Making decarbonizing the federal healthcare system a priority...”**  
(Undersecretary Admiral Rachel Levine at COP26 11/09/2021)



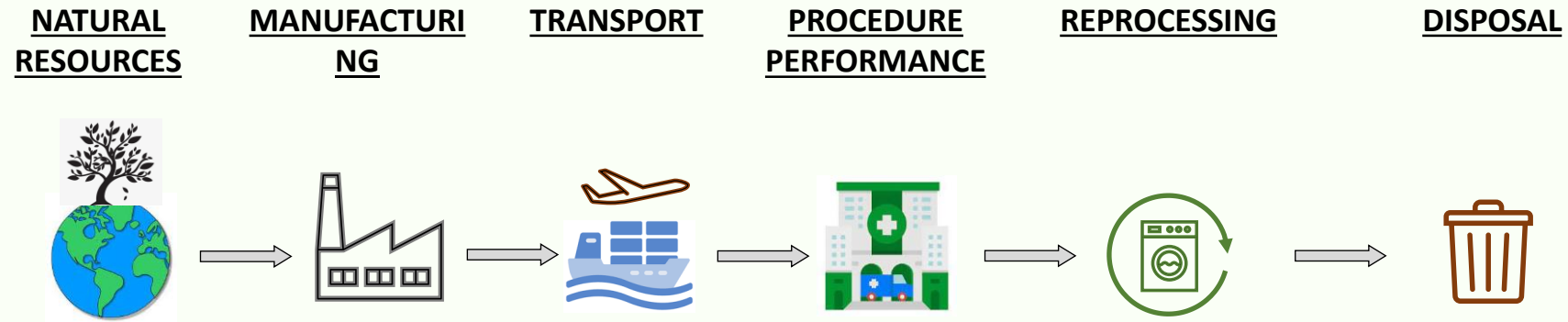
# How do we get there?

- Within WEO CRC Screening committee
- In our practice





# Green house gas (GHG) emission sources



**Scope 1:** Direct emissions (burning fuel, anesthetic cases)

**Scope 2:** Indirect emissions (electricity from fossil fuels)

**Scope 3:** Supply chain



# Initiatives

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- Green Endoscopy Group
- ESGE – Guideline/recommendation
- BSG – strategic plan
- US Multisociety Taskforce (strategic plan)
- ASGE taskforce on climate change/green endoscopy
- WGO working group



# Example Green Endoscopy

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- Assess current practice
- Identify practice changes
- Implement practice changes



# Estimating the environmental impact of disposable endoscopic equipment and endoscopes

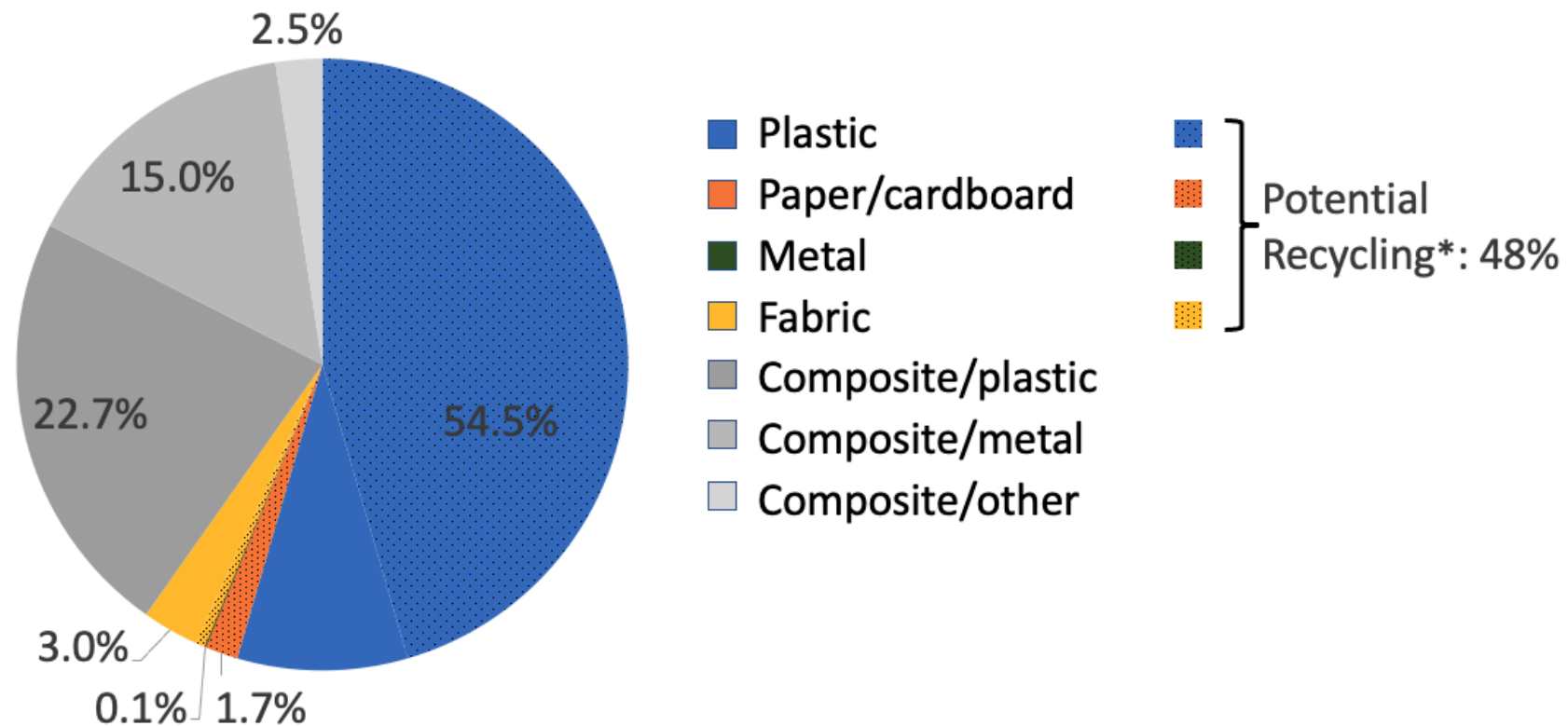
 Sathvik Namburar <sup>1</sup>, Daniel von Renteln <sup>2</sup>, John Damianos <sup>1</sup>, Lisa Bradish <sup>3</sup>, Jeanne Barrett <sup>4</sup>, Andres Aguilera-Fish <sup>5</sup>,

Benoit Cushman-Roisin <sup>6</sup>, Heiko Pohl <sup>1, 4, 5</sup>

|  | All         | Low endoscopy<br>volume center<br>(VA) | High endoscopy<br>volume center<br>(DHMC) |
|--|-------------|--|---|
| <b>Endoscopic procedures per year, n</b>   | 15,000      | 2,000                                  | 13,000                                    |
| <b>5-day audit, n</b>                      | 278         | 37                                     | 241                                       |
| <b>Waste, total</b>                        |             |  |   |
| Volume, n trash bins (20 Ga or 76 L)       | 190         | 19                                     | 171                                       |
| Mass, kg                                   | 619         | 73                                     | 546                                       |
|  |             |  |   |
| <b>Waste per endoscopy</b>                 |             |  |   |
| Mass, in kg                                | <b>2.11</b> | 1.96                                   | 2.27                                      |
| Direct landfill waste, kg (%)              | 1.34 (64)   | 1.33 (68)                              | 1.36 (60)                                 |
| Biohazard waste, kg (%)                    | 0.59 (28)   | 0.64 (32)                              | 0.54 (24)                                 |
| Recycled waste, kg (%)                     | 0.18 (9)    | 0 (0)                                  | 36 (16)                                   |
|  |             |  |   |
| <b>Waste of reprocessing one endoscope</b> |             |  |   |
| Mass, kg                                   | <b>0.30</b> | N/A                                    | 0.33                                      |



**Figure 1.** Material components of non-biohazard waste of disposable supplies used for endoscopic procedures and potential for recycling (data based on waste audit at the low volume hospital, see methods).



\* Potentially recyclable plastic included: PET or Polyethylene terephthalate, HDPE High-density polyethylene, PVC or Polyvinyl chloride, LDPE or Low-density polyethylene, PP or Polypropylene (Resin identification code  $\triangle$  1-5).





# If results were applied to annual number of endoscopies in the US

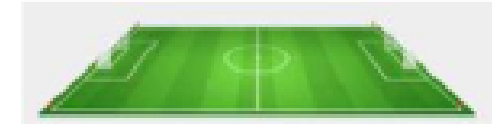
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US: 18 Mio endoscopies/yr

- 11 Mio colonoscopies
- 6 Mio EGDs (incl EUS)
- 117,000 ERCPs
- 119,000 EUS

WASTE in VOLUME:  
836,000 cubic meters

Equivalent to



Covering 117 soccer fields  
with waste to 1 m depth

WASTE in WEIGHT:  
38,100 metric tons\*

Equivalent to



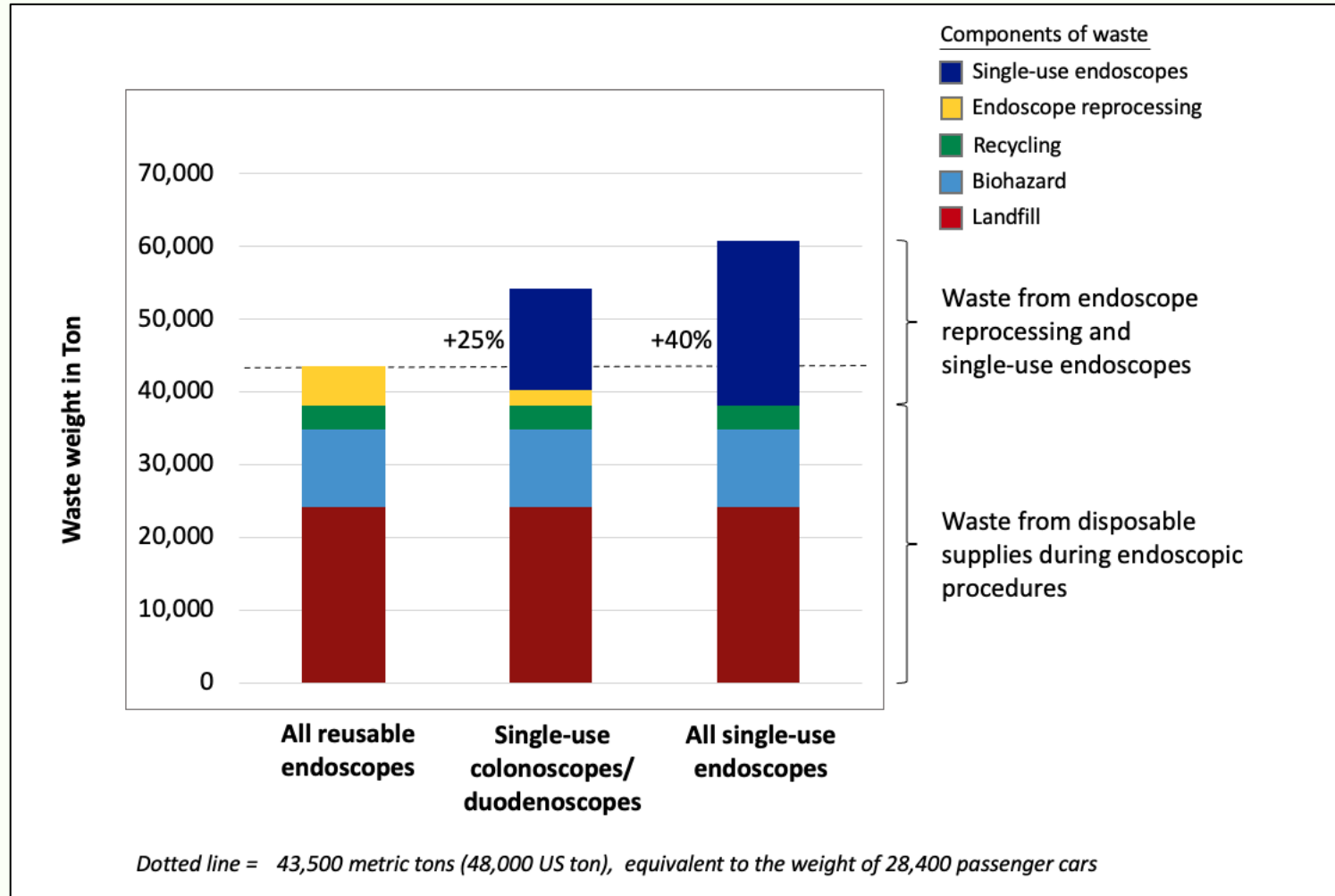
24,900 passenger cars



If results were applied to annual  
number of endoscopies in the US

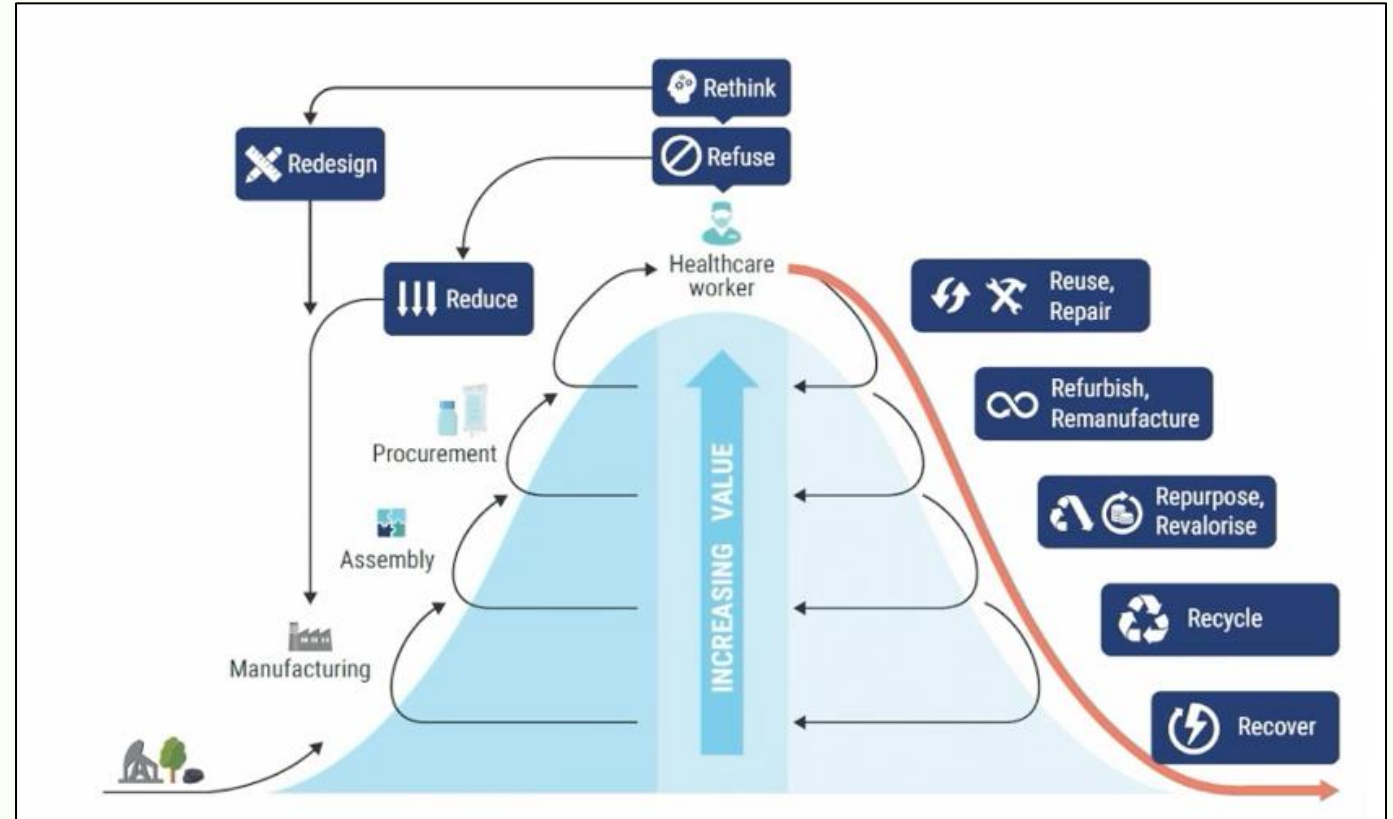
&

Performed with  
disposable scopes



# Green Endoscopy – possible practice changes

**Reduce > Reuse > Recycle**



Courtesy of Adriaan Volkers, AMC, Netherlands



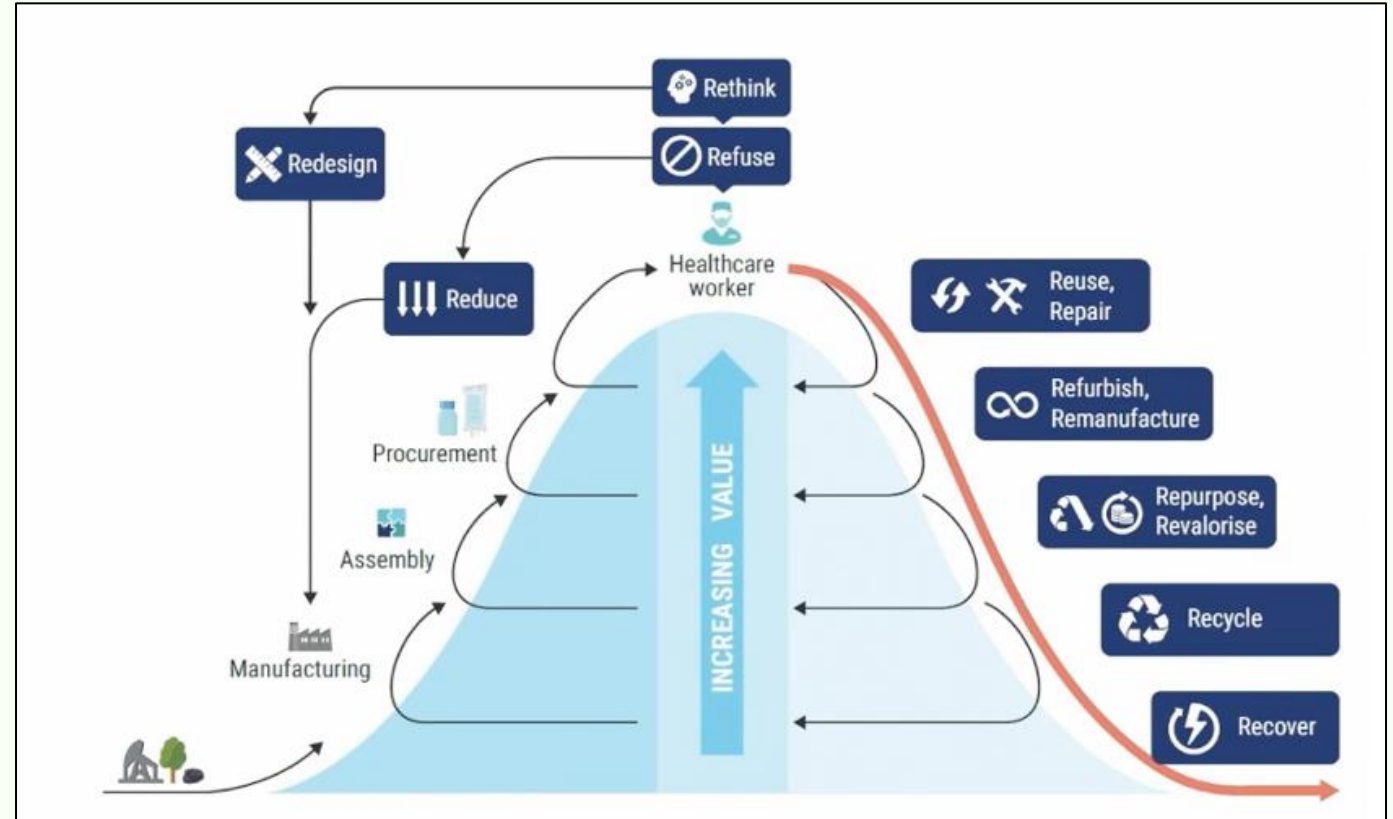
# Green Endoscopy – possible practice changes

## Procedure adequate?

- Procedure indicated?
- Surveillance interval appropriate?
- FIT vs colo

## Conservation (energy/material)

- Lights (LED, motions sensor)
- HVAC
- Digitize/Printing



Courtesy of Adriaan Volkers, AMC, Netherlands



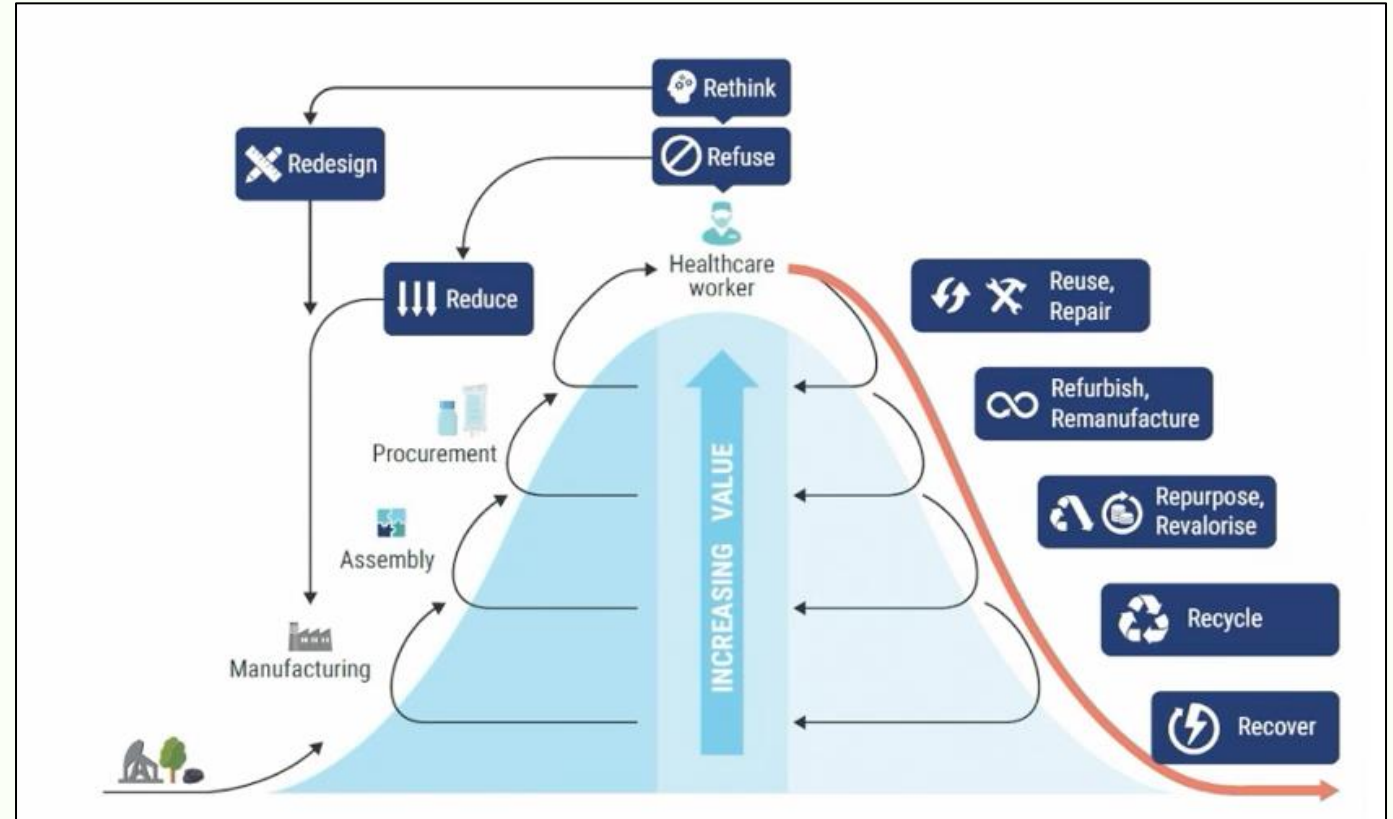
# Green Endoscopy – possible practice changes

## Procedure performance?

- Ancillary devices
- Sterile water use
- Need for biopsies
- R & D (leave polyps)

