COVID-19
CARE PATHWAY STRATEGY

A Hospital Guide to Implementing Enhanced Traffic Control Bundling for Protecting Healthcare Workers and Patients

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INTRODUCTION

These materials are designed for healthcare leaders focused on preparing patient care pathways in response to COVID-19.

Information shared in this document helps to address the following concerns:
- Patient care pathways are not optimized for easily identifying and separating suspected or confirmed COVID-19 patients.
- Healthcare workers (HCWs) are at high risk for contracting COVID-19 and spreading the virus to co-workers and patients.
- Personal protective equipment (PPE) is being used at an alarmingly high rate. PPE usage guidelines have been dynamic, and at times dependent on supply.

GETTING STARTED

If you are interested in adopting this Traffic Control Bundling (TCB) model in your facility, we recommend reviewing the following materials in this order:
1. Watch Video **on Vimeo**: **Traffic Control Bundling & Implementation Model** to gain an overview of the TCB model and collaborative problem solving
2. View Slide Deck: **Review of Traffic Control Bundling & Implementation Use Case**
3. Utilize the **Implementation Guide, Checklist, and Signage Templates** as resources for hospitals adopting the Traffic Control Bundling and Risk Zones Model

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6. **Signage Templates for Risk Zones** and Instructions for Use

IMPORTANT

These materials have been developed by Medtronic based on information and experience available at the time of publication and is subject to change rapidly as we continue to learn more about the current COVID-19 pandemic. You should continue to review all relevant resources as they become available. This Guide is provided for general information purposes only and should not be considered the exclusive source for this type of information. The ultimate responsibility for controlling the risks associated with patient, visitor and employee traffic patterns rests with your facility, and outcomes will depend on each facility's own circumstances, including physical layout, resources, and policies. At all times, it is the professional responsibility of providers to exercise independent clinical judgment in a situation. Medtronic makes no guarantee that the use of strategies outlined in this Guide will prevent exposure to any pathogen, reduce the use of PPE, or result in minimizing any other negative outcome. MEDTRONIC DISCLAIMS ANY REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER.

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CONTRIBUTORS

Medtronic collaborated with the Minnesota Emergency Physicians Professional Association (EPPA) during the COVID-19 pandemic to redesign a COVID-19 care pathway and define an implementation plan for the local hospital systems to rapidly adopt and deploy.

 In addition to their own free-standing Urgency Room facilities, EPPA physicians and advanced practice clinicians staff several hospital emergency rooms (ERs) within local health systems across the State of Minnesota including Allina Health, CentraCare, Park Nicollet Methodist Hospital, and North Memorial Health. We recognize their collaboration with EPPA and Medtronic to operationalize many of the concepts shared in this document.

ACKNOWLEDGEMENTS

We acknowledge Dr. Muh-Yong Yen, Director of Diseases Control and Prevention, Taipei City Hospital, and his many co-authors, for their contributions to the medical and infectious disease literature on Traffic Control Bundling. Our contribution includes how to modify and implement this model for use in the USA for COVID-19 response. Our interactions with Dr. Yen and his team helped us better understand the TCB model. This contribution is based on published work.

The Dynamic Learning Environment at Medtronic

Representatives from several Medtronic groups came together to create a dynamic learning environment. Leveraging the expertise and resources of several multidisciplinary teams, we were able to move with speed and rigor while ensuring continuity across hospital sites. Key learnings were shared in rapid learning cycles in order to validate usefulness of the model in these hospitals preparing for an effective COVID-19 crisis care response plan.

The strategies identified by the team:

1. Redesign the care pathway and workflows based on an evidence-based infection containment model
   - Redesign flow for Patients
   - Redesign flow for Healthcare Workers
   - Redesign flow for PPE
2. Define an implementation plan for several healthcare systems to rapidly adopt and deploy within their institutions.

KEY PLAYERS

One key component to this project was identifying the right hospital and system administrative teams from the start. Early alignment was critical to the success of this project.

