



Global meeting on WASH in health care facilities: from resolution to revolution
9-11 September 2019, David Livingstone Lodge, Livingstone, Zambia

Climate Smart Health Care Waste Solutions

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Health Care Without Harm works to transform health care worldwide so that it reduces its environmental footprint, becomes a community anchor for sustainability and a leader in the global movement for environmental health and justice.

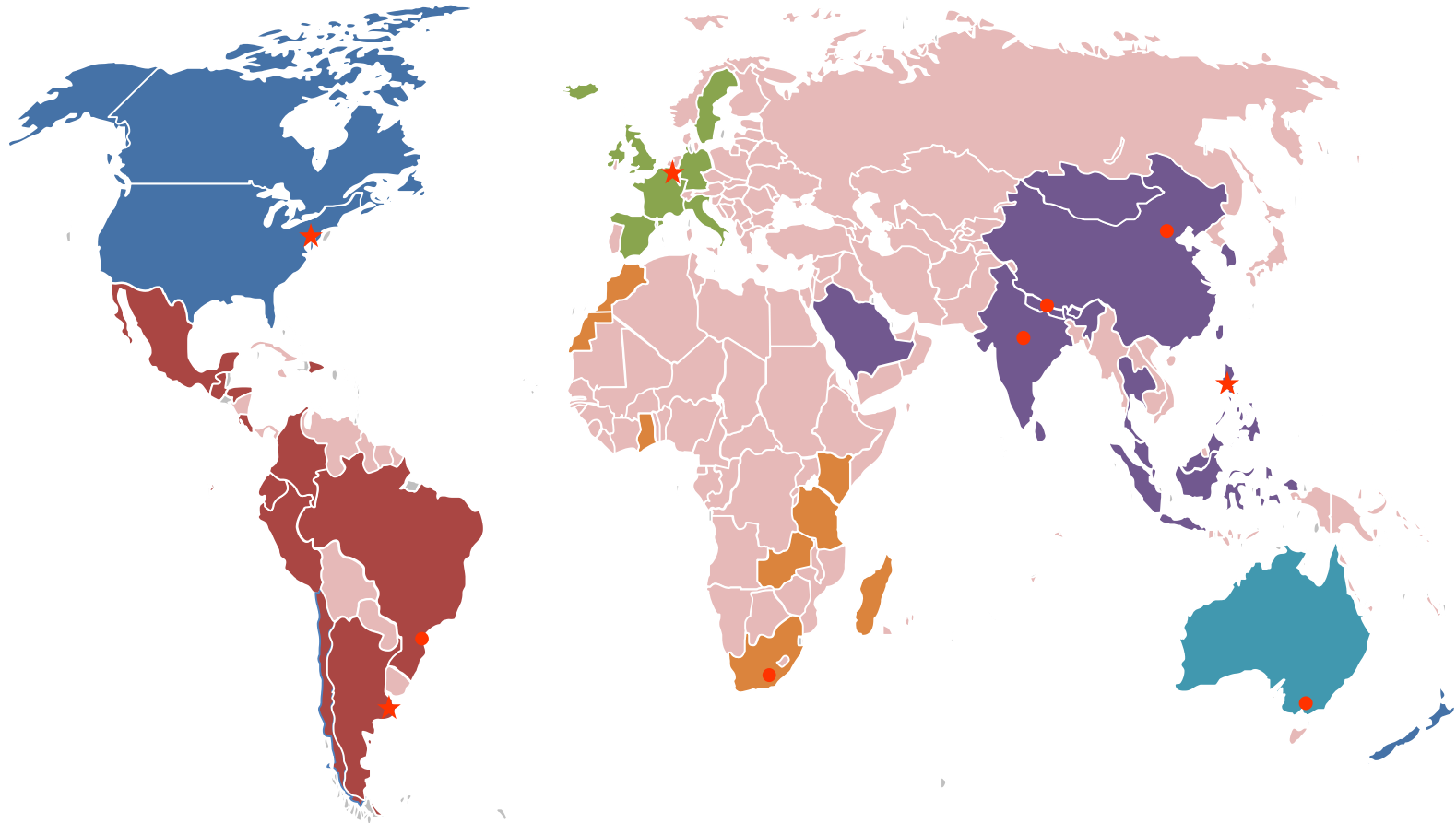
www.noharm.org

www.greenhospitals.net

The Campaign for Environmentally
Responsible Health Care



Global Green and Healthy Hospitals



The Global Green and Healthy Hospitals community has more than **1,200 members** in **60 countries** who represent the interests of over **36,000 hospitals and health centers**.

- ★ HCWH Regional Offices
- Strategic Partners

<https://www.greenhospitals.net/members/>

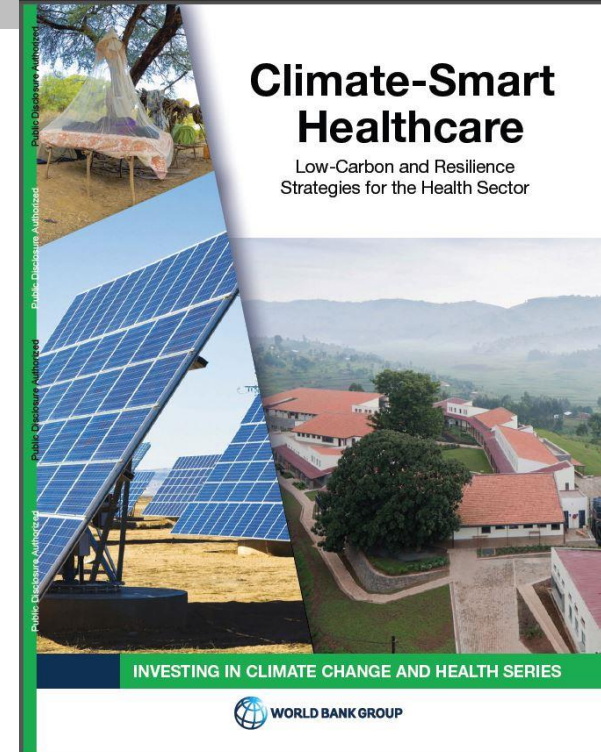
Climate-Smart Health Care

- **Mitigation** – Reducing health care’s own carbon footprint and deploying low carbon strategies.
- **Resilience** – Preparing for the impacts of extreme weather and the shifting burden of disease.
- **Leadership** – Educating staff and the public while promoting policies to protect public health from climate change.



