

# LARYNGOSCOPES: Disposable vs Reusable

(vs Budget /Human Resources /Environment /Infection Prevention /Practice Guidelines)

## Expert Guidance Document

Prepared by Sharn Anesthesia, September, 2014

*The question of whether to implement disposable vs. reusable anything has been waged in healthcare for decades. When it comes to laryngoscopes, there are so many factors in the debate that one is easily tempted to put the pillow back over their head, hit the snooze alarm and worry about it tomorrow. Unfortunately recent attention from JCO and others makes that a nearly impossible approach.*

*As one of the largest distributors of multiple brands of laryngoscopes in the US, Sharn Anesthesia has a solid background and extensive experience with both reusable and disposable laryngoscopes. We used that broad understanding to develop the following guidance document to help you navigate the conversation. There is not a one-size-fits-all solution so our goal here is just to present some real-life considerations for your team to discuss.*

### Why now?

Why is this a hot topic now? There are two primary drivers:

- 1) **Joint Commission.** JCO and other organizations have made reusable blade and handle reprocessing a focus. They are looking for evidence of a consistent and repeatable practice that demonstrates how both the handles and the blades are processed and stored. For facilities who previously mainly wiped handles after procedures rather than sending them for reprocessing this will be a significant change.
- 2) **Infection Prevention Initiatives.** Most health organizations are focusing on everything they can do to prevent HAI's. Making sure reusable devices are thoroughly reprocessed after every use is a key. A recent assessment<sup>1</sup> of 64 laryngoscope handles found bacterial contamination on 86% of them suggesting these concerns are well founded.

### The Challenge (with reusables):

Reusable handles and blades all come with disinfection and sterilization instructions. So, what's the challenge? There are potentially several:

- **Inventory** – do you have enough reusable blades and/or handles to circulate through cleaning and sterilization?
- **Time** – do you have enough time and human resources to disassemble, reassemble and inspect?
- **Blade Wear & Tear** – most fiber optic blades are glass and stainless steel. They withstand frequent sterilization pretty well although over time it takes its toll. Those blades with removable bundles require added time to disassemble, reassemble, inspect and then you hope there are no criss-crossed parts.
- **Handle Wear & Tear** – now here is a problem! Fiber optic handles have wiring, springs for the on/off mechanism, bulbs and batteries. While they come with approved disinfection and/or sterilization methods, the truth is that most aren't holding up under the increased frequency of this stress. There is a big difference between wiping it down after each use and only sterilizing weekly to sterilizing after every use. Industry wide, across all brands, we are seeing increased failure rates with handles.

Newer LED bulbs present an even greater challenge. While they provide brighter illumination they are far more temperamental than the Xenon or Halogen versions. In some models the bulb cannot be replaced either so once it is blown from over processing the whole handle may have to be replaced.

All reusable handles have to be disassembled to some degree. At the very least, batteries, or battery cores, have to be removed. That means added time to reassemble and inspect. Furthermore, if they are sterilized in a regular peel pouch then the pouch has to be opened to insert the batteries and test prior to use. Either the integrity of the pouch is breached prior to use or surgery is delayed for this step.

- **Flickering**– let's face it, this happens; and all too often at the worst possible moment. It is not a new problem but now it is preventable.

## The Environment:

Whenever we consider disposable medical waste we can't help but think about the environment impact. There is not much recycling of medical waste yet. It is sad but so far, true. On balance, keep in mind that reprocessing carries with it the environmental burden of chemical wastewater. Another, especially significant consideration, in our mind, is disposing of batteries and bulbs. No doubt this is a point often discussed by the Green Team and Infection Prevention Team at your organization. For our part, Sharn has made a commitment to donate a portion of our disposable laryngoscope profits to national environment charities on an annual basis to offset some of the inevitable impact.

## The Solutions:

Because the challenges with blades and handles are different, we recommend you consider each separately while keeping in mind that together they create one system. Naturally provider preference and compliance will play a role as well.

- 1) **Keep a totally reusable system and buy more inventory.** If you have the human resources and facility resources to handle the added reprocessing load then this could be your answer. Be sure to consider the care your staff generally gives equipment. Some facilities experience higher rates of loss and so this may not be the right choice for all. If you do go this route you'll probably need more inventory. Sharn recommends:
  - a. **Blades** – with integrated bundles. They are easier to clean and require no disassembly. Generally these blades are crafted of a better grade of steel too which leads to a longer life.
  - b. **Handles** – with a double barrel design. The outer shell is easily reprocessed and the inner battery core can still be wiped down. Note there is still some minor reassembly required.
- 2) **Disposables all the way.** This is certainly the most efficient solution. It saves time, virtually eliminates risk of cross contamination, may reduce HAI's and greatly reduces the headaches of dealing with non-performing equipment. It is quite likely a very cost effective scenario as well once you factor in time, labor and reprocessing costs. Remember, with this option you'll cut out most of your bulb and battery costs too. If you go with this solution, there are lots of options. Sharn recommends:
  - a. **Blades** – stainless steel. Prices are now under \$5.00 per patient. Plus, you will generally realize better provider compliance with stainless vs. plastic. As an added benefit, according to one study, disposable metal blades actually lead to improved first-try intubation success rates due to better illumination than reusable blades.<sup>2,3</sup>
  - b. **Handles** – this comes down largely to price and preference. Prices range from \$4 to \$12 with most in the \$6 to \$10 range. Almost all come pre-loaded with batteries so you have the advantage of a fresh battery and bulb for every intubation. Many even have an LED bulb so the providers will have the excellent illumination they generally prefer. Materials include plastic, silicone or aluminum.
  - c. **Handle/Blade pre-pack** – if you are going to go all disposable then you might even want to consider combination units that have the blade and handle pre-assembled and packaged together. If your team generally only uses 3 or 4 sizes of blades this might be a good option. If they use 7 or 8 sizes of blades you could find storage to be a challenge.
- 3) **Reusable blade / disposable handle** – very good option, especially for lower volume facilities and/or organizations with a strong provider preference for reusable blades. The handle is the hardest to reprocess effectively anyway so if you're only going to use one part disposable this is the right choice.
- 4) **Disposable blade /reusable handle** – not recommended if you are going to sterilize handles after every use and you use them daily.
- 5) **Handle Skin (Reusable “engine” core & Disposable skin)** This is the most cost effective, energy efficient and environmentally friendly option under the disposable heading. We say “environmentally friendly” because you are not tossing out the batteries and bulbs after every use. As with all of these options, there are some special considerations:
  - a. Is your staff diligent about keeping the reusable part?
  - b. An effective skin should not slip, it should be rigid.
  - c. An effective skin should fully isolate the blade from the handle. Check around the bulb to make sure it is separated from the blade.