It is recommended to involve the following administrative roles when preparing to deploy the TCB model:

- System-level and Hospital-level Executives (e.g., CEO, CNO, COO, CMO, CIO)
- Emergency Department (ED) Physician Group Administrator (if managed externally)
- Hospital-site senior leader
- ED Medical Director
- ICU medical director and ICU nursing leader
- In patient COVID unit nursing leader
- Incident Command
- Infection Prevention
- Quality
- Operations / Facilities
- Information Technology
- Marketing / Communications
- Process Improvement Team

STATEMENT OF INTENT

As you are aware, COVID-19 has been spreading at an alarming rate across the world. My colleagues in emergency medicine and healthcare workers (HCWs) of all disciplines across the nation have been working tirelessly to prepare and respond to the impact of the COVID-19 epidemic in our local hospitals.

At EPPA, Emergency Physicians Professional Association, we are passionate about providing excellence in emergency medicine. During this acute crisis, we take pride in our culture of mutual respect and camaraderie as we partner with 5 hospital systems and 11 Emergency Departments across the state of Minnesota in which we provide our services. These health systems include Allina Health, CentraCare, North Memorial Health, and Park Nicollet/Health Partners.

As CEO and President of EPPA, it is my personal mission to listen to the voice of the front-line providers and HCW to ensure that their safety is our main priority. I am especially committed to ensuring our physicians are able to deliver the care our local hospitals depend on us to provide. As we started to build out our plans, we knew we could not do this alone.

We connected with many of our corporate partners to explore if any would be willing to help us to accelerate and expand our efforts. Medtronic responded to our request and quickly deployed a multifaceted team to help us assess our needs and define a plan of action. Medtronic leveraged their healthcare optimization consulting expertise including strategic planning, Lean Six Sigma, research, and project management resources.

We learned early in our collaboration that containment and workflow optimization were critical aspects of COVID-19 pandemic planning. Leveraging the literature on Traffic Control Bundling and adapting the enhanced model in our partner hospitals augmented the existing surge planning, infection prevention and PPE conservation efforts already underway by the hospitals we serve. The attached document is the summary of the joint work of EPPA and Medtronic and represents an evidence-based approach to contain the spread of COVID-19 and prevent nosocomial infection; keeping our patients and HCWs safe while preserving PPE.

Although many of you are much further along, we are hopeful that sharing this model can be helpful for others on the front lines fighting this pandemic.

With Compassion,

Dr. Rob Thomas
CEO and President of EPPA

TRAFFIC CONTROL
BUNDLING &
RISK ZONES
IMPLEMENTATION
GUIDE

PURPOSE

Use this implementation guide to understand specific action steps required to create a model called enhanced Traffic Control Bundling (eTCB) in your hospital or healthcare facility. This guide is a tool to help you adapt and implement an eTCB approach with risk zones.

SOURCE

Traffic Control Bundling (TCB) is an approach documented by Yen et al. (2020) from Taiwan who have applied this model successfully during SARS and H1N1 epidemics and have now adapted their model for COVID-19. Specific sources for reference and further information are listed at the end of this document.

PHASE ONE
Create Site-wide Leadership Team to Establish Traffic Control Bundling and Risk Zones

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KEY QUESTION

I. Who are the (a) lead physicians, (b) operational leaders, (c) boots on the ground representatives, (d) infection prevention staff members, and (e) facilities representatives for your site who might be included as you think about your area of work?

ACTION STEPS

A. Identify key representatives from the various functional areas listed.
B. Watch the **Traffic Control Bundling & Implementation Model Video** to gain an overview of the TCB model and collaborative problem solving.

> **VIEW VIDEO**

C. Ensure there is an appropriate sense of urgency to move forward, that the vision can be developed for the site or department, and the team is positioned to communicate the vision. This includes identifying and closing gaps in the current protection of healthcare workers (HCW), and empowering employees to adopt better practices to ensure their safety.
D. Establish operational definitions of zones for your site and personal protective equipment (PPE) requirements. Possible questions to consider:
    i.   Who will be allowed in **GRAY ZONES**? Only HCWs showing no symptoms? Or patients not under investigation (non-PUI patients) and their family members as well?
    ii. Will all patient areas be designated as **YELLOW ZONES** regardless of presentation of symptoms?

Example

ZONE	DEFINITION	PPE REQUIREMENT
GRAY	Presumed clean zone for healthy people.	Surgical mask (not N95).
YELLOW	Possible contaminated area.	Gown, gloves, eye protection, and N95 mask.
RED	Probable contaminated area.	

Note: Definitions shown in the example are modified from the TCB source literature. Consider what naming makes sense in your institution (i.e., hot, warm, cold).

