

Reprocessing Guidelines for Basic Neonatal Resuscitation Equipment in Resource-Limited Settings

Quality Improvement Roadmap

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Introduction

This roadmap aids in planning improvement activities after having received training in the *PATH Reprocessing Guidelines for Basic Neonatal Resuscitation Equipment in Resource-Limited Settings*. In order for individual facilities to most effectively improve reprocessing of neonatal resuscitation equipment, activities should be aligned with guidelines approved by the country's Ministry of Health.

Upon returning to the facility, the focus of activities will be on effectively improving the reprocessing of reusable basic neonatal resuscitation equipment in all units where such equipment is available. This involves forming an improvement team (also described in the *Survive & Thrive* curricula) made up of people who are involved in the various aspects of reprocessing. Determine if this activity pertains to an existing quality improvement team or infection control committee. Important persons to include in the improvement team:

- *In-charge nurse or perinatal administrator*
- *Provider(s) who perform reprocessing*
- *Ancillary personnel* (e.g., central sterile processing, environmental services) *who perform reprocessing*
- *Procurement officers* (for chemicals, personal protective equipment, containers, autoclave/boiling machines)
- *Biomedical engineers* (for maintenance of autoclave, boiling machines)
- *Infection control officers* (in larger facilities)

A member of this team can become a champion who can provide support on a regular basis to those who are responsible for reprocessing medical equipment.

Decide what to improve

Improvement may be needed at one or many stages/steps in the reprocessing of neonatal resuscitation equipment (see four stages and all steps on the *Reprocessing General Job Aid*). The following are some initial considerations:

1. **Preparation:** The *PATH Reprocessing Guidelines for Basic Neonatal Resuscitation Equipment in Resource-Limited Settings* provides a comprehensive set of recommendations based on the available evidence. However, each health authority may set explicit standards for various levels of health facilities. This also includes having sufficient equipment (both resuscitation and reprocessing equipment) procured and available. Each unit/facility needs to select the primary disinfection method to be used regularly, and select alternative methods for when the primary method is not available.
2. **Pre-disinfection:** Each unit/facility needs to establish routine reprocessing of equipment after each use and assign staff responsible for all steps or staff responsible for certain steps.
3. **Disinfection:** Each unit/facility needs to determine how best to ensure that correct technique is followed for whichever disinfection method is selected.
4. **Post-disinfection:** Besides ensuring consistent technique for these steps, each unit/facility needs to determine their policies in regard to replacement of any parts or equipment, proper storage, etc.

Preparing for the process

- Form an improvement team.
- Review PATH reprocessing guidelines and country-specific reprocessing guidelines. Select the most appropriate disinfection method to be used regularly.
- Collect observational data on the actual performance of reprocessing:
 - ___ Photograph the current reprocessing area.
 - ___ Talk with providers and cleaning staff regarding their experience with reprocessing.
 - ___ Review any records that document reprocessing in the facility.
 - ___ Directly observe the process and collect baseline data about performance for a short period (adapt the Simulation Checklist to the disinfection method currently being used).
- Compare the process with recommended guidelines:
 - ___ Is the process performed correctly?
 - ___ Is the process performed consistently?
- Choose what to improve:
 - ___ If more than one step needs improvement, rank the steps in order of the expected amount of improvement, importance of the process, and impact of the improvement.
- Perform a baseline assessment of the step chosen (how often the step is being performed correctly).
- Write an aim statement for the chosen improvement:
 - ___ *What*—the outcome or process that needs improvement.
 - ___ *Who*—the group (of providers or other workers) who will be affected.
 - ___ *How much*—the change from baseline to the desired result.
 - ___ *By when*—the timeframe for change.

Decide what barriers to overcome

The outcome of safe, disinfected equipment for neonatal resuscitation depends on several important processes. Preparation of the space, persons, and materials for reprocessing is one process with several steps. Pre-disinfection, disinfection, and post-disinfection are additional processes with multiple steps in each. The quality of a process depends upon inputs and performance of the process. Input considerations include: knowledge and skill of providers, staffing, supplies, infrastructure, and financial resources. Even when all essential inputs are available, performance of processes must be correct and consistent. Sometimes poorly designed processes lead to inadequate performance. Performance considerations include: process organization, incentive alignment, leadership, and management buy-in, and provider convenience.

- Identify barriers to the inputs and performance of the processes chosen for improvement by examining the organization of reprocessing steps for efficiency and effectiveness. If the root cause of the quality issue is not immediately apparent, consider using the tools/visual aids (Figures 1 and 2) in the Appendices to assist in mapping the barriers
- Choose the barrier(s) to overcome.
 - If more than one barrier needs to be addressed, rank the barriers by considering the importance, cost, and feasibility of making a change. Questions to consider:
 - Is it critical to the process to overcome this barrier?
 - What is the cost of overcoming this barrier?
 - What is the likelihood that the barrier can be overcome?