Health Care Climate Challenge

<https://www.greenhospitals.net/about-challenge/>



Maldives Green Climate-Smart Hospitals

Hospital Vulnerability Analysis and Report

Co-Produced by the World Health Organization and Health Care Without Harm

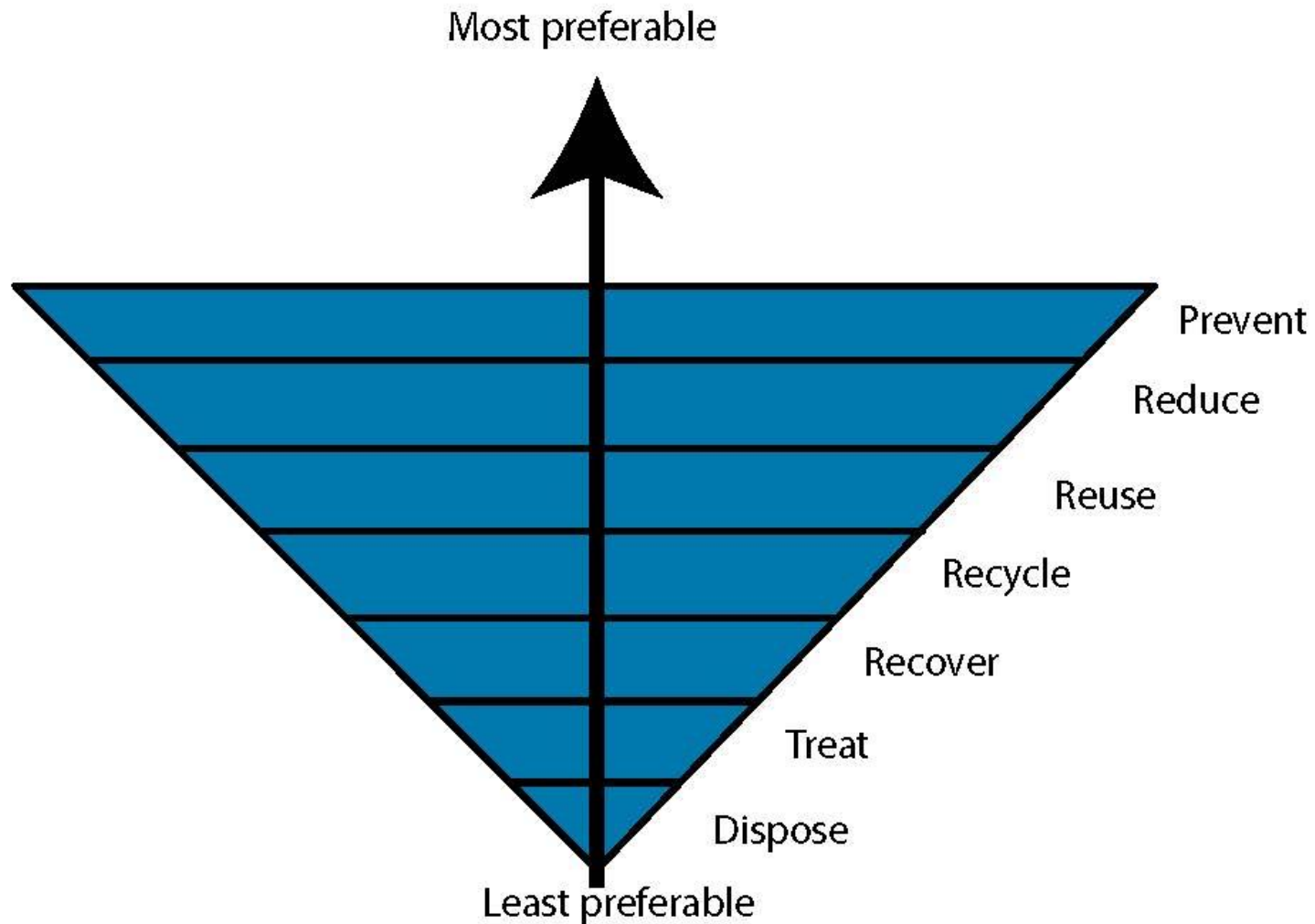


Maldives Green Climate-Smart Hospitals

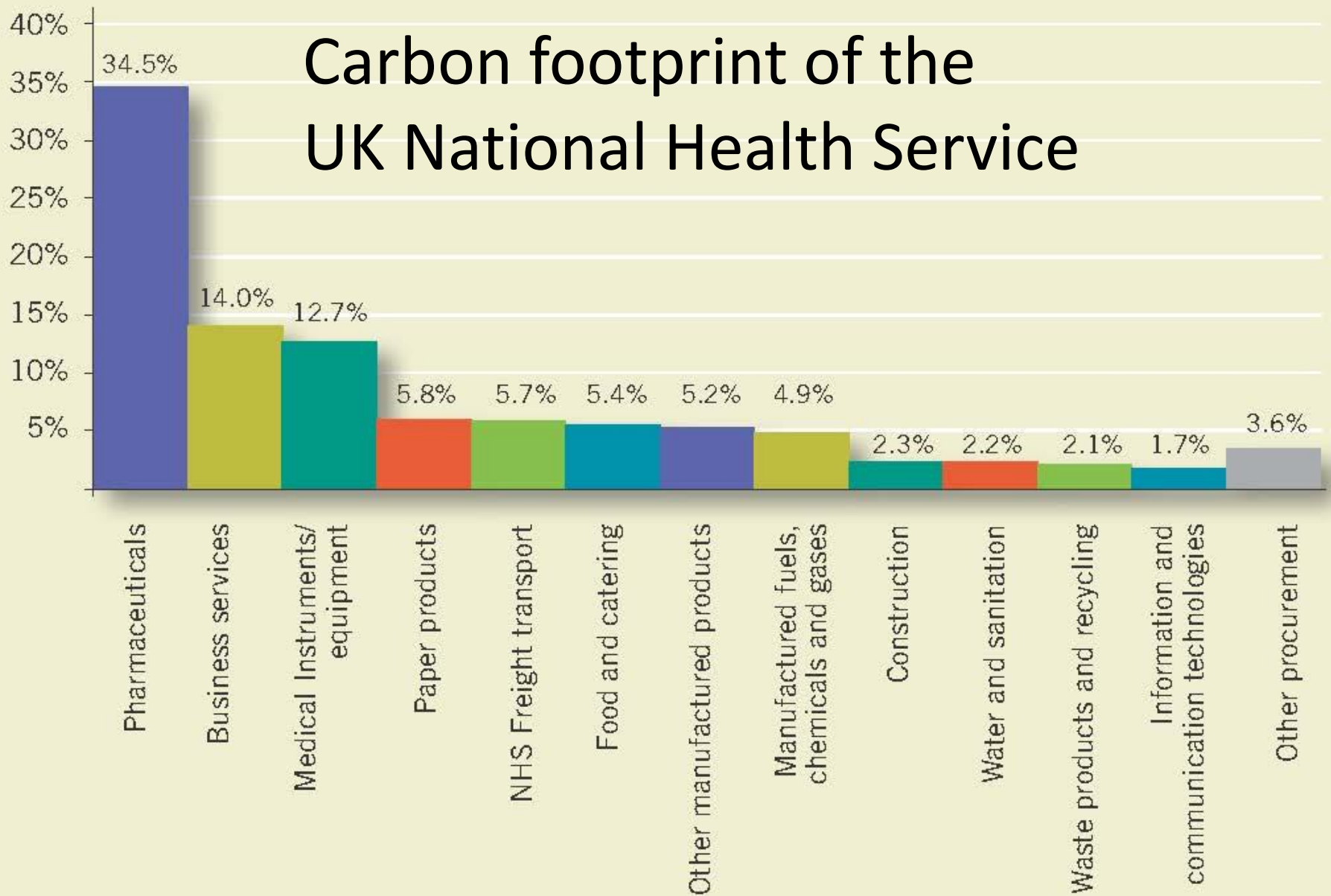
Policies and Strategies Report

Co-Produced by the World Health Organization and Health Care Without Harm

Mitigation through the Waste Hierarchy



Carbon footprint of the UK National Health Service



Reduce waste

- Pharmaceuticals
 - Largest fraction of healthcare carbon footprint
- Plastics/packaging
 - 1 million plastic bottles produced every minute
