50th Annual Regional Anesthesiology and Acute Pain Medicine Meeting
May 1-3, 2025 | Orlando, FL

A life cycle assessment of a peripheral nerve block premade pack: How far has that syringe travelled?

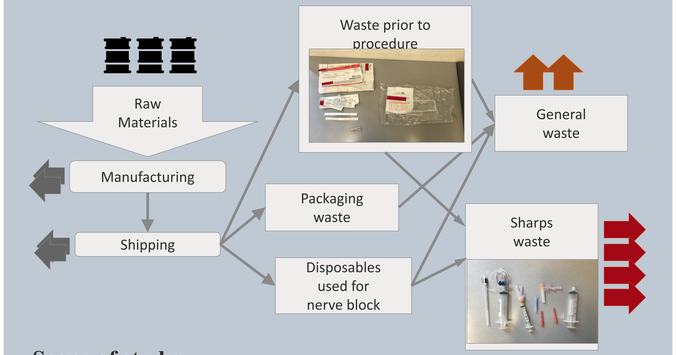
E.B. Fouts-Palmer MD[1], Deirdre Kelleher MD[1], Rakesh Sondekoppam MD[2], Timur Ozelsel MD[3], Vivian Ip MD[4]

Weill Cornell Medicine Anesthesiology

1. Weill Cornell Medicine, New York
2. Stanford Medicine, Stanford, California
3. University of Alberta, Edmonton, AB, Canada
4. University of Calgary, Calgary, AB, Canada

Introduction

- Climate change and environmental pollution is a significant global public health threat (1).
- Disposal of single-use medical equipment represents a source of environmental harm (2).
- Operating rooms are estimated to produce a quarter of all the trash generated in a typical hospital, with up to 30% of this waste attributed to anesthesia care (3).

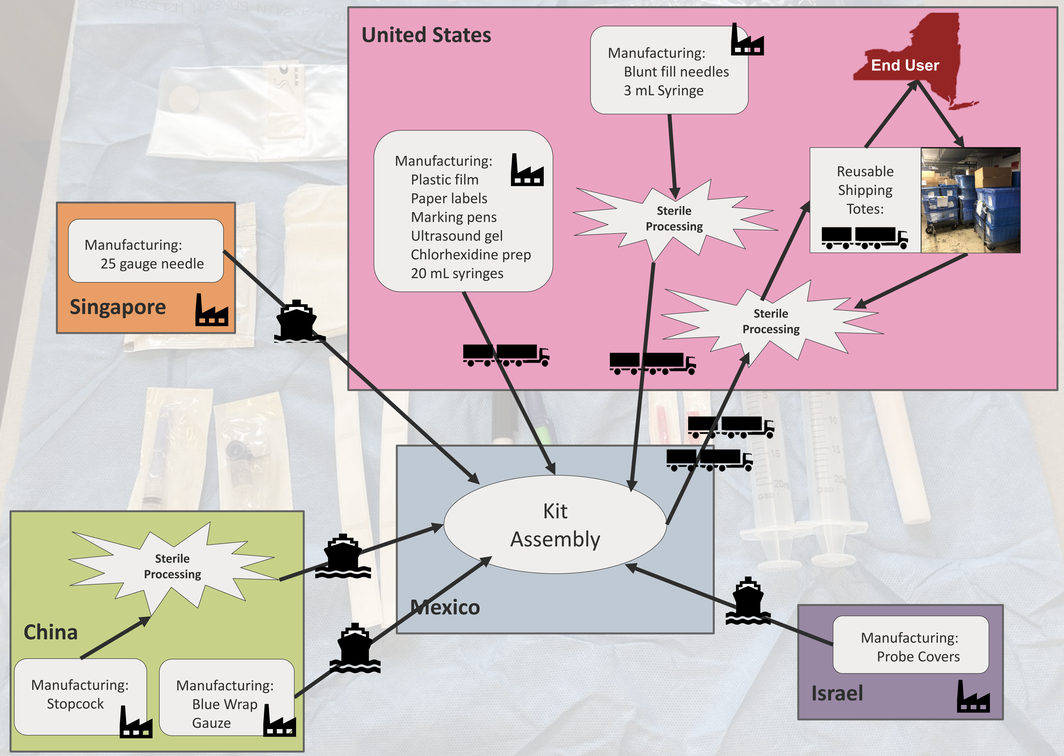


Scope of study:

Disposable used to set up for one single-injection ultrasound-guided peripheral nerve block with a stimulating needle, with 30 mL local anesthetic used in the nerve block and 3 mL to anesthetize the skin.

NOT within scope:

- Local anesthetic medications
- Ultrasound use
- Operating room time
- Energy consumed in the facility
- Sedation equipment and medications



About two thirds of the 213.88g of disposable materials used in each peripheral nerve block is composed of various types of plastics.

References
1. Romanello M, et al. Lancet. 2024 Nov 9;404(10465):1847-1896. PMID: 39488222
2. McBride JP, Meyer MJ. APS) Newsletter. 2022;37(2).
3. McGain F, et al. Br J Anaesth. 2020 Nov;125(5):680-692. PMID: 32798068
4. Leapman MS, et al. Eur Urol. 2023 May;83(5):463-471. PMID: 36635108.

Discussion

- A single premade pack for peripheral nerve block requires a supply chain with global reach. (1,780 kg·km total shipping)
- This preliminary lifecycle inventory illustrates the disproportionate use of disposable plastics in healthcare.

Next steps:

Our multicenter team is working to expand this preliminary lifecycle inventory into a complete cradle-to-grave lifecycle analysis to compare the environmental impact of regional anesthesia with and without premade packs.

Material	Amount per peripheral nerve block (g)
Total plastics	142.78
Water	22.10
Paper (including cardboard shipping packaging)	21.5
Woven cotton	14.45
Isopropyl alcohol	7.35
Glass	4.19
Other chemicals (1)	1.02
Steel	0.40

Table 1: Summary of life cycle inventory of disposable materials used to set up for one single-injection ultrasound-guided peripheral nerve block.

(1) "Other chemicals" includes additional ingredients in isopropyl alcohol-based chlorhexidine prep solution (chlorhexidine digluconate, FD and C Yellow No. 6), and in water-based ultrasound gel (propylene glycol, carbomer, triethanolamine).

Connect with #ASRAGreenSIG at ASRA.com!