RED ZONE KEY QUESTIONS

I.   Look at the external layout of your emergency department (ED). Where do ambulances arrive and where could an outdoor screening and triage stations be established?
II. What back doors can be established as COVID-19 entrances for patients under investigation (PUIs) and additional entrances for HCWs in PPE?
III. What ED rooms can you convert to negative pressure? Where do you want to triage probable PUIs? Which rooms should be reserved for emergency care?
IV. What criteria do patients need to meet before they can be admitted to the inpatient COVID-19 ward in your hospital?

RED ZONE ACTION STEPS

A. Consider stopping screening and triaging PUIs inside the hospital if possible, per guidance from TCB sources for COVID-19.
B. Establish an outdoor screening area.
    i.   Drive up area for initial check.
        a) Send home patients who do not need hospital attention per your hospital's agreed-upon approach.
        b) PUIs stay in cars, if possible.
        c) Non-PUIs can enter ED through a designated entrance.
    ii. Perform as much screening while PUI remains in their car.
    iii. Consider obtaining and setting up tents for further screening/triage if possible.
C. Create plan for physical flow of how automobiles and ambulances will arrive by taking into consideration high volumes of patients.
D. Create plan for additional screening of patients if needed. This should remain outside, if possible, per the literature.
E. Expand medical screening exam privileges to allow nurses to complete this work in preparation for high patient volumes, not just physicians.
F. Identify negative pressure rooms or other areas **inside** where you will be admitting PUIs.
    i.   This area is in the **RED ZONE**. Include adjacent hallways and the route that will be taken from outside into this area.
G. Determine specific standard of work for sorting PUIs.
    i.   Remember, PUIs, during high volume times, will likely only enter the ED if they are (a) brought by ambulance, (b) suffering from severe respiratory symptoms, or (c) if an exam room in the **RED ZONE** is available. Discuss and agree on your site's approach for these conditions.
H. Consider expanding work areas by create outdoor workspace: including power, heating, WIFI, etc.

GRAY ZONE KEY QUESTIONS

V.   Where do HCWs usually enter the site? What key areas (i.e., lounges, changing rooms, restrooms, workspaces, etc.) should be included in this area?
VI. What clear pathways can HCWs take to get to the **GRAY ZONES**?

GRAY ZONE ACTION STEPS

I. Establish a clear **GRAY ZONE** that encompasses these key areas.
   i. Per your site's definitions of zones, this zone might not be open to the general public.
J. Designate clear routes out of the **GRAY ZONE** to the rest of the hospital.
   i. These routes will apply to HCWs in **all departments**, not just those working with the COVID-19 cohort.
K. Establish PPE donning stations at the end of **GRAY** pathways to the rest of the hospital.
   i. The routes to some **YELLOW ZONES** (those in the ED) and all **RED ZONES** likely will require full PPE, specifically N95 masks. Use your facility's operational definitions and PPE requirements here.
   ii. Routes to other areas of the hospital need surgical masks or other appropriate protective equipment. Again, follow your facility's operational definitions and PPE requirements.
L. Set up a hand sanitizing station at the ends of **GRAY ZONES**.
M. Clearly Delineate the **GRAY ZONE** through physical boundaries, markings on the floor (color tape), and clear signage. Instructions about marking this zone to follow.
N. Create HCWs internal message boards for daily announcements and updates.
O. Reinforce that social distancing should still be enforced in this area.

YELLOW ZONE KEY QUESTIONS

I. What clear pathways can HCWs take to get from **GRAY ZONES** to their zones of work—ideally separate from PT flow?
II. What is the PPE protocol for working in **YELLOW ZONES**?

YELLOW ZONE ACTION STEPS

P. Identify paths from **GRAY ZONES** to general areas of work.
Q. Identify paths to the **RED ZONE**.
R. Determine clear PPE usage protocol by department.
   i. Reinforce that social distancing should still be enforced in this area unless completing patient exams or procedures.
S. Set up doffing stations where HCWs can decontaminate before returning to the **GRAY ZONE.**
T. Set up a hand sanitizing station at the ends of **YELLOW ZONES**.
U. Clearly Delineate this transitional **YELLOW ZONE** through physical boundaries, marking on the floor, and clear signage.

