SDC 1. Ten-day timeline for design, prototyping, execution, and replication[1]

Day 1	• Assemble an interdisciplinary team • Activate a data synthesis team to feed information to core team
Day 2	• Establish design principles • Start iterating Team Guides and prototyping process
Day 3	• Continue iterating documents
Day 4	• Plan simulation at first hospital for Day 6
Day 5	• First hospital receives COVID-19 surgical patient; use pre-briefing and debriefing; make needed changes
Day 6	• Postpone simulation until Day 7 in order to incorporate learnings from actual case on Day 5
Day 7	• Conduct comprehensive simulation at first hospital; make needed changes
Day 8	• Plan and coach replication #1 at second hospital
Day 9	• Second hospital receives first COVID-19 surgical patient • Use pre-briefing and debriefing; report findings to core team; make changes
Day 10	• Replicate simulation at second hospital; report findings to core team; make needed changes

[1]Use continuous closed loops and two-way communication to vet changes with core team, larger team, advisors, and senior healthcare system leaders

Muret-Wagstaff SL, Collins JS, Mashman DL, Patel SG, Pettorini K, Rosen SA, Shaffer VO, Sumler ML, Sweeney JF, Sharma J. In Situ Simulation Enables Operating Room Agility in the COVID-19 Pandemic. *Annals of Surgery*, 2020.

SDC 2. Pre-Brief Readiness Checklist: COVID-19-Positive Patient Heading to Surgery

Intubated non-Aerosol-Generating Procedure (AGP) Patient arriving from Unit

OR Readiness to receive patient

- Each staff member states name and defines role (including 3-4 people to transport to OR)
- Verify notifications: Infection Prevention, PACU, Floor/ICU, Pharmacy, Pathology; others?
- Review Team Guide (Protocol)
- Route is designated and cleared
- Handoff between Unit and OR team performed (ICU RN to Outside Circulator via phone)
- Bring ventilator from ICU if necessary
- Staff identified to transfer patient to OR table
- Anesthesia, OR, and surgical equipment ready: whiteboard list (variable by case)
- Non-essential equipment removed from OR
- Designated PPE Champion to observe donning/doffing for each OR staff member
- Isolation sign on outside door; core door taped shut
- All personal items removed (e.g., mobile phones, pagers, jewelry, badges)
- PPE cart and bag inside and outside OR
- Infection Control tags posted outside OR
- Blood available if needed
- Code cart outside room (keep patient on ventilator for CPR)
- Surfaces covered when possible
- Runner and Outside Circulator posted outside OR
- Infection control discussed
- Dedicated restroom location identified; runner clears path; disinfect room after case
- Walk-through in OR room
- All team members present for Pre-Brief and understand role

Peri-operative

- Policy reviewed
- Double gloving
- Primary and secondary runner/circulator identified
- Scrubbing timing understood by team
- Process and staff determined for patient transfer to the OR table and back
- Booms in OR 27 with Buffalo filter for smoke evacuation to be used for all cases
- Roll down drapes and remove
- Clean bed, including rails

Post-operative

- Specimen handling protocol followed
- Staff decontamination: Hand hygiene, shower, scrub change
- OR disinfection completed
- Anesthesia team transports intubated patient back to ICU (doff PPE inside OR; leave mask and eye protection on; transport with clean gloves after wiping down bed rails; anesthesia tech clears path)

Muret-Wagstaff SL, Collins JS, Mashman DL, Patel SG, Pettorini K, Rosen SA, Shaffer VO, Sumler ML, Sweeney JF, Sharma J. In Situ Simulation Enables Operating Room Agility in the COVID-19 Pandemic. *Annals of Surgery*, 2020.

SDC 3. Facilitator Guide
In Situ Simulation for the COVID-19 Surgical Patient
Emory Healthcare/Emory University School of Medicine

Purpose: The purpose of this *in situ* simulation is to find ways to optimize effectiveness and efficiency of teamwork and care of the surgical patient with COVID-19; and to proactively identify and mitigate risks for patients and staff.

