

## [Infection Prevention and Control Guideline for Flexible Gastrointestinal Endoscopy and Flexible Bronchoscopy]

| STEP OR PROCEDURE                                                                                                                                                                                                               | RATIONALE                                                                                                                                                                  | BARRIERS TO ADEQUATE REPROCESSING                                                                                                                                                                              |
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| <b>Pre-Cleaning (Immediately after use in procedure room)</b>                                                                                                                                                                   |                                                                                                                                                                            |                                                                                                                                                                                                                |
| 1. Wipe down the insertion tube of the endoscope with a soft lint-free disposable cloth or endoscope sponge soaked in freshly prepared enzymatic detergent.                                                                     | Reduces risk of worker and/or environmental contamination.                                                                                                                 |                                                                                                                                                                                                                |
| 2. Flush the air/water channels as per the manufacturer of the endoscope. Flush all other channels with enzymatic detergent solution at bedside immediately post procedure, followed by air.                                    | Removes gross debris and ensures patient material is not allowed to dry, which will impair reprocessing.                                                                   | The correct adaptors are to be used in order to properly flush all channels according to manufacturer's instructions.                                                                                          |
| 3. Remove all detachable parts (e.g., valves) and reprocess accordingly. Attach the water resistant cap, if appropriate. Transport in a covered container rapidly to reprocessing area before drying of patient material occurs | Prevents patient material from drying on scope and prevents environmental contamination.                                                                                   | Reprocessing done off-site; may have long transit time so that secretions dry on device.                                                                                                                       |
| <b>Leak Testing</b>                                                                                                                                                                                                             |                                                                                                                                                                            |                                                                                                                                                                                                                |
| 4. Perform leak testing as per manufacturer's instructions.<br><br><b>Note:</b> If a leak is detected, the endoscope must be repaired. Follow manufacturer's instructions.                                                      | If leaks are present, subsequent cleaning will allow fluid to enter the scope housing and cause damage.                                                                    | Patient material can enter scope housing and will not be accessible to cleaning; sequestered soil inhibits disinfection; the residual soil acts as a source of contamination if scope used on another patient. |
| <b>Manual Cleaning &amp; Rinsing</b>                                                                                                                                                                                            |                                                                                                                                                                            |                                                                                                                                                                                                                |
| 5. Completely immerse scope in enzymatic detergent solution.                                                                                                                                                                    | Enzymatic detergent improves cleaning ability by breaking down proteins. Immersion reduces aerosols, thereby reducing the infectious biohazard risk to reprocessing staff. | 1) Scope is not completely immersed, cleaning is not as well done.<br>2) Contact time with the enzymatic detergent is not adequate.<br>3) Full reprocessing of the                                             |

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|                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                   | <p>endoscope is not completed promptly. If patient-used endoscopes are allowed to soak in enzymatic detergent or remain wet overnight, this will facilitate biofilm formation.</p> <p>4) The enzymatic detergent is not properly diluted or the required temperature for activation of the product is not respected, which can lead to inadequate product performance.</p>                                                                                                                             |
| <p>6. Clean all exterior surfaces of the endoscope using a soft lint-free cloth or endoscope sponge while keeping the endoscope immersed. Use endoscope brushes to clean ALL channels while the scope is immersed. (NOTE: not all channels can be brushed - follow manufacturer's recommendation for channel cleaning). Repeat until all debris has been removed.</p> | <p>Brushing greatly improves the efficiency of the cleaning process.</p>                                          | <p>Inadequate brushing leads to residual patient material that can cause disinfection failure and lead to disease transmission between patients.</p> <p>Ensure that the brush used is appropriate for the type of endoscope and that the diameter of the bristle is adequate for the diameter of the channel. Inappropriate brushes may not dislodge biological materials or may damage the inside of the channels. Refer to the manufacturer of the endoscope for specifications of the channels.</p> |
| <p>7. Use manufacturer's cleaning adaptors to ensure adequate enzymatic detergent is flushed through ALL channels (including the elevator wire, forward jet, 2nd therapeutic channel, balloon channel), and soak in enzymatic detergent as directed by the manufacturer of the enzymatic detergent.</p>                                                               | <p>Residual material in any channel can pose a risk for transmitting infectious material to the next patient.</p> | <p>If a channel is blocked, fluid will flow preferentially through other channels. Therefore, ensure fluid is flowing through all channels. The preferred method of flushing the instrument is from umbilical end to distal end.</p>                                                                                                                                                                                                                                                                   |
| <p>8. Remove the endoscope from the enzymatic detergent basin and place in a basin filled with clean water for rinsing.</p>                                                                                                                                                                                                                                           | <p>The enzymes are proteins and if not adequately rinsed off, can contribute to protein</p>                       | <p>Adequate removal of detergent is not achieved when an insufficient amount of</p>                                                                                                                                                                                                                                                                                                                                                                                                                    |

