Beth Israel Lahey Health

System-Wide Recovery Guidelines

Team: **PPE/Supply**
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Introduction

This document offers a set of guidelines and tools to help BILH facilities plan for the resumption of elective care.

The personal protective equipment (PPE) and supply guidelines are organized into the following categories:

I. PPE Guidance including Reuse/Extended Use Protocols

II. Reprocessing

III. BILH Shared System-Wide PPE/Supply
   a. Sourcing
   b. Receipt and Management of Large Orders
   c. Logistics and Distribution
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IV. PPE and Supply Demand Modeling

V. Hand Hygiene Products

VI. Vendor PPE

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I. PPE Guidance including Reuse and Extended Use Protocols

PPE is required to protect healthcare personnel (HCP) from exposure to a variety of organisms in the course of providing care. BILH follows national recommendations from the Centers for Disease Control and Prevention (CDC) and the Massachusetts Department of Public Health in developing guidance for protection of HCP in the setting of COVID-19. As the understanding of transmission of COVID-19 evolves over the course of the epidemic, PPE guidance is adapted to follow new recommendations.

PPE guidance is complicated by the national shortage of certain PPE components and an unpredictable supply. Therefore, extended use protocols and reuse protocols are in effect for N95 respirators, surgical masks, isolation gowns, and eye protection. The overall guideline and protocols for each type of PPE are located on the BILH COVID-19 materials website in the PPE section. Note that as care shifts and there are fewer units providing entirely COVID care, extended use protocols will not be able to be employed as frequently. This change is anticipated to further impact PPE supply, especially isolation gowns.

- N95 Respirator Reuse Procedure
- Eye Protection Extended Use and Reuse Procedure
- Surgical Mask Extended Use and Reuse Procedure
- Envo Mask Reuse Procedure
- Gown Extended Use Procedure
- Gown Extended Use Protocol with Apron
- Interim PPE Reuse and Extended Use for Inpatient COVID-19 Units, Urgent Care, Labor and Delivery Triage, Emergency Departments

Extended use of PPE, especially masks and respirators, may lead to skin irritation, abrasions, and ulceration. A document on prevention measures is posted on the BILH COVID-19 website.

- Comfort Strategies for Extended Mask & N95 Use

Appropriate procedures for donning and doffing of PPE are critical to prevention of self-contamination, especially in the setting of reuse and extended use. Step-by-step procedures for donning and doffing, as well as seal check of N95 respirators are available on the website.

- N95 Respirator Donning and User Seal Check Instructions
- Sequence for PPE Don/Doff Poster with Laundered Gown

II. Reprocessing of N95 Respirators and Surgical Masks

1. *Explanation of VHP*

   Vaporous hydrogen peroxide (VHP) is a concentrated disinfectant that can be used to decontaminate thousands of N95 respirators at a time that are contaminated or potentially contaminated with bacteria and viruses, including SARS-CoV-2, the virus that causes COVID-19. To see how the VHP process works and find answers to common questions about VHP reprocessing of masks and respirators, please visit the “N95 Respirator and Mask Disinfection” section of the BILH COVID-19 website.

   - How the VHP Disinfection Process Works at BIDMC
   - FAQ about VHP Disinfection

2. *Mask and Respirator Disinfection Protocols and Procedures*

N95 respirators and surgical masks will be disinfected off site, either at Battelle or at one of BILH's three sites for PPE reprocessing:

- **Battelle:** N95 respirators will be disinfected by Battelle (an Ohio-based company now providing VHP services at Assembly Row in Somerville) for a number of BILH institutions.
- **BIDMC:** A container car customized for VHP disinfection is in use for reprocessing of N95 respirators at BIDMC with expansion to include other BILH sites once fully operational. This site will be used additionally for disinfection of surgical masks and other types of personal protective equipment (PPE) in the future.
- **LHMC:** A container car customized for VHP disinfection is in the process of being set up.
- **Dedham NEBH:** VHP disinfection is operational in sealed containment units outside our Dedham facility with a focus on surgical masks. N95 respirators for NEBH are also being reprocessed.
- N95 respirators can be disinfected only if they do not contain cellulose.

3. *N95 Respirator Disinfection Logistics*

The objective is to return N95 respirators to the original user whenever possible. In order to do this, a standard labeling process is used including a 3-character institution code and a 2-digit unit code on the respirator and the staff member's first initial and last name.