Note: Maintain all current general COVID-19 precautions throughout the simulation session to the extent possible, e.g., hand hygiene, social distancing.

A. Process Maps: Our aim is to establish working "Team Guides for Management of the COVID-19 Patient in the OR" to care for these patients. Each Guide is intended to provide a simple one-page picture of key actions for each staff member. This enables a shared mental model, situation awareness, and critical points for the team. More detailed guidance for each profession or role is available separately. Be sure to look for month and day of updates on the Team Guide.

B. Simulation scenario(s): Create one or more one-paragraph clinical cases in collaboration with the core simulation leadership team. Keep the scenarios simple and focused on either most likely or most high-risk cases. Giving the "patient" a name and a short story helps the team focus. Use a pillow, or an inflated plastic bag with a sheet over it, to simulate the "patient."

C. Identify roles and assign participants:

- Facilitator and core simulation leaders: In collaboration with a core simulation leadership team representing key professions, the facilitator oversees the simulation process including set-up, execution, debriefing, analysis, and follow-through of prioritized opportunities for improvement. The facilitator does not speak, interrupt, instruct, or ask or answer questions during the simulation scenario itself.
- Interdisciplinary, front-line participants: Participants carry out their usual roles.
- Observers: Observers are stationed at strategic locations with the Team Guide and observation sheets listing a very few key points to watch for. If relevant, observers may also be asked to write down time stamps for start/stop of specific occurrences. They do not speak or interact with participants during the simulation.

D. Establish a safe *in situ* space for simulation and debriefing: See *In Situ* Simulation Safety Checklist.

E. Assemble equipment, supplies, and materials: Include:

- Facilitator Guide
- Sign-in Sheet
- Door sign: Simulation in Progress
- *In Situ* Simulation Safety Checklist
- Readiness Checklist: COVID-19-Positive Patient Heading to Surgery
- Team Guides (currently: Management of the Intubated, Non-AGP Patient; Management of the Non-intubated, Non-AGP Patient)
- Failure Modes and Effects Analysis (FMEA) template

F. Introduce participants and observers to the simulation session:

- Post the Simulation in Progress door sign. Leave it up until the room and equipment are cleaned and returned to clinical standards, and supplies are re-stocked.
- Carry out sign-in; introductions; agenda
- Review and discuss the Pre-op Readiness Checklist and Team Guide thoroughly.
- Orient observers (as above) and participants to their roles.

- State:
    - Our basic assumption is that everyone is doing his or her best.
    - Please "suspend disbelief" and act as you normally would during the flow of clinical care.
    - Think out loud as you carry out actions. This will help teammates and observers.
    - This is NOT a test. The focus is not on individual performance or technical skills. Instead, this is an opportunity for front-line expert teams to work together to pinpoint opportunities to improve the local process and reduce risks in caring for COVID-19 surgical patients.
    - Please ignore the observers; they will be taking notes about the process and will not be speaking or interacting with you.
- Station the observers in their pre-designated places.

G. Carry out the scenario:

- Read your one-paragraph case to participants.
- Ask participants to START the scenario in the designated location.
- STOP the scenario at the appropriate time and thank participants.
- Arrange to clean and return the space and equipment for clinical use.

H. Debrief the simulation scenario: Immediately following each scenario, facilitate a structured debriefing with participants and observers. Ask participants:

    - What went well?
    - When were times when you had difficulty thinking things through or getting things done?
    - Considering the Team Guide, where are the best opportunities to make improvements, to simplify, to clarify, to mitigate risks and errors?
    - Observers remain silent during this time.
- Next ask observers:
    - What questions do you have for the participants?
- Capture responses on a flipchart or whiteboard. Write issues that are off-topic or unknown in a Parking Lot section to be addressed later.
- Maintain a tone of curiosity, listening, and respect in the room. Avoid lecturing, instructing, criticizing individuals, or asking questions to which you already know the answer.
- Identify categories or themes of comments about potential system failures and possible solutions, and verify with participants.
- Ask all: What went well, and what could we do to make the *in situ* simulation session itself even better?
- Thank everyone.

I. Use FMEA to set priorities and actions to reduce risks:

- Translate process failure modes identified by participants and observers to the FMEA template.
- Working with your core simulation leadership team and/or participants and observers, determine a risk profile number (RPN) for each.
- Use the RPN to prioritize actions needed to reduce occurrence of failure.
- Follow through to close the loop on actions for improvement.
- Communicate and disseminate your findings.

Please send us whatever you can: a scanned sign-in sheet; snapshot of the board; FMEA sheet; suggestions for how we can improve and better support your work.

smuretw@emory.edu
jsharm3@emory.edu

Muret-Wagstaff SL, Collins JS, Mashman DL, Patel SG, Pettorini K, Rosen SA, Shaffer VO, Sumler ML, Sweeney JF, Sharma J. In Situ Simulation Enables Operating Room Agility in the COVID-19 Pandemic. *Annals of Surgery*, 2020.

SDC 4. *In Situ* Simulation Safety Checklist

Simulation facilitator:
Clinical unit leader:
Clinical Unit:
Simulation date:

		+	Comments
1	Clinical unit and participant group leaders agree that simulation goals and plans are appropriate and feasible for the unit.		
2	Clinical unit has adequate space for the simulation scenario(s) and confidential debriefing without interruption of clinical care or administrative routines.		
3	A simulation specialist/facilitator is on site.		
4	Staffing pattern is adequate to ensure patient safety in the absence of simulation participants.		
5	No simulated medications or supplies will be brought into the clinical unit.		
6	Any simulation equipment brought into the clinical unit has been treated or cleaned as appropriate and approved for safety and infection control.		
7	Any simulation equipment brought into the clinical unit is clearly marked as “Simulation Only – Not for Patient Care” and inventoried into the space.		
8	Any emergency equipment used in simulation (e.g., crash cart) is duplicated for clinical availability during the simulation session.		
9	No “Anesthesia Alert” or clinical emergency is occurring just prior to or during the simulation session.		
10	No adverse event has occurred in this clinical unit on the day of simulation.		
11	Participants are volunteers who have been briefed on the purpose, confidentiality, and use of information regarding the simulation.		
12	Any patients, family members, or significant others in the area surrounding the *in situ* simulation site have been briefed on the purpose and occurrence of the simulation.		
13	Following simulation, the clinical unit and equipment are appropriately cleaned and returned to clinical status.		
14	Other:		

Reference:

Bajaj K, Minors A, Walker K, Meguerdichian M, Patterson M. “No-Go Considerations” for in situ simulation safety. Simul Healthc. 2018;13(3):221-224.

Muret-Wagstaff SL, Collins JS, Mashman DL, Patel SG, Pettorini K, Rosen SA, Shaffer VO, Sumler ML, Sweeney JF, Sharma J. In Situ Simulation Enables Operating Room Agility in the COVID-19 Pandemic. *Annals of Surgery*, 2020.

SDC 5. Failure Modes and Effects Analysis (FMEA)

Step in the Process	Failure Mode	Failure Causes	Failure Effects	Likelihood of Occurrence (1-10)	Likelihood of Detection (1-10)	Severity (1-10)	Risk Profile Number (RPN)	Actions to Reduce Occurrence of Failure
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Consider: Patient/family; infection risk; space hazards; flow/efficiency; standardization; communication; noise/distraction; visibility; staff fatigue; equipment; other.
Failure Mode: What could go wrong?
Failure Causes: Why would the failure happen?
Failure Effects: What would be the consequences of failure?
Likelihood of Occurrence: 1-10 (10 = very likely to occur)
Likelihood of Detection: 1-10 (10 = very unlikely to detect)
Severity: 1-10 (10 = most severe effect)
Risk Priority Number (RPN): Likelihood of Occurrence x Likelihood of Detection x Severity

Adapted from Institute for Healthcare Improvement, ihi.org, 2019. Contact: Sharon Muret-Wagstaff, PhD, smuretw@emory.edu