 - Provide drinking water for staff and patients
- Sharps
 - 70-90% of injections may be unnecessary in some countries
- Products that are non-reusable, non-recyclable, or must be incinerated by national law

\$180bn investment in plastic factories feeds global packaging binge

Colossal funding in manufacturing plants by fossil fuel companies will increase plastic production by 40%, risking permanent pollution of the earth



Plastics

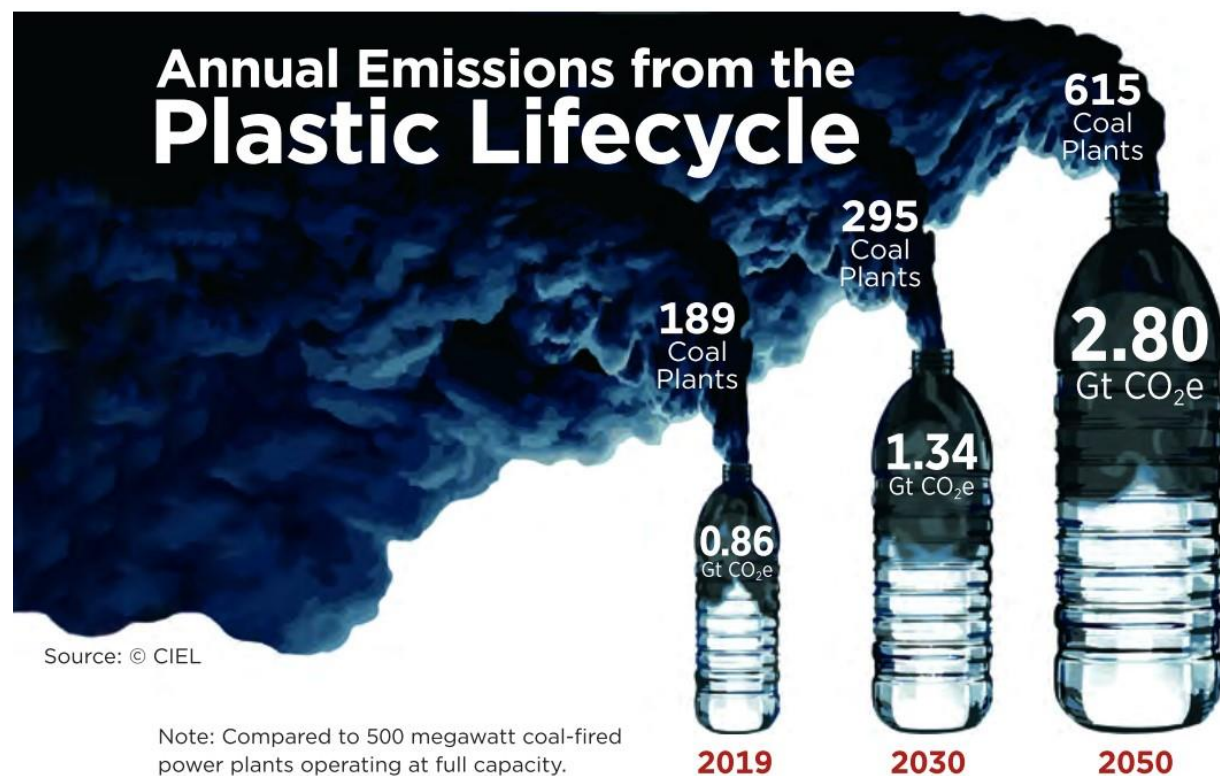
4% of the world's oil is used to make plastics and another 4% is used to power the factories that make it.

Around half HCW is plastic

Up to 2015, approx 6300 Mt of plastic waste was generated
9% recycled, 12% incinerated, 79% accumulated in land-fills or the natural environment.