## Instruments/devices

- Green purchasing (packaging, CO2)
- Hazardous waste
- Recycling
- Reprocessing



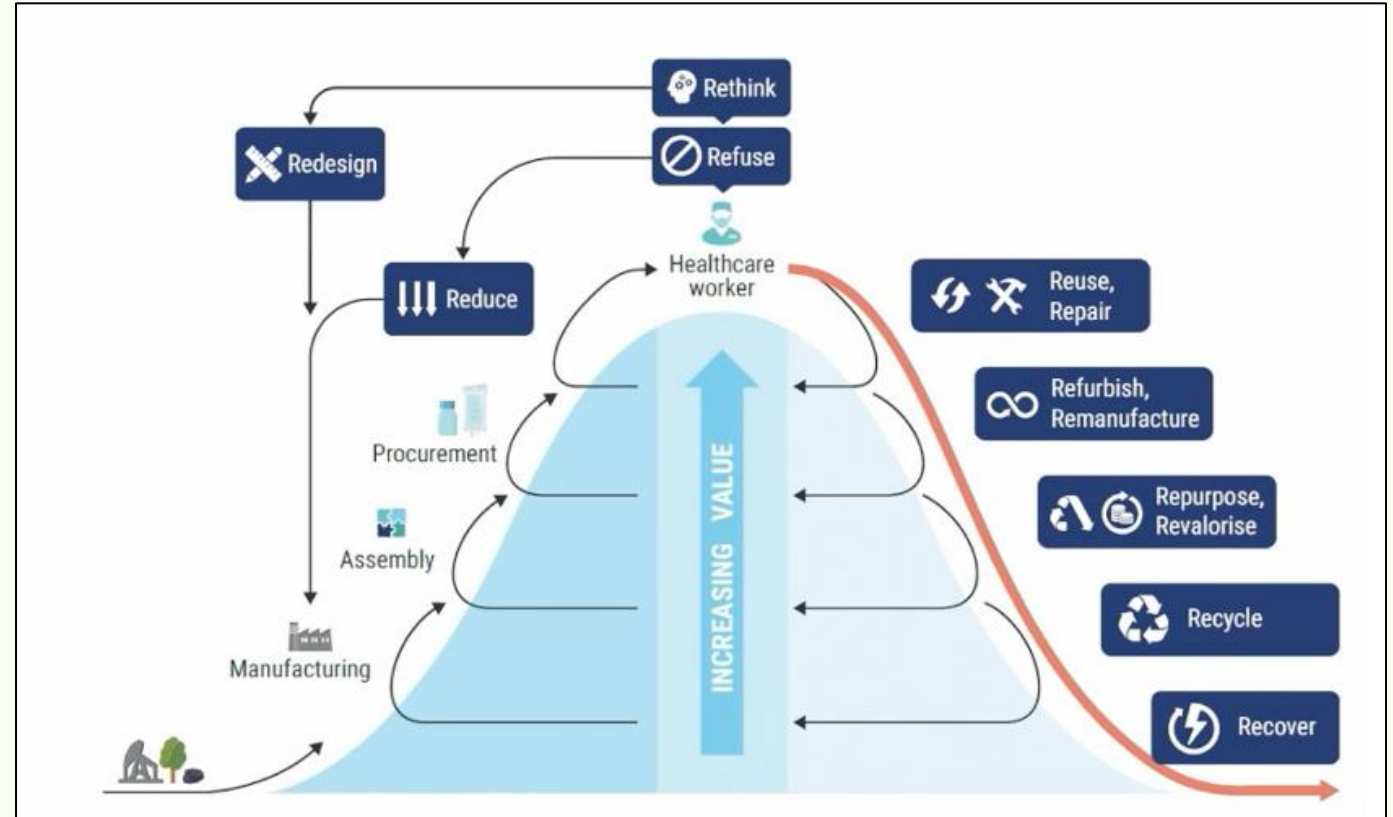
Courtesy of Adriaan Volkers, AMC, Netherlands



# Green Endoscopy – possible practice changes

## Team approach

- All in
- Educate, engage
- Reassess
- Leadership support



Courtesy of Adriaan Volkers, AMC, Netherlands



## WEO CRC Screening Committee & Sustainable/Green Care

- What is our vision?
- What are our goals?
- What steps shall we take to achieve them?