- To assist with this process, more detailed labeling instructions are available under the *Labeling Posters* section of the BILH COVID-19 website in the N95 Respirator and Mask Disinfection section. Instruction posters are hung up on the units and other care locations.
- Staff have been instructed to avoid use of makeup and perfumes/cologne to ensure that each N95 is free from organic material and can be effectively reprocessed.
- N95s are inspected after disinfection at the reprocessing location. Hash marks or numbers on specific parts of the N95 respirators and surgical masks track the number of cycles performed. Each N95 respirator may be processed up to twenty (20) times using the FDA VHP protocol, as long as it remains intact and without visible soil. Some centers have published protocols with successful reprocessing for up to 50 cycles.
- Shipping instructions to all reprocessing sites are included in the PPE section on the BILH COVID-19 website.

4. *Surgical Mask Disinfection*
   - Surgical masks do not require specific fit/seal to be maintained and therefore will not be returned to the same user post-disinfection and do not require labeling.
   - Currently, surgical masks are disinfected at the Dedham facility.
   - Surgical masks will not be redistributed to the facility of origin. Instead, surgical masks will be stockpiled at Dedham for potential future use.

5. *Collection of PPE*
   - There will be two bins at each designated collection site for contaminated PPE collection, separating N95s and surgical masks. Staff should carefully place contaminated PPE in the appropriate bin.

- Currently, N95 respirators are worn for three (3) shifts before being placed into the bin in order to preserve the integrity of the respirator. This duration may change over time. If an N95 becomes visibly soiled, moist, or contaminated, before or at the time that three shifts have elapsed, it must be discarded and not recycled.
- Surgical masks are worn for one (1) shift before being placed into the bin.
- All PPE placed into these bins should be free of visual soiling or contamination (i.e., blood, body fluids, makeup). Soiled masks will be disposed of or returned to the original user along with the reason for inability to reprocess.
- Individual institutions will need to secure their own bins, which should be approved for holding biohazardous materials.
- N95 respirators should be placed carefully in the bin without crushing or crumpling, which can compromise fit and function.

III. BILH Shared System-Wide PPE/Supply

BILH Supply Chain/Materials Management (SC/MM) teams work together to facilitate and coordinate the selection, purchase, receipt, and delivery of key PPE and other supplies to the System's acute and non-acute providers.

1. Sourcing

- All Hospitals continue to place domestic orders for PPE through established Prime Distributors, HealthTrust Purchasing Group (HPG) contracted vendors, and other sources that are identified and reasonably qualified/credentialed.
- The BIDMC and LHMC teams coordinate and place international orders of PPE on behalf of the entire health system. Additionally, and when practical to do so, these teams will also place domestic orders on behalf of the system (sometimes in conjunction with HPG agreements or special opportunities where a "system order" will create a pricing or delivery advantage).
- A weekly PPE Inventory Assessment is provided to all staff as a color-coded grid (red/orange/yellow/green) to indicate an approximation of current inventory compared to national estimates. An example is below.

The table below shows current PPE and COVID-19 supply status **for the week ending May 1, 2020**, based on approximations of current data.
Although our current inventories are not optimal, we believe our situation compares favorably relative to other regional and national supply levels.

	Current Week		Prior Week	
	BILH Inventory	National Supply Estimation	BILH Inventory	National Supply Estimation
N95 Respirators				
Surgical Masks				
Isolation Gowns				
Face Shields/Goggles				
Hand Sanitizer				
Germicidal Wipes				
Swabs for COVID-19 Testing				

Ample supply / Usual or Equiavalent Products in Use
Limited / Alternative Supplies in Use
Conservation / Preservation Protocols in Effect
Critically Low

2. *Receipt and Management of Large Orders*
   As possible, large supply orders and donations will be directed to the offsite warehouse in Stoneham where they can be held, managed and staged for delivery to the hospitals and non-acute sites, as required. Some large orders may also be delivered directly to a hospital location when it is practical to do so (i.e., when that hospital will be the primary user of the supply, such as swabs that currently are assembled at the BIDMC Lab, and then redistributed across the system).

3. *Evaluation of New PPE Brands and Innovation*
   - Shortages of PPE have led to investigation of equivalent alternative brands whenever possible. These new items are evaluated by:
     - Infection Control for degree of protection and compliance with CDC recommendations
     - Environmental Health and Safety for compliance with FDA, OSHA, and NIOSH regulations as well as fit testing, filtration, and durability for respirators
     - Users for tolerability and fit
   - When purchase is not possible or supplies are limited, the BILH COVID-19 Innovation Committee works with industry and other interested parties to pursue items for development or for purchase to fulfill key institutional needs, including PPE. To date, these have included face shields, N95 alternatives, isolation gowns, and straps and holders for surgical masks. See the BILH Innovation Hub website for additional details.

4. *Logistics and Distribution*
   Regular PPE counts and conference calls are conducted by Supply Chain/Materials Management to ensure that all hospitals and non-acute sites have the PPE resources that they require. A redistribution of supplies is routinely made between the hospitals and the offsite warehouse using contracted courier services.