Waste burning is the most expensive and polluting method of energy production

HCWH Plastics report and toolkit at: <http://bit.ly/DownloadPlasticsReport>
https://drive.google.com/file/d/1JBmaiqjhPT_4AgFH0uWpwaD4nzLDDEIY/view



Reuse

- Eliminate single use
 - Foodware
 - Surgical gowns and drapes
- Single use diapers
 - Non-recyclable, huge disposal problem
- Many other items can be reused or repurposed
- Staff can come up with creative ideas

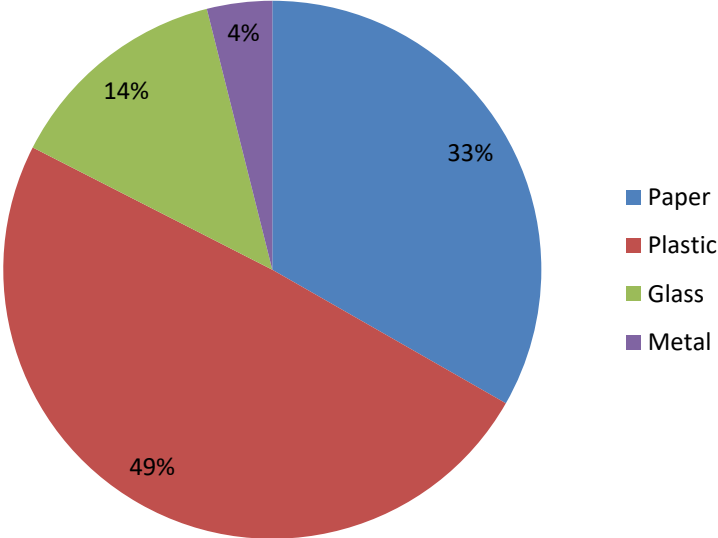


Recycle

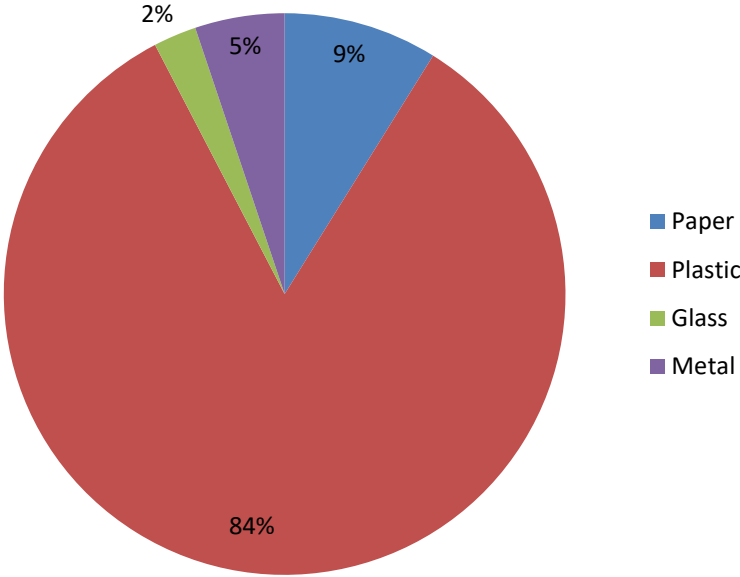
- Expect to start with limited waste streams, but more will be possible in the future
- Segregation must be excellent- mixed or dirty waste will be worthless
- Create space to store enough waste for it to be profitable for a recycler to collect
- Negotiate motivating uses of income, eg offset the cost of waste management, bonuses for staff

Resource and cost recovery from recycling

Waste sold



Income from waste sales



75-90% of healthcare waste is general municipal waste

70% of general waste is recyclable

Even syringes can be recycled if needles are cut and they are disinfected

Value of recyclables from vaccination waste

| Material | Syringe plastic | Plastic packaging | Cardboard packaging | Paper packaging | Vials and ampoules | Aluminum vial caps | Total |
|---------------------------------|-----------------|-------------------|---------------------|-----------------|--------------------|--------------------|----------|
| Value/kg (\$) | \$0.33 | \$0.23 | \$ 0.07 | \$ 0.06 | \$ 0.003 | \$ 1.29 | n/a |
| Value/100,000 vaccinations (\$) | \$81.68 | \$7.88 | \$9.47 | \$ 2.19 | \$ 0.07 | \$2.94 | \$102.03 |

Data from Nepal, 2014. All components except cut syringe needles could be sold once disinfected.

Funded by a grant from the Bill and Melinda Gates Foundation through the Grand Challenges Initiative

Treatment and disposal

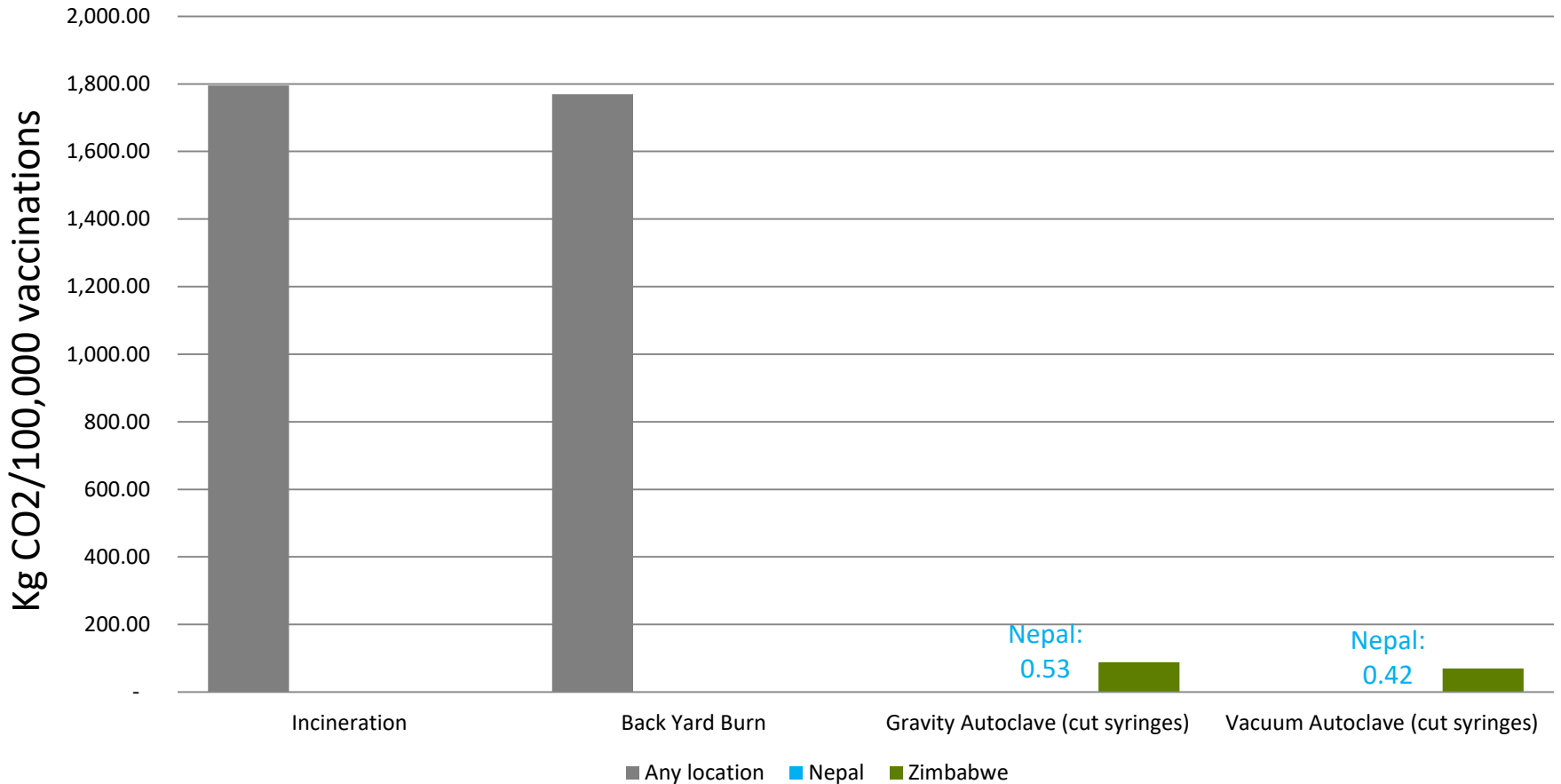
- Non-burn waste treatment
 - Lower emissions than burning, avoids toxic/POPs pollution, saves recyclables
- Biodigestion
 - Applicable to most organic waste streams, including pathological waste/placenta
 - Biogas is mostly methane, burning it reduces carbon footprint

Autoclaving immunisation waste

Needles and hubs were cut from syringes at the point of use. Syringes were collected, transported in locally made, lockable, aluminium high capacity sharps bins. Cutting needles and using these bins allowed 3x more syringes to be treated than using standard sharps boxes.



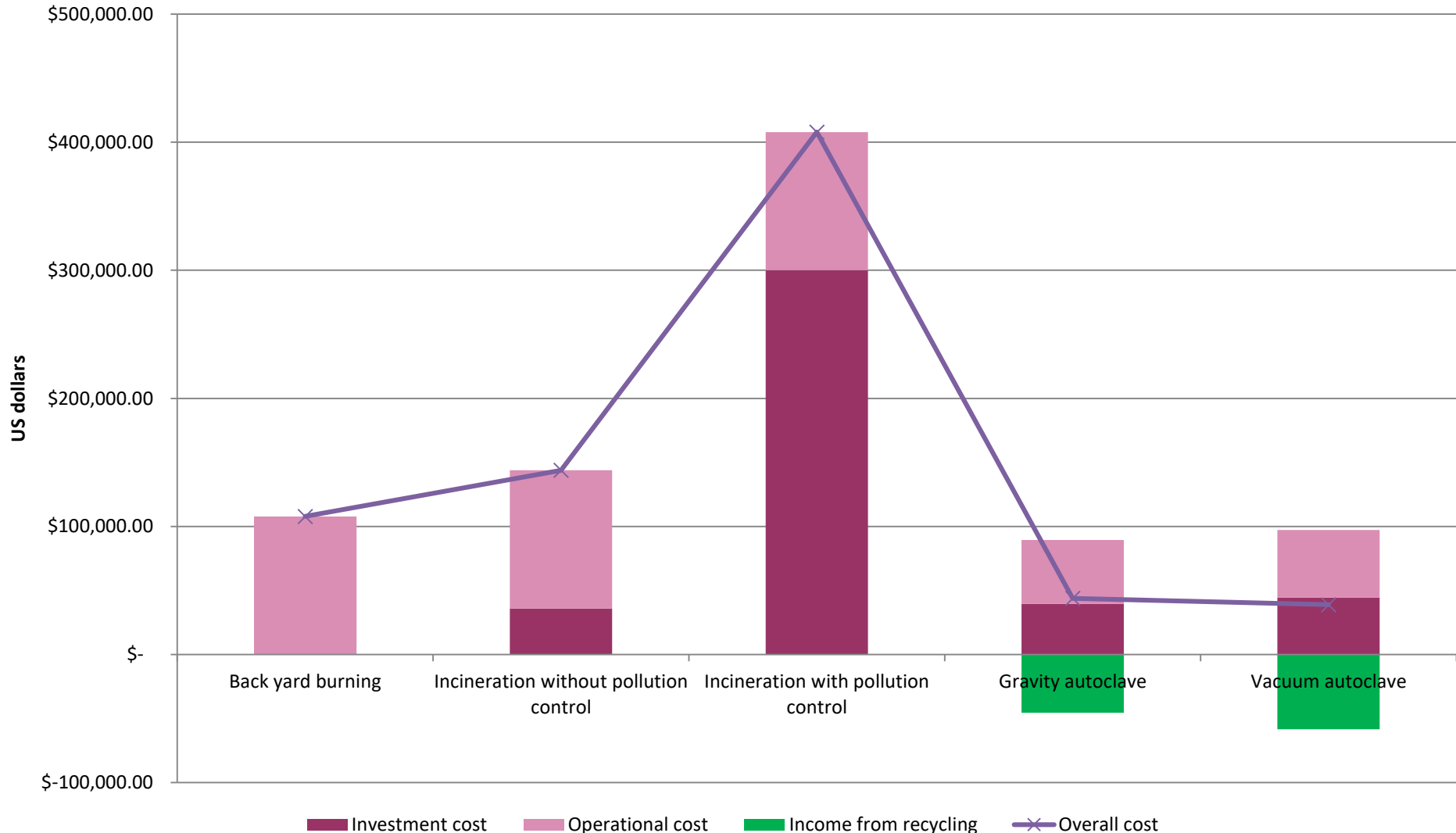
Carbon footprint - burn vs autoclaving



Note- Nepal mostly generates its power from hydroelectric sources, so the carbon footprint of grid electricity is very low in comparison to most countries. Zimbabwe is more typical for a low income country