TCB CHECKLIST: After the future state **Emergency Department Zones** are identified, use the **TCB Checklist document** to gain confidence the design will work in practice and to identify unique risk points that might remain, requiring change or mitigation.

RED ZONE KEY QUESTIONS

I. What area of the hospital can be designated to house COVID-19 patients?
II. What needs to be arranged to allow flow of medications and food service?

RED ZONE ACTION STEPS

A. Establish clear bounds around the inpatient **RED ZONE**
B. Establish HCW flow into the COVID-19 ward.
C. Establish patient transfer routes into the COVID-19 ward from the ED or outside.
D. Set up hand sanitizing stations at the beginning, end, and throughout this **RED ZONE.**
E. Clearly delineate the **RED ZONE** through physical boundaries, marking on the floor, and clear signage.
    i. Instructions about marking this zone to follow.
F. Repeat **GRAY ZONE** and **YELLOW ZONE** Questions and Action Steps for Inpatient areas.

> **TCB CHECKLIST:** After the future state **Inpatient Zones** are identified, use the **TCB Checklist document** to gain confidence the design will work in practice and to identify unique risk points that might remain, requiring change or mitigation.

KEY QUESTIONS

I. What leader or team can be identified and placed in charge of PPE at your site as a part of the Traffic Control Bundling model, including the decontamination process?
II. What types of PPE will your site need to reuse? We assume the life of N95 masks will need to be prolonged. Are there other types of PPE that will need reuse?
III. Does this site have a plan for reuse of N95 masks per one of the many cleaning and recycling process which have been documented?

ACTION STEPS

A. Read educational material from University of Nebraska or Duke University about N95 reuse. Review updated sources on this topic as they become available.
B. Determine N95 cleaning and recycling plan for your site with alignment from your health system's central command.
C. Determine the flow of PPE to the cleaning location from the **YELLOW ZONE** doffing station, and back into the **GRAY ZONE** to be donned again.
D. Order supplies to transport PPE.
   i. For example, per the University of Nebraska practice: brown bags for dirty PPE, white/clear bags for clean PPE.
E. Train transporters of PPE about the new process.
F. Teach HCWs safe doffing practices and new protocols for how and where to drop off and pick up their PPE from decontamination.

PHASE FIVE
Deliver Staff Training and Communication

KEY QUESTIONS

I. How long can HCW staff members be expected to don PPE and work in COVID-19 zones before a break is given?
II. Are there some team concepts that might be worth exploring such as working in pairs or as cross-functional teams to be scheduled together, to run supplies, and to best support those HCWs scheduled to work in **YELLOW ZONES** or **RED ZONES**?
III. What are some potential roles that have been temporarily sidelined (i.e., anesthesiologists, scrub nurses, surgery techs, etc.) and what role can they play in this new plan?
IV. What internal processes already exist for checking in with HCWs on their health, potential COVID-19 symptoms, and how they are supported emotionally?

ACTION STEPS

A. Establish a clear training plan to help everyone understand TCB and Risk Zone protocol, and implementation of cross-functional teams.
B. Consider creating a video outlining new sitewide changes as the site adopts TCB and Risk Zones.
C. Create hospital-specific materials so that PPE requirements can be understood by teams, departments, and general staff.
D. Establish a mandatory daily monitoring of HCWs to document suspected cases of COVID-19 and so that appropriate action can be taken.
E. Determine how to manage for the scenario where staff become symptomatic with COVID-19 characteristic. Determine ways staff can still work remotely while under isolation or self-quarantine. Create contact tracing of infected staff to control infection spread both outside and within the hospital.

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TRAFFIC
CONTROL
BUNDLING
CHECKLIST
FOR HOSPITALS

PURPOSE

Use this checklist to gain confidence that the future-state design of traffic control bundles for COVID-19 are likely to function well and will be followed by all healthcare workers (HCWs) in the site. This checklist is a tool to help confirm the design of a TCB approach with risk zones.

GUIDING PRINCIPLES

1. Key focus is on containment to protect HCWs and reduce likelihood of widespread hospital breakout.
2. Make the operational flow visible using a color-coated picture.
3. Simplification where possible but no simpler than what is needed to be effective.
4. Handwashing / hand sanitizing is a key component at all transitions between zones.
5. All donning of personal protective equipment (PPE) is in **GRAY ZONES**; all doffing of PPE is in **YELLOW ZONES**.
6. Account for hallways and elevators in zone configuration, not just rooms.

