

A close-up photograph showing a person's hand holding a clear plastic bottle with a blue cap, pouring a green liquid into a yellow funnel. The funnel is placed over a grey plastic bag. In the background, another yellow funnel and a blue funnel are visible, also over grey plastic bags. The scene is set outdoors with green foliage in the background.

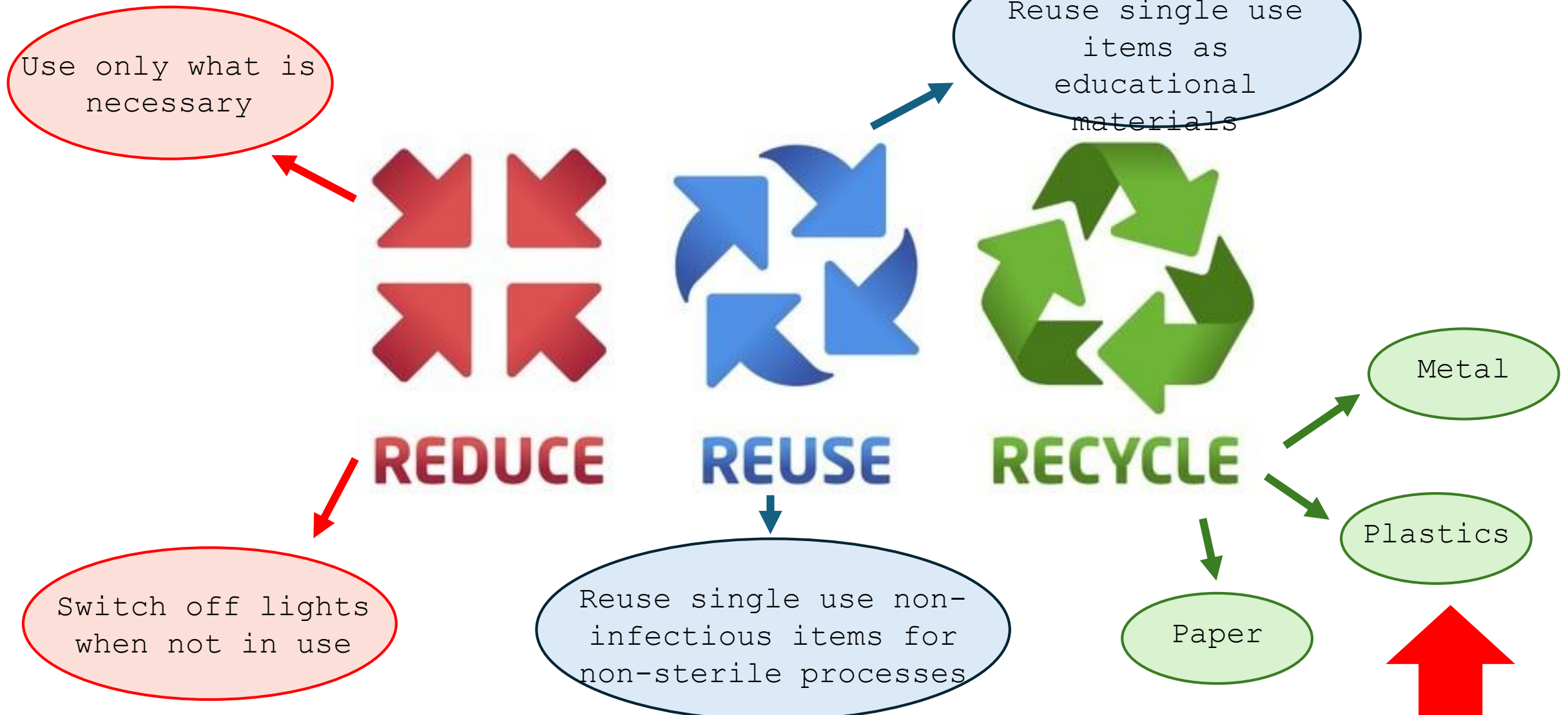
Healthcare segregation
of healthcare waste in
ICU

Why is recycling important?



- Healthcare contributes 3.4% of Singapore's emissions - second globally in healthcare per capita emissions
- ICUs can generate up to 60% of recyclable waste but recycling opportunities are often missed

Where are the opportunities?



What is our current burn rate?

Burn rate per annum

= plastics waste (%) × number of patients × number of days

- Average waste consumed per 24 hours per patient = 11.82kg
- Plastics waste generated per patient per 24h = $\frac{0.35kg}{11.82kg} = 2.96\%$
- Plastics waste generated in 1 year (assume 14 patients) = $0.35kg \times 14 \text{ patients} \times 365 \text{ days} = 1788.5kg$
- CO₂ EF = 1871.92226 = 1872

What are the current perceived barriers to recycling?



Perceived infectious risks



Lack of recycling facilities



Lack of education/awareness about recycling



Financial concerns



Lack of incentives, presence of disincentives



Lack of time



Lack of available staff



Lack of leadership, hospital administration support

Overview of solution



Increase ease of waste segregation

- 1. Design and label collection boxes for clean recyclable plastics/paper
2. Easy and accessible location for waste segregation
3. Integrate process of recycling as part of usual nursing care processes



Involve relevant stakeholders

1. Environmental-sustainable ICU core group with key stakeholders (nurses, consultants)
2. Regular meetings (briefings, daily huddles), education programs (CME)



Engage community partners

1. Collaborate with local companies for recycling of plastic waste

Our ICU setup

- Currently no infrastructure for recycling

Visual aids to act as reminder for recycling



Movable cupboard to create more space

Potential location of recycling bin



Examples of recycling bins

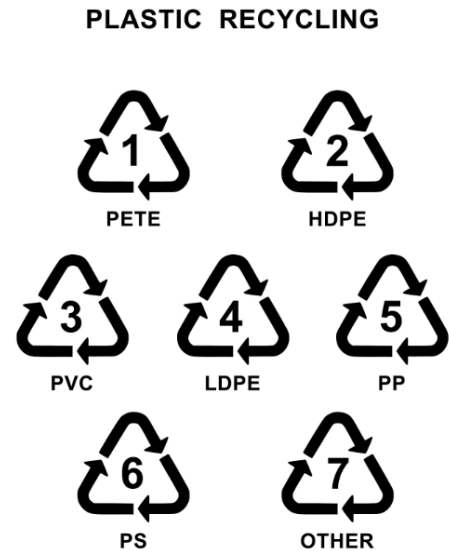
Information on types of plastics to be recycled

Made of cardboard (sturdy, recyclable)



Big signs as cognitive aid to encourage waste segregation

Educational resources



- Educational e-learning videos on types of recyclable plastics, importance of recycling
- Address common FAQs, concerns

- Simple posters illustrating everyday common medical plastics that can be recycled
- Can include QR codes for more information

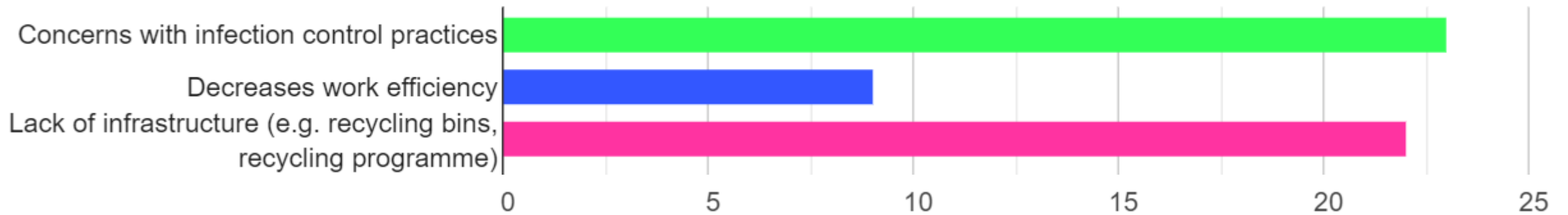
Engagement of community partners

- Collaborate with existing partners e.g.
 - Plaspulp Union: for collection of recyclable plastics
 - Semula Asia: for conversion of plastic waste into new materials
- Local companies (e.g. Lian Gim Trading) can recycle plastics including PVCs
- Recycled into plastic bags, cable covers, garden hoses

Feasibility and uptake

- Survey of ICU nurses + consultants on interest and feasibility of waste segregation in ICU
- **79.4%** of respondents had worked >5 years in ICU
- **88.2%** of respondents expressed interest, **61.7%** were likely to actively segregate ICU waste (8, 9, 10 on 10-point Likert scale)
- **79.4%** of respondents felt that waste segregation was feasible
- **9.7%** of respondents **would not actively** segregate waste

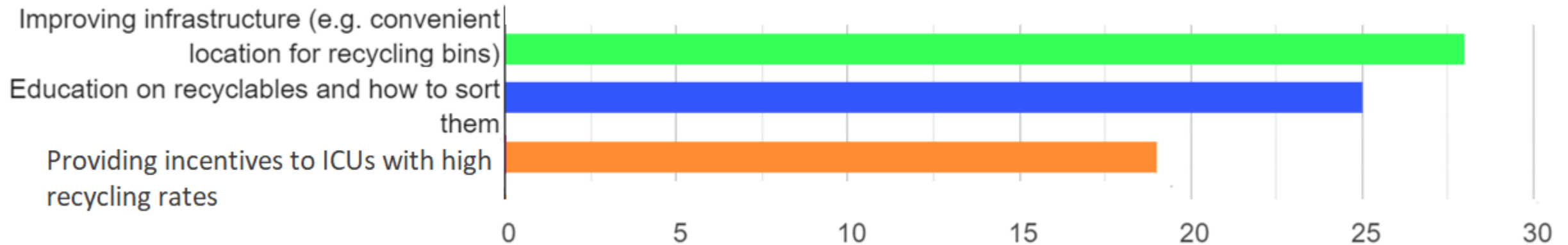
Perceived barriers



Other responses

- Difficult to segregate waste in emergency situations
- Lack of time and space
- Lack of knowledge with regards to "clean" vs. "infectious" waste

Strategies to improve uptake of recycling



Other responses

- Having a larger scale pilot study to test uptake in ICU
- Scale down on specific plastic wastes to be segregated

Our small pilot study in 1 ICU

- Staff willing to segregate plastics from waste
- Waste still may be inappropriately sorted into wrong bins
- Concerns about infectious risks leading to IV





Consists of "paper" and "plastic" that needs to be separated and thrown into correct bins



Non-plastic waste separated from plastic wastes

Future expansion

- Improving infrastructure
 - Large recycling waste bin in the common area of the ward + smaller individual bins in every patient's room
 - Visual aids on recycling bins
- Involving hospital leadership
 - Discussion with ID on infectious vs non-infectious waste
 - Sustainability champion/office
- Engaging community partners
 - Multiple different vendors that have different requirements as to recyclable waste
- Upscaling
 - Further expansion to other ICUs and GW (hospital-