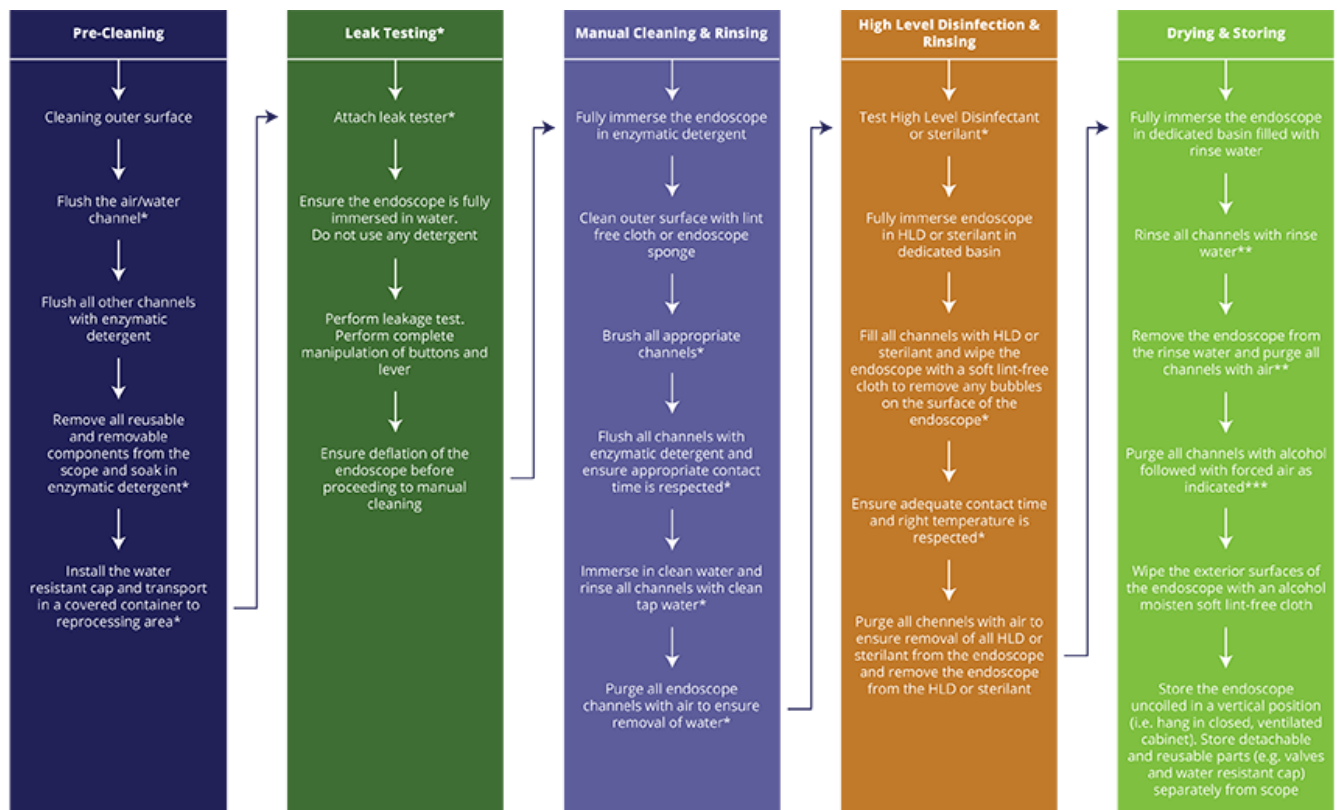
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | build-up within scope channels.                                                                                                                                       | rinse water is used or with used rinse water. The pre-rinse cycle of some Automated Endoscopy Reprocessors (AERs) can be used to ensure the appropriate volume of rinsing is achieved.                  |
| 9. Rinse all channels with an adequate volume of water to remove all detergent (At a minimum use approximately three times the total channel volume specific to the endoscope being reprocessed. Ensure a copious amount of water is used to remove all enzymatic detergent).                                                                                                                                                                                                                                                                                                                           | The enzymes are proteins and if not adequately rinsed off, can contribute to protein build-up within scope channels.                                                  | Adequate removal of detergent is not achieved when an insufficient amount of rinse water is used. The pre-rinse cycle of some AERs can be used to ensure the appropriate volume of rinsing is achieved. |
| 10. Following the rinse, purge all endoscope channels with air to ensure removal of water. Wipe the exterior surfaces of the endoscope using a soft lint-free disposable cloth to remove excess moisture.                                                                                                                                                                                                                                                                                                                                                                                               | Residual water will dilute the high level disinfectant and reduce the concentration of the disinfectant.                                                              | A high level disinfectant diluted with residual water may reduce the efficacy of the disinfectant and not properly disinfect the device.                                                                |
| <b>High-Level Disinfection</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                       |                                                                                                                                                                                                         |
| 11. Monitor minimal effective concentration (MEC) of the high level disinfectant or sterilant if reused. Rapid test strips specific to the product being used are available for this purpose.                                                                                                                                                                                                                                                                                                                                                                                                           | The high level disinfectants that are reused can lose efficacy through excessive dilution and/or inactivation.                                                        | Lack of monitoring can result in use of ineffective high level disinfectant concentrations and inadequate microbial killing.                                                                            |
| 12. Completely immerse the endoscope in a dedicated basin filled with an approved high level disinfectant or sterilant as per manufacturers' instructions. Use the endoscope cleaning adaptors to fill ALL channels with adequate high level disinfectant or sterilant (including the elevator wire, forward jet, 2nd therapeutic channel, balloon channel), and soak in the high level disinfectant or sterilant as directed by the manufacturer of the product. Wipe the endoscope with a soft lint-free cloth to remove any bubbles on the surface of the endoscope. <b>(NOTE: If an AER is used</b> | Microbial killing needs to be effective; therefore, only disinfectants with antimycobacterial activity (e.g., high level disinfectant) or sterilants are appropriate. | Disinfectants other than those approved may result in inadequate microbial killing.                                                                                                                     |

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| <p><b>for reprocessing Endoscopic Retrograde Cholangiopancreatography (ERCP) scopes or other specialty endoscopes, ensure that all channels can be disinfected by the AER. Otherwise the affected channels MUST be manually cleaned/disinfected prior to placing in the AER).</b></p>                                                                                                                                                                  |                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>13. Adequate contact time and temperature are critical; therefore, temperature of the product should be monitored and contact time should be timed accurately as per manufacturer's recommendations. The use of a timer should be considered.</p>                                                                                                                                                                                                   | <p>If less than the minimum effective exposure time or temperature are used, microorganisms may survive. This increases the risk of transmitting infections.</p> | <p>Problems with adequate timing are frequent when manual disinfection is done because timing of exposure to a high level disinfectant is often not performed. This is not an issue with AERs as long as the AER is programmed according to the manufacturer of the high level disinfectant or sterilant instructions. Temperature requirements still need to be respected while using an AER.</p> |
| <p>14. Following the disinfection, purge all channels with air to ensure removal of all high level disinfectant or sterilant from the endoscope and remove the endoscope from the high level disinfectant or sterilant.</p>                                                                                                                                                                                                                            | <p>Residual high level disinfectant and sterilants can cause tissue damage<sup>(99)</sup>.</p>                                                                   | <p>The correct adaptors are to be used in order to properly flush air through all channels according to manufacturer's instructions to remove all high level disinfectant or sterilant from the endoscope.</p>                                                                                                                                                                                     |
| <b>Rinsing</b>                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>15. Immerse the endoscope in a dedicated basin filled with fresh bacteria-free or sterile water. Rinse all channels with an adequate volume of water to remove all high level disinfectant or sterilant (at a minimum use approximately three times the total channel volume specific to the endoscope being reprocessed. Ensure a copious amount of water is used to remove all high level disinfectant or sterilant). Refer to the high level</p> | <p>Residual high level disinfectant and sterilants can cause tissue damage<sup>(99)</sup>; therefore, adequate rinsing is critical to remove all residuals.</p>  | <p>Problems with inadequate rinsing are possible when manual disinfection is done. Different endoscopes may require larger rinsing volume than others. Because the rinse volume in an AER is usually preset and cannot be reduced by the user unless initially programmed incorrectly, AERs provide more reliable rinsing, compared to manual methods</p>                                          |

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| disinfectant or sterilant manufacturer's recommendations for appropriate rinsing procedure. Some high level disinfectant or sterilants require several complete water exchanges. Most AERs rinse with several liters of water.                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                    | where user variability is a problem.                                                                                                                                                                                                                                      |
| <p>16. Final rinse water should be sterile or bacteria-free.</p> <p><b>Tap water can be used, but if it is, a subsequent 70-90% alcohol rinse is CRITICAL between each patient use and prior to storage.</b></p>                                                                                                                                                                                                             | <p>Tap water can contain <i>Mycobacteria</i>, <i>Pseudomonas</i> and other microorganisms. Therefore, the final rinse water should be bacteria-free (i.e., filtered through a 0.2 <math>\mu</math>m filters). Filtration can produce bacteria-free water provided there are no viruses in the water being filtered and the filters are patent.</p> | <p>Bacterial overgrowth within flexible endoscope channels may result from tap water microorganisms in moist channels. This has led to infection transmission between patients.</p>                                                                                       |
| <b>Drying</b>                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                           |
| <p>17. Remove the endoscope from the rinse water and purge all channels with air to remove all remaining rinse water. Rinse all channels with 70% - 90 % alcohol (approximately 60 ml. flushed through all channels using the appropriate adaptors).</p> <p><b>(NOTE: alcohol rinse and drying is not needed if scope is used immediately on another patient, unless the final rinse was with unfiltered tap water).</b></p> | <p>This facilitates the drying of the channels and will also kill any tap water microorganisms that might be present.</p>                                                                                                                                                                                                                          | <p>Lack of drying has been associated with infection transmission between patients due to microbial overgrowth.</p>                                                                                                                                                       |
| <p>18. Following the alcohol rinse and prior to storing the endoscope, purge all channels with forced air. Wipe the exterior surfaces of the endoscope with an alcohol moisten soft lint-free cloth.</p>                                                                                                                                                                                                                     | <p>This facilitates the drying of the channels.</p>                                                                                                                                                                                                                                                                                                | <p>Lack of drying has been associated with infection transmission between patients due to microbial overgrowth. High pressured air (compressed air) may damage the inner structures of the endoscope. Consult the manufacturer of the endoscope for more information.</p> |

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| 19. Store endoscope uncoiled in a vertical position (i.e., hang in closed, ventilated cabinet). Store detachable and reusable parts (e.g., valves and water resistant cap) separately from scope. | This facilitates drying of the scope during storage and reduces risk of recontamination. | Keeping valves on during storage increases the risk that residual moisture will remain, increasing the risk of microbial overgrowth and infection. |
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**Figure 3. Flow Chart for Endoscope Reprocessing --**



Obtained from: <http://www.phac-aspc.gc.ca/nois-sinp/guide/endo/part4-eng.php>