## The Budget:

This is always a crucial part of the decision. Our advice is to look at it from the high level, total facility view rather than the departmental level. To say that sterilizing is “free” because it is done in another department could be short sighted if it leads to diminished life of equipment and failures.

The tough part is analyzing your actual costs. This worksheet may help you get started. You may have additional costs and at the same time may decide that some of these don't apply. That's fine, it is just intended to get you started.

Number of O.R.'s: \_\_\_\_\_

Total number of carts with laryngoscope inventory: \_\_\_\_\_

Total number of laryngoscopies annually \_\_\_\_\_

### **Reusable Laryngoscope Blade & Handle Sterilization Costs in Central Supply** **Annual Cost**

# of blades to be resterilized in CS per year for OR (6' cycle each for labor) \_\_\_\_\_

# of handles to be resterilized in CS per year for OR (6' cycle each for labor) \_\_\_\_\_

Cost of sterile water (\_\_\_\_\_ cases per week) \_\_\_\_\_

Cost of cleaning solution \_\_\_\_\_

Cost of bags & labels used each year in CS \_\_\_\_\_

Cost to run drying oven for blades & handles \_\_\_\_\_

Autoclave costs \_\_\_\_\_

### **Reusable Laryngoscope Blade & Handle Sterilization Costs in Anesthesia (or elsewhere)**

Cost of cleaning blades by Anesthesia team per year \_\_\_\_\_

Cost of cleaning handles (incl disassembly, reassembly, testing) in Anesthesia \_\_\_\_\_

Cost of cleaning solution \_\_\_\_\_

Cost of batteries \_\_\_\_\_

Cost of bulbs \_\_\_\_\_

Cost of replacement blades (due to failure or loss) \_\_\_\_\_

Cost of replacement handles (due to failure or loss) \_\_\_\_\_

Cost of time spent on flickering and other “issues” (x hours /week x 52 weeks) \_\_\_\_\_

Cost of transporting laryngoscope to and/or from CS (x trips/day x 260 dys) \_\_\_\_\_

**Total cost** \_\_\_\_\_

**Total cost per intubation** (total cost ÷ total laryngoscopies) \_\_\_\_\_ \*

**\* If the answer is over \$12.00 per intubation (hint: average we hear is over \$17<sup>3</sup> to \$23.00), then an all disposable system will result in overall cost savings for your organization.**

## The Questions:

Once you understand your actual costs per intubation, per blade, per handle and per department, there are still a few more questions to consider before deciding on the right solution(s) for your organization:

- What is driving this decision? What is our goal?
  - Time and resource management?
  - Cost savings?
  - Infection prevention?
  - Standards?
  - Inventory Management?
  - Better illumination / more reliable equipment?
  - Other \_\_\_\_\_?
  - All of the above? (In that case, prioritize)
  
- Will the same solution be used for all locations? (often code carts are treated differently)
- Have we ever experienced “flickering” in our handles?
- How much staff is available to reprocess?
- How much time does staff have to test and troubleshoot?
- How often are we using our laryngoscopes / what percent of our cases are general vs. sedation?
- What is our cost of reprocessing blades?
- What is our cost of reprocessing handles?
- How often do we replace bulbs?
  - (for LED handles – can the bulb be replaced?)
- How often do we replace batteries?
- What is our cost of replacing failed equipment annually?
- How can we test the handle prior to use?
  - Do we have to open the package?

## The Answers:

This will vary based on institutional needs, budget, culture and resources. Sharn Anesthesia has one of the broadest lines of laryngoscopes available to help you with any direction you choose. Please contact your representative to discuss the best program for your institution at: **800-325-3671**.

**Thank you.**

### References:

<sup>1</sup>Contamination of laryngoscope handles, ScienceDirect, January 2010, D Williams, J. Dingley, C. Jones, N. Berry

<sup>2</sup> Comparison of Single-use and Reusable Metal Laryngoscope Blades, Anesthesiology, February 2010, Vol. 112, Amour, Julien M.D., Ph.D.\*, et al.

<sup>3</sup> Enhanced Direct Laryngoscopy: Managing Routine and Difficult Airways Using the Mcgrath MAC EDL, Anesthesiology News, August 2014, D Krhovsky, MD; D Leggett, MD; C Pelham, MD; W B Worthington, MD.