Planning and Testing Change

Consider what needs to be done to overcome the barriers identified. There may need to be changes in inputs and in processes. Some examples of action include the following:

Inputs

- Knowledge and skills—Making reprocessing the focus of refresher training after Helping Babies Breathe. Making sure each provider follows reprocessing steps after each use and has the skill to disassemble, reassemble, and test the bag and mask device and the suction device.
- Staffing—Assigning reprocessing tasks rationally. This may involve redistributing tasks or combining responsibilities of personnel.
- Supplies/materials—Making sure the correct chemicals, water supply, instruments, containers, linen, labels, and log books are always available. If supplies are not available, determine if the barrier to be addressed lies in the purchasing or distribution of items.
- Infrastructure—Physical space and workflow for reprocessing. Reorganization of space and workflow may address issues at a lower cost than structural changes. Maintenance of equipment and replacement of damaged equipment may need to be addressed.
- Financial resources—Realize cost-savings or demonstrate the need for a major investment of funds. Large-volume purchases of chemicals or equipment for all units within a facility may result in cost savings.

Performance

- Poorly designed processes—Redesigning the workflow for reprocessing and informing providers of the change.
- Misaligned incentives—Changing incentives to more appropriately promote the desired reprocessing behavior.
- Challenges with leadership or management—Involving leadership in understanding the gaps and the proposed solutions.
- Provider's convenience—Showing providers how adhering to reprocessing can make their job easier and reduce frustration.

- Based on your analysis of gaps/barriers, choose the changes to implement in reprocessing.
 - Knowledge and skills:
 - Understanding the rationale for each step.
 - Preparation of the reprocessing area.
 - Pre-disinfection steps.
 - Disinfection method and specifics of primary and secondary methods.
 - Post-disinfection steps.
 - Staffing and workflow—who performs each step and where.
 - Supplies/materials:
 - Personal protective equipment.
 - Labels, pens, timers, log books.
 - Chemicals—correct concentration, dilution, labeling, storage.
 - Containers for cleaning, rinsing, protection for drying.
 - Autoclave, boiling machine or steaming pans, chemical container.
 - Safe and accessible storage container.
 - Infrastructure:
 - Physical space for reprocessing.
 - Cleaning of the reprocessing space.
 - Physical arrangement of reprocessing workflow to maximize efficiency.
 - Preparation of reprocessing materials.
 - Labeling of containers for reprocessing.
 - Design of processes:
 - Facility-specific policy and procedures.
 - Job aids—chemical identification, example calculations for dilution.
 - Diagrams/posters.
 - Incentives:
 - Provider documentation.
 - Audits.
 - Leadership/management:
 - Mechanism for providing input/suggestions.
 - Provider convenience:
 - Measure of provider satisfaction.
- Test the changes and adjust them if necessary.
- Collect data on the aim chosen for reprocessing.

Decide if the change made an improvement

- Determine how well the change was implemented.
- Determine if the change produced improvement.
- Start the next cycle of improvement with new barriers/changes.

Make the improvement a routine

- Revise facility policy and procedures for reprocessing.
- Document and share the improvements made.

Schedule to improved reprocessing of neonatal resuscitation equipment

Date programmed	Date accomplished	Task and deliverables
_____	_____	PATH reprocessing guidelines distributed.
_____	_____	Facility-based reprocessing team formed. List members and professional roles: _____ _____ _____ _____ _____ _____
_____	_____	Observation of baseline performance of reprocessing. Photos taken.
_____	_____	Comparison of guidelines with actual processes. List the identified differences: _____ _____ _____ _____ _____ _____ _____
_____	_____	Identification of barriers to reprocessing. List the identified barriers: _____ _____ _____ _____ _____ _____ _____

		<p>Changes undertaken to improve reprocessing.</p> <p>List the changes implemented:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Describe the data that showed improvement:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Share any especially successful changes:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Incorporation of reprocessing into the routine for quality care.</p> <p>_____</p> <p>_____</p> <p>Facility policies and procedures for reprocessing</p> <p>Log books</p> <p>Results of audits</p> <p>In-service education sessions</p> <p>Facility-specific reprocessing wall chart</p> <p>Photos of reprocessing area</p>
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Appendices

Figure 1: Inputs and process barriers that influence improvement in healthcare settings (adapted for reprocessing)