5. *Hospital and Non-Acute Care Sites Roles and Responsibilities*
   Local SC/MM staff support their respective operations by managing select areas of inventory and providing or coordinating the ordering, receipt, and internal distribution of supplies. The onsite management and accountability for key PPE supplies may be performed by non-SC/MM staff to include Department Directors, Administrative team members, Incident Commanders, and other local leadership.

IV. PPE Supply and Demand Modeling

A BILH team is building a consolidated, predictive model, including a range of supply and demand inputs, focusing particularly on N95 use associated with the resumption of elective surgeries and procedures at each of the hospitals.

- Once modelling has been reviewed and vetted, there will be a system-wide determination of PPE demand as well as calculations of supply days on hand aligned with assumed burn rates and clinical guidelines.
- N95 respirators and isolation gowns (especially disposable gowns) are of primary concern as national shortages and unpredictable supply chain exist, thus creating the need for extended use and reuse protocols.

- PPE utilization will be impacted by the degree of compliance with guidelines (e.g., N95 reprocessing guidelines, gown recommendations). Utilization will be monitored to assess the need for revisions to the guidelines.

V. Hand Hygiene Products

Meticulous hand hygiene performance is critical in prevention of transmission of COVID-19 and other organisms. BILH institutions base their hand hygiene guidance on national recommendations and best practices. As CDC guidelines continue to evolve, it is vital that BILH remains up-to-date on any changes and adjusts policies and practice as needed.

- On April 27, the CDC recommended that alcohol-based hand rubs (ABHR) have higher percentages of ethanol (>60%) and isopropyl alcohol (>70%) for COVID-19 than during "usual care."
- Areas that use Purell ABHR are within recommended guidelines for use.
- Any areas that use CalStat Hand Sanitizer or other hand hygiene products that do not comply with the new CDC guidelines optimally will source a substitute product.
    - Soft 'N Sure rubs ABHR are an example of a sufficient substitute, which also fit in the CalStat wall dispensers.
- BILH hospital pharmacies that produce ABHR are increasing alcohol concentration to meet CDC recommendations.
- Due to the national shortage of ABHR and the critical importance of hand hygiene, along with poor user acceptance/tolerability of alternate, currently available products, we do not recommend elimination of CalStat or other ABHR until a suitable alternative has been established.

VI. Vendor PPE

BILH facilities should greatly reduce/limit vendors in the OR and procedural areas and require that vendors bring their own N95s. Vendors who perform support services, repairs and deliveries should try to limit frequency of services provided when possible. Vendor representatives in clinical locations such as ORs and procedure rooms must be essential to perform cases as determined by the attending physician. All vendor representatives should follow each BILH facility's requirements for vendor credentialing and check-in.

1. *Surgical mask requirement*
    - In line with guidelines for staff, patients, and essential escorts in BILH facilities, vendor representatives are required to wear a mask at all times while on the premises.
    - Vendor representatives will be asked to arrive wearing a mask or cloth face cover. If they do not have a mask upon arrival, one will be provided for them.
    - Vendors entering operating rooms or procedural areas will be given one (1) surgical mask to wear (replacing their own mask).

2. *Vendors who provide direct clinical support*
    - Only one (1) representative is permitted to support surgical procedures requiring vendor support; additional representatives are not permitted.
    - Where possible, the representative will support the case from outside of the operating room or procedure room to reduce exposure and the need for PPE.

3. *N95 Respirators*
    - Vendor representatives are required to provide their own N95 respirators to wear whenever they are providing support for a patient with a planned aerosol-generating procedure (which includes intubation/extubation). The N95 respirator should be a NIOSH-approved product without an exhalation valve.
    - Vendor representatives must obtain and submit valid documentation verifying they have been appropriately fit tested through an employer or third-party occupational health provider. Vendors who are not fit tested or do not have a respirator will not be permitted in the operating room.
    - A vendor letter is in development containing this information to be shared with each representative before their visit.

VII. COVID-19 PCR Swab Kits – Procurement and Distribution

BILH Supply Chain will continue to source COVID-19 nasopharyngeal PCR swab kit supplies and distribute swab kits to hospitals and non-acute sites.

- Hospital laboratory directors, in conjunction with Infectious Diseases, Infection Control, and hospital leadership, will remain responsible for selection of best use, validation, and needed test capacity estimation.
- BIDMC Microbiology Laboratory has been critical to the production of viral transport media and the validation of a variety of swabs to package together into test kits to supply the entire system. BIDMC Incident Command will plan logistics for future test kit production, as needed, with the ultimate goal to switch over to commercial kits to sustain supply.
- BILH Supply Chain will continue to coordinate the weekly distribution of swab kits.