

The Financial and Environmental Costs of Reusable and Single-use Plastic Anaesthetic Drug Trays

Forbes McGain,¹ Scott McAlister,² Andrew McGavin,³ David Story.⁴

¹Anaesthetist and Intensive Care Physician, Western Hospital, Footscray, Victoria 3011, Australia.

²Life Cycle Analyst, Eco Quantum, Melbourne, Victoria, Australia.

³Bioengineer, Western Hospital, Footscray, Victoria, Australia.

⁴Anaesthetist, Austin Hospital, Heidelberg, Victoria, Australia.

There is increasing interest in the environmental effects of health care which are responsible for approximately 3% of all carbon dioxide (CO₂) emissions in the UK. We modelled the financial and environmental costs of two commonly used anaesthetic plastic drug trays. We proposed that, compared with single-use trays, reusable trays are: less expensive, consume less water, and produce less carbon dioxide (CO₂); and that routinely adding cotton and paper increases financial and environmental costs.

Methods: We used life cycle assessment (LCA) to model the financial and environmental costs of reusable and single use trays. In brief, an LCA has inputs (such as the CO₂ emissions and water use for electricity from brown coal) which are combined to form a process (such as the CO₂ emissions and water use for making plastic trays).

Results: From our LCA modelling, the reusable tray cost (Australian dollars) \$0.23 (95% CI: \$0.21 to \$0.25) while the single-use tray alone cost \$0.47 (price range of \$0.42 to \$0.52) and the single-use tray with cotton and gauze added was \$0.90 (no price range in Melbourne, Australia). Production of CO₂ was 110g CO₂ (95% CI: 98g to 122g CO₂) for the reusable tray, 126g (95% CI: 104g to 151g) for single-use trays alone (mean difference of 16g, 95% CI: -8g to 40g) and 204g CO₂ (95% CI: 166g to 268 gCO₂) for the single-use trays with cotton and paper. Water use was 3.1L (95% CI: 2.5L to 3.7L) for the reusable tray, 10.4L (95% CI: 8.2L to 12.7L) for the single-use tray and 26.7L (95% CI: 20.5L to 35.4L) for the single-use tray with cotton and paper.

Conclusion: Compared with reusable plastic trays, single-use trays alone cost twice as much, produced 15% more CO₂, and consumed three times the water. Packaging cotton gauze and paper with single-use trays markedly increased the financial, energy and water costs. On both financial and environmental grounds it appears difficult to justify the use of single-use drug trays.