SOURCE

Traffic Control Bundling is an approach documented by Yen et al. from Taiwan who have applied with model successfully during SARS and H1N1 epidemics and have now adapted their model for COVID-19. Specific sources for reference and further information are listed at the end of this document.

DESIGN
Overall Traffic Control Bundle Design

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1. Does the site leadership team have agreement on operational definitions of **GRAY**, **YELLOW**, and **RED** zones? And, are these definitions clearly documented?   YES ☐   NO ☐

2. Does the site have agreement on PPE requirements for each zone?   YES ☐   NO ☐

   Note: For protection of HCW, PPE requirements should likely be the <u>same</u> for **YELLOW** and **RED** zones.

   EXAMPLE

ZONE	DEFINITION	PPE REQUIREMENT
GRAY	Presumed clean zone for healthy people.	Surgical mask (not N95).
YELLOW	Possible contaminated area.	Gown, gloves, eye protection, and N95 mask.
RED	Probable contaminated area.	

   Note: Some questions to help sort this out. Depending on your answers to these questions, what are the implications for HCWs level of PPE when working in these areas?

   - Should only HCW be allowed in **GRAY** zones assuming they have no COVID-19 symptoms?
   - Will all patient/family areas be designated as **YELLOW** regardless of symptom presentation?

3. Are all employee entrances identified for HCWs to enter the site for work clearly labeled, and are these areas **GRAY** zones? YES ☐ NO ☐

4. Are handwashing stations located at each site entrance and zone transitions? YES ☐ NO ☐

5. Are there donning stations in all **GRAY** zones before entering all **YELLOW** zones? YES ☐ NO ☐

6. There are no **GRAY** zones that are immediately adjacent to **RED** zones. YES ☐ NO ☐

7. Break zones for HCWs are also identified in the plan and are demarcated as **GRAY** zones. YES ☐ NO ☐

8. Doffing and decontamination zones are identified on the blueprint and are all found in **YELLOW** zones at appropriate areas before entering **GRAY** zones. YES ☐ NO ☐

Patient Flow

9. Screening and triage stations are set up and functional outside in an area immediately adjacent to the hospital building. YES ☐ NO ☐

10. Expected pathways of patients are identified and anticipated. YES ☐ NO ☐

    Example: (a) Sending patient home for self-quarantine; (B) Sending patient directly to a contaminated **RED** zone; or (C) Sending patient to a quarantine **YELLOW** zone for observation until diagnosis becomes clear.

11. If screening and triage is happening inside the building, these areas are all considered **YELLOW** or **RED** zones. YES ☐ NO ☐

12. Are the EMS and any Heli pad areas labeled **YELLOW** and therefore require PPE? YES ☐ NO ☐

13. Any direct admit hallways from ED areas to in-patient COVID-19 zones are either **RED** or **YELLOW**. YES ☐ NO ☐

    Note: If these areas are yellow due to building layout, is there a plan for hallway cleaning/decontamination in place?

Personal Protective Equipment Flow

14. We have a plan for donning in **GRAY** zones and doffing in **YELLOW** zones.　　　　YES ☐　　NO ☐

15. Facilities / supply management have processes for (a) processing contaminated PPE in **YELLOW** zones, (b) cleaning/curing of N95 using an approved method, and (c) replenishment of PPE supplies for use in **GRAY** zone donning stations has been discussed and integrated with this plan.　　YES ☐　　NO ☐

16. HCWs know how to properly label and wear their N95 masks.　　YES ☐　　NO ☐

17. HCWs know where to store their N95 respirators when not in use　　YES ☐　　NO ☐

18. HCWs know and understand how and where to drop off and pick up their PPE from decontamination.　　YES ☐　　NO ☐

OTHER TO BE DISCUSSED
Dining and Pharmacy

19. We have a plan for food service for patients, and the kitchen, food distribution, and food clean up processes and training for crew are known and ready.　　YES ☐　　NO ☐

20. Flow of contaminated dining tools such as plates, utensils, and trays has been effectively planned to reduce hospital-spread of COVID-19.　　YES ☐　　NO ☐

21. We have a plan for medication to be distributed to individual patients.　　YES ☐　　NO ☐

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