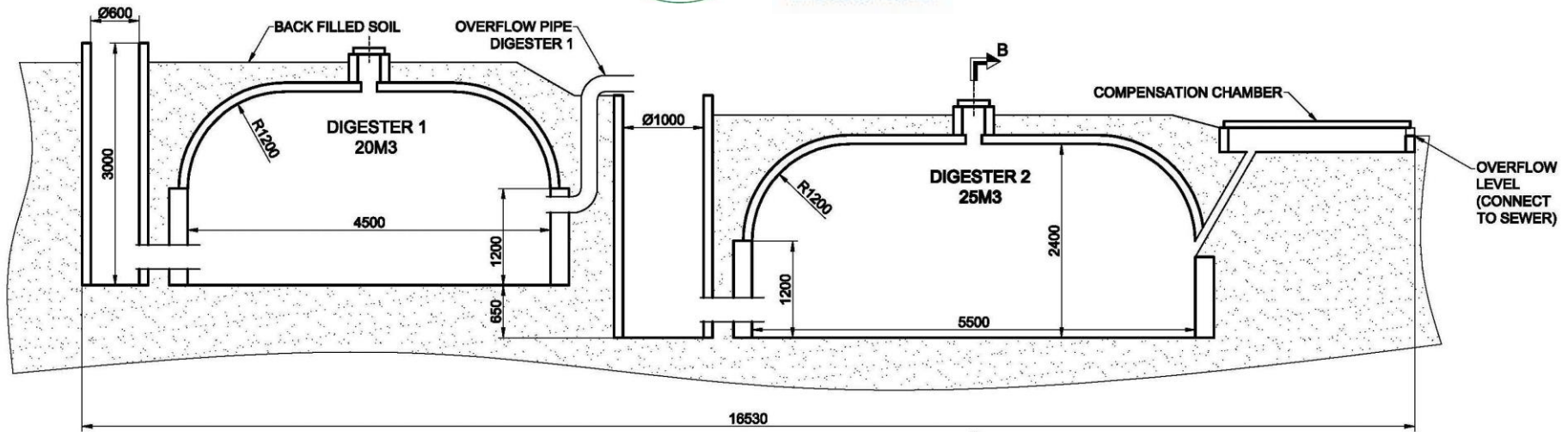
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Autoclaving is cheaper than incineration



NEPAL

- Biodigesters at major hospitals including KMC and TUTH
- 2-chamber design to maximise retention time (>90 days for placenta)
- Gas value of over 2 US cents per kg of waste treated
- Digestate goes to sewer without further handling
- Potential lifetime 20+ years



Mwanayamala hospital, Tanzania

- 250 bed hospital
- 60 deliveries per day
- Placentas input directly from maternity unit
- Food input via hatch outdoors
- Construction ~\$10,000



- ~25kg placenta + ~25kg food = 2.5m³ gas every day
- Biogas is 65% methane, 35% CO₂. Methane is 25-40 x more potent greenhouse gas than CO₂, burning it reduces carbon footprint



Will biodigestion work for you?

- Capable designers/construction companies
- Capacity for basic maintenance (eg piping, burners)
- Minimum 10-12kg of waste/day to generate significant useful amounts of biogas
 - Can also be adapted for smaller situations eg healthpost toilets and organic wastes
- Space that will not be built on (or cars parked)
 - Ideally close to waste sources
- Source of water to keep digester contents flowing
 - Min 1litre water/kg waste. Too much reduces retention time
- Connection to sewer or septic tank for digestate
- Location for use of gas
 - As close as possible to digester
 - Acceptance by users