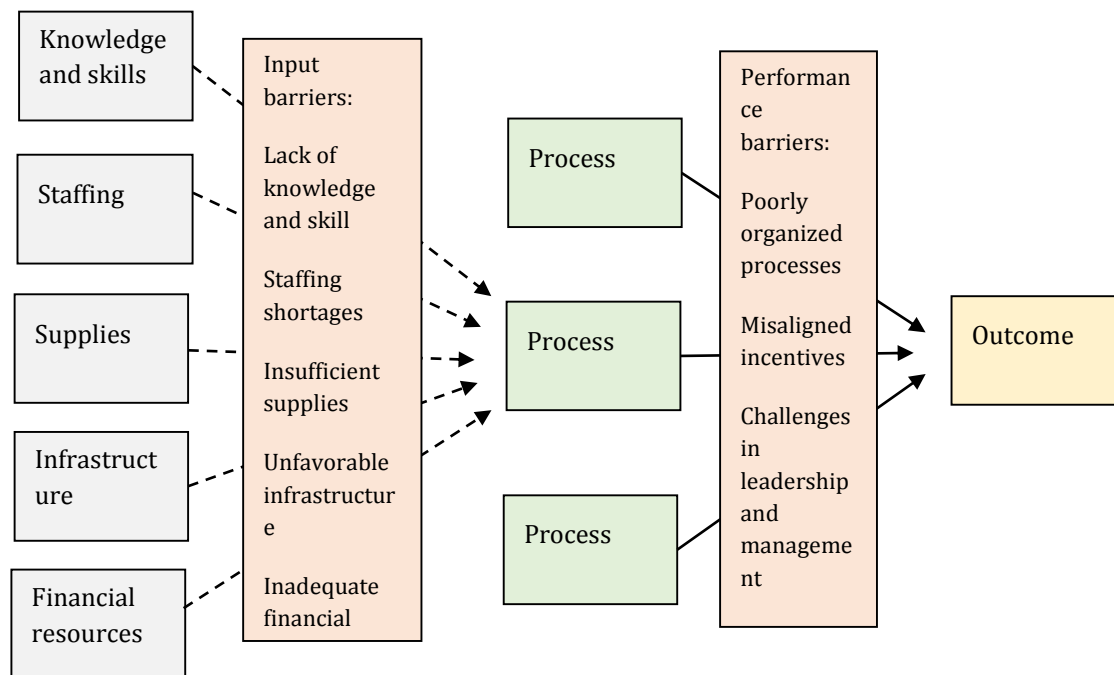


Figure used with permission from Survive & Thrive and the Improving Care for Mothers and Babies Editorial Board. Figure 1 was adapted from the Survive & Thrive Quality Improvement Workbook, which was in draft form at the time this reprocessing road map was developed.

Figure 2: Example flow chart of existing reprocessing steps at the facility to identify areas that need to be improved

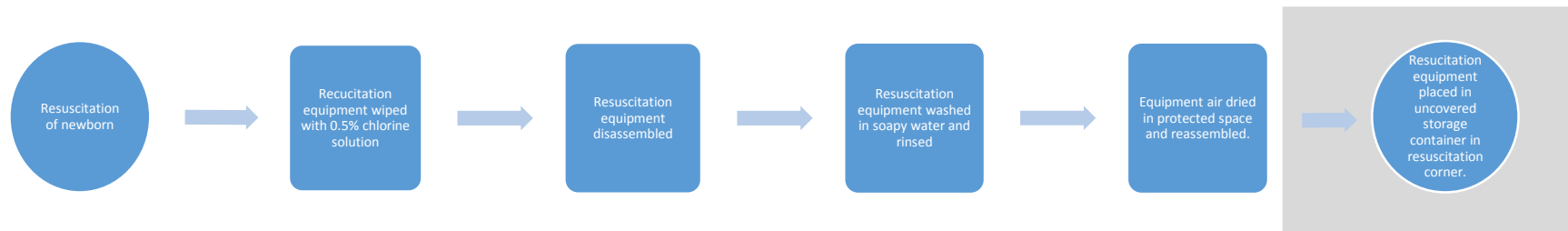


Figure used with permission from Survive & Thrive and the Improving Care for Mothers and Babies Editorial Board. Figure 2 was adapted from the Survive & Thrive Quality Improvement Workbook, which was in draft form at the time this reprocessing road map was developed.

This flow chart identifies a poorly organized process. Disinfection/sterilization and function testing, and their associated processes, are missed and the equipment is stored in an unprotected manner. The shaded area defines where process improvement activities should be directed in this case.

Note: circles indicate the first and last steps; squares indicate steps or activities; in some cases, a diamond could be also included to indicate when decisions or observations are made.