Supplemental Information for

**Life Cycle Assessment and Costing Methods for Device Procurement: Comparing Reusable and Single-Use Disposable Laryngoscopes**

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**Section Information: Cleaning and repackaging protocols**

Details on the cleaning and re-packaging protocols used at YNHH are provided below:

* *Low-Level Disinfection (LLD)*. CaviWipes®[[1]](#footnote-1) are single-use disposable towelettes soaked in isopropanol (17.2%), ethylene glycol monobutyl ether (1-5%), diisobutylphenoxyethoxyethyldimethylbenzylammonium chloride (0.28%) and water (70-80%). It is assumed that ¼ of a wipe is required to clean each reusable handle (as the wipe is also used on the anesthesia machine surface), with 30 second treatment time by anesthesia tech staff.
* *High-Level Disinfection (HLD).* Reusable equipment is disassembled, and then soaked and manually decontaminated (scrubbed) in an enzyme bath of Renuzyme Plus, 1,2-propylene glycol 10-30% and 1-decanamine, *N*,*N*-dimethyl-, *N* oxide 0.5-1.5%. An average of 0.3 g of enzymatic cleaner are attributed to the decontamination of a single component in the bath. Next, equipment is disinfectedin an industrial washing machine (Getinge 8666) using Getinge washer detergent at 47 °C for 33 minutes. Each tray requires 0.30 kWh electricity, 975 g of steam, 22 L of water and 0.5 g of detergent. Maximum efficiency loading is assumed, 180 handles or 180 tongue blades and light pipes per wash cycle, to proportion attributions. After a reusable tongue blade or handle is disinfected, rinsed and dried, each is separately reassembled.
* *Packaging.* Each assembled tongue blade or each assembled handle is then placed (along with a sterile indicator test strip if destined for STZ) into a peel-pack made of polypropylene film and paper, and heat-sealed (Rennco LS). Energy impacts for the sealing were negligible and excluded. Handles treated to LLD are not processed in CSS and therefore not repackaged. Batteries are inserted either in CSS or by Anesthesia Tech staff, without difference in costs or impacts.
* *Sterilization (STZ)*. Reusable equipment is disassembled and decontaminated as with HLD, noted above. Repackaged tongue blades and repackaged handles are then placed on a tray. The steam sterilization autoclave machine (Getinge 833HC) is run for 55 minutes at 135 °C. Each tray requires 3.1 kWh of electricity and 50 kg of steam. Maximum efficiency loading is assumed, 240 assembled blades or 240 assembled handles, for per-use component attributions

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | ***Disassembly*** | ***Decontamination / Disinfection*** | ***Re-Assembly*** | ***Re-Packaging*** | ***Sterilization*** | ***Total Labor Time Observed*** |
| ***LLD*** | ***Handle*** |  | Wipe clean with disinfection cloth between cases |  |  |  | 30 Seconds |
| ***Blade*** |  |  |  |  |  | N/A |
| ***HLD*** | ***Handle*** | Unscrew cap, remove batteries, replace cap | Soak in enzyme bath and manually scrub. Load into and send through washing machine | Unscrew cap, replace batteries, replace cap, test light | Insert into pouch and seal |  | 90 Seconds |
| ***Blade*** | Remove fiber optic conduit | Replace fiber optic conduit |  | 90 Seconds |
| ***HLD &  Sterilization*** | ***Handle*** | Unscrew cap, remove batteries, replace cap | Soak in enzyme bath and manually scrub. Load into and send through washing machine | Unscrew cap, replace batteries, replace cap, test light | Insert into pouch with sterile strip indicator and seal | Load, run, and unload autoclave | 120 Seconds |
| ***Blade*** | Remove fiber optic conduit | Replace fiber optic conduit | 120 Seconds |

**Table S1. Time-motion study for reprocessing of reusable components.** *Note*: the sterilization process is preceded by high-level disinfection. *Abbreviations*: MU=multi-use reusable, SU=single-use disposable, LLD=low-level disinfection, HLD=high-level disinfection, STZ=sterilization

1. Metrex® Research. CaviWipes® Material Safety Data Sheet. <http://www.metrex.com/sites/default/files/content/education-file/education-file-upload/msds-us-en-caviwipes.pdf> (Accessed on February 22, 2016). [↑](#footnote-ref-1)