Resilience/Disaster preparedness

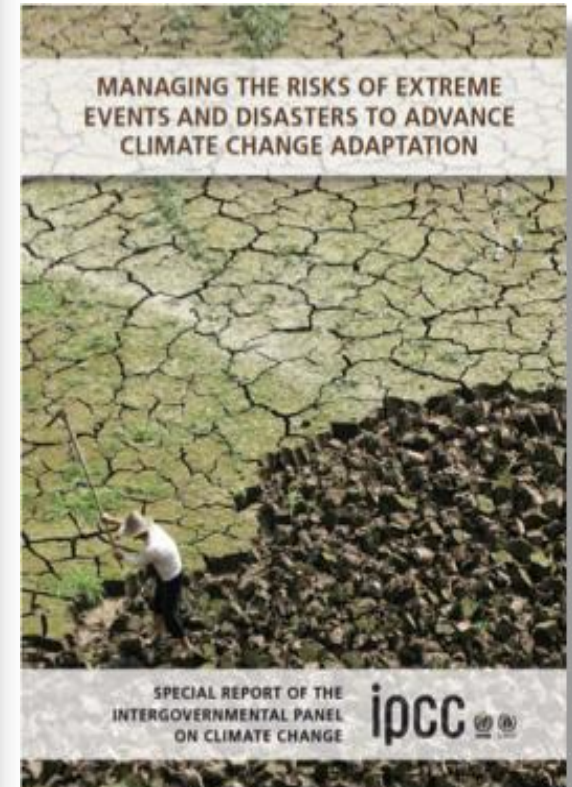
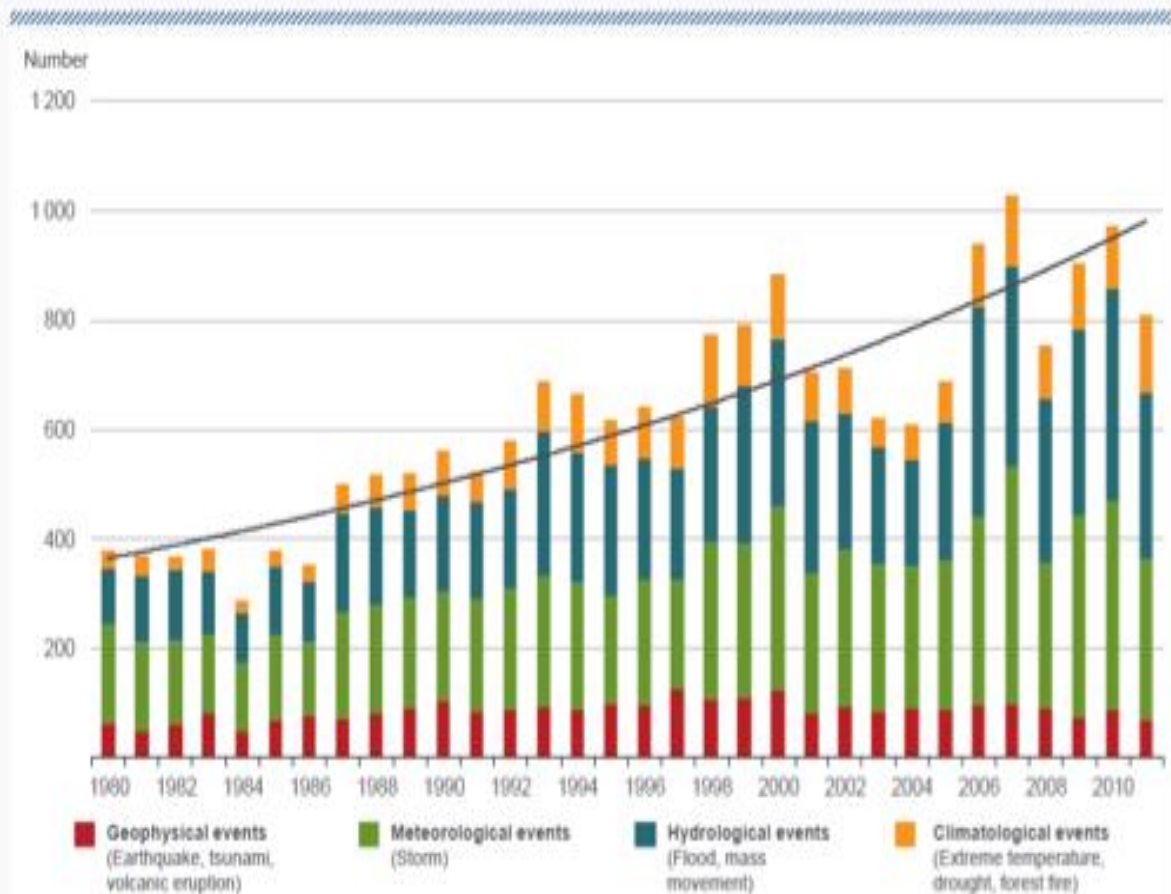


NatCatSERVICE

Natural catastrophes worldwide 1980 – 2011



Number of events with trend



Resilience/ Disaster preparedness

- Climate- related emergencies are already increasing
- Good HCWM will reduce risk of disease spread during emergencies
- Very hard to put in new practices during an emergency
- Train and vaccinate staff so they can work safely even in extreme situations
- Waste management needs to be included in disaster planning and training

The Gorkha Earthquake 2015

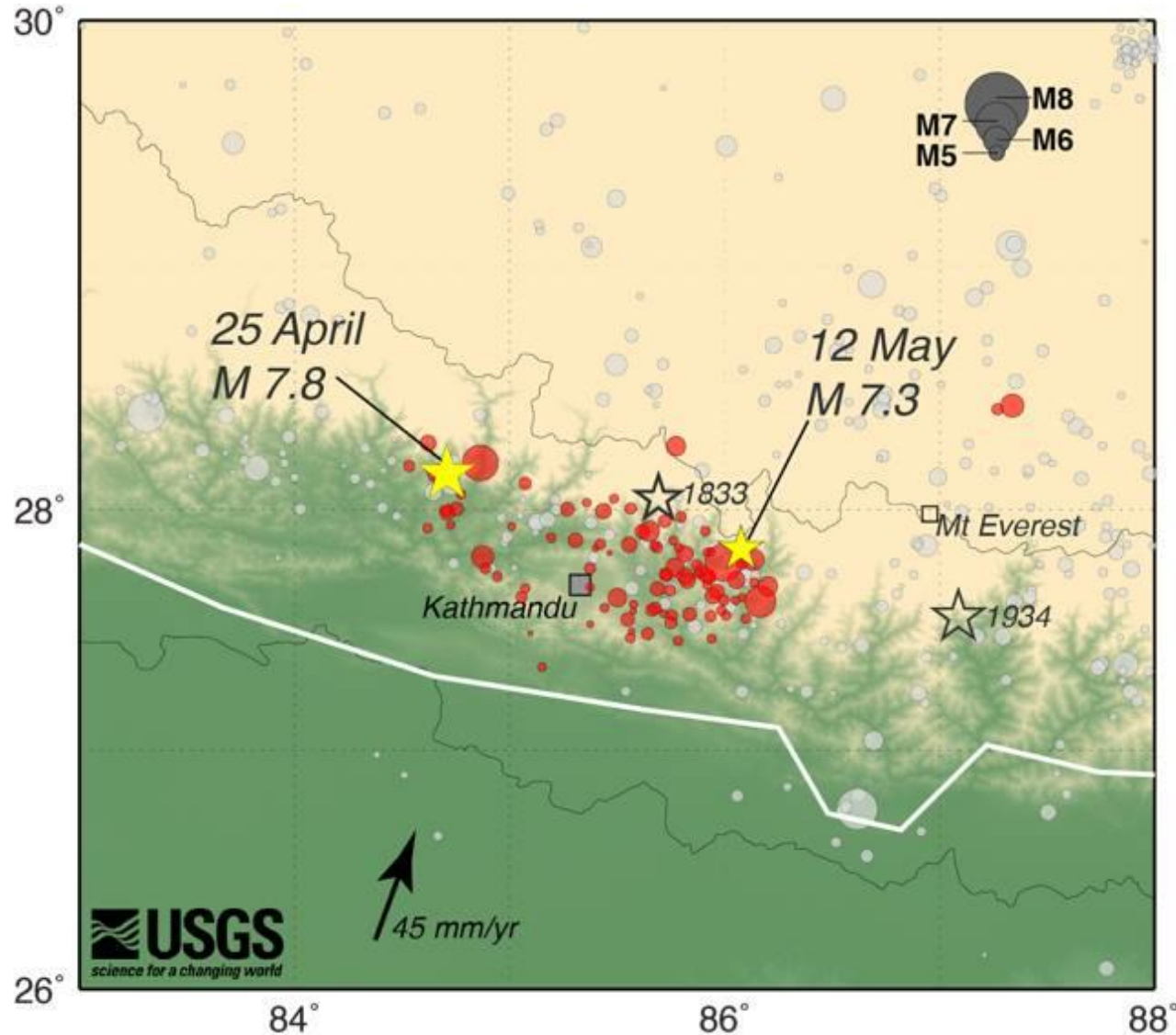
Occurred just before noon
on Saturday 25th April, 2015

Over 8,000 fatalities and
22,000 injured

1,000 healthcare facilities
damaged or completely
destroyed

HCWH was collaborating
with local NGO HECAF to
help Nepali hospitals
manage healthcare waste

How did our hospitals fare
and what lessons can be
learned about resilience
against disaster?

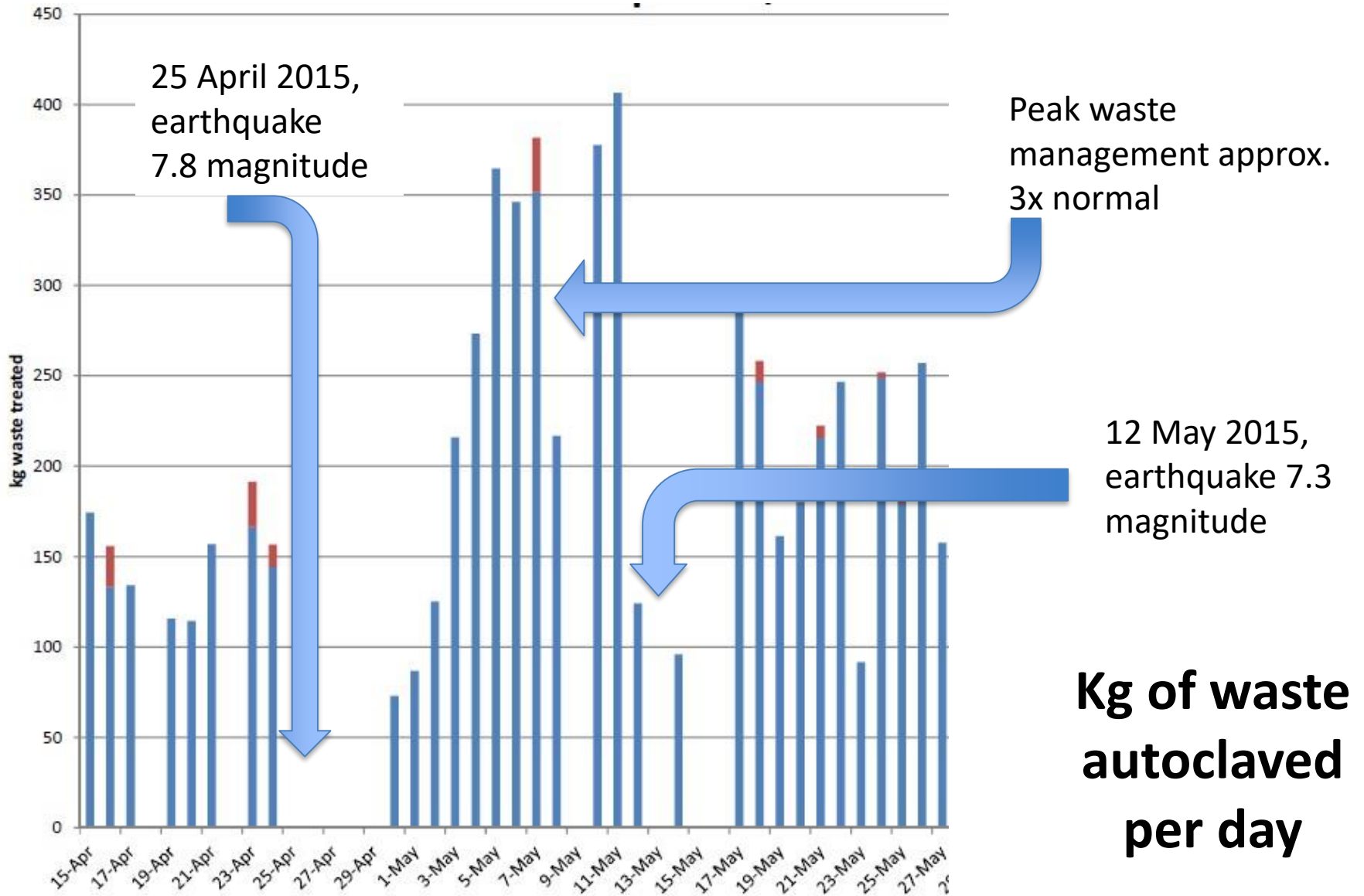




Partner hospitals waste management- segregation, autoclaving, recycling



Government hospital/Trauma centre



HCWM lessons from the Gorkha Earthquake

- Extra waste volume
 - NOT a problem, the systems could take extra waste
 - Well trained, dedicated HCWM staff continued work
- Segregation systems faltered
 - Pressurised staff did not regard it as a priority
 - Volunteers did know the system
 - Hospital wards were moved
 - Waste bins and needle cutters were left behind
- **Waste management needs to be included in emergency planning and training**
 - Needle cutting especially important if segregation fails
 - Site HCWM away from flood areas, protect power supply
 - Field hospitals have no healthcare waste management

www.noharm.org, www.greenhospitals.net

THANK YOU!

