

# Medication Safety During the COVID-19 Pandemic: What Have We Learned in the United States?

**ISMP**  
Institute for Safe Medication Practices  
An ISMP Affiliate

## Medication Safety During the COVID-19 Pandemic: What Have We Learned in the United States?

**Christina Michalek**, BSc Pharm, RPh, FASHP, Medication Safety Specialist, ISMP  
**Michael R. Cohen**, RPh, MS, ScD (hon.), DPS (hon.), FASHP, President, ISMP  
**Nistha Shah**, PharmD, International Medication Safety Management Fellow, ISMP  
**Allison Hanson**, PharmD, BCPS, International Medication Safety Management Fellow, ISMP



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## Infusion Pumps in the Hallway

— Physical set up

- Extension tubing attached to primary set
  - Macrobore versus small bore tubing
  - TriPort connectors/splitters
- Labeling tubing inside and outside the room
- Infusing compatible medications together
- Secure tubing to avoid disconnection and tripping hazard



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## Purpose

Reduce nursing staff exposure to COVID-19	Conserve Personal Protective Equipment (PPE)	Potential ease in responding to multiple pump alarms, bag changes
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**Risks and Challenges**



- Shortage of extensions sets
- Occlusion alarms
  - May be delayed at low flow rates (e.g., below 5 mL/hour)
  - More frequent alarms at high flow rates (e.g., 300 mL/hour)
- Flow rate accuracy (under infusion) due to downstream resistance with some pumps
- Increased priming volume necessary with multiple extension sets
  - Much/all of the volume of secondary infusions may remain in the tubing
  - Need to know total tubing volume
  - Carrier fluid lines and flushing procedures



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**Risks and Challenges**



- Impact on barcode scanning
  - Scanning of proxy patient ID band placed on the hallway pump
  - Labeling pumps with patient name and date of birth
- Independent double check considerations
  - Tracing of infusion lines
  - Dual signature in HER
- Negative pressure rooms
- Availability of power outlets in hallway
- Placing pumps in the hallway should be limited to single patient/room



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**Planning for anticipated shortage of pumps/ infusion administration sets**

- Develop list of medications that require use of smart infusion pumps
  - See ISMP list of High-Alert Medications for drugs most likely to cause harm with accidental over or underdose
    - Consider vasopressors, opioids, insulin, IV sedation/anesthetics, neuromuscular blockers, antithrombotics, "highly concentrated" potassium chloride injection (potassium riders), etc.
- Use syringe pumps if available
  - Nursing familiarity, syringe brand, volume, priming, etc.
- Use any pumps, even without a drug library
- Use pumps from other manufacturers
- Special considerations
  - Some pumps may be located "off the beaten track" (radiology, procedural areas, perioperative areas, etc.)



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# Medication Safety During the COVID-19 Pandemic: What Have We Learned in the United States?

**Planning for anticipated shortage of pumps/ infusion administration sets**

- Switch patients from IV to oral as soon as possible following your facility's IV to oral protocol
- PO rather than IV hydration when possible
- Consider change in IV set duration policy (as per INS standards and CDC Guidelines)
- Use IV push medication administration when possible (use hospital guidelines)
  - Review ISMP Safe Practice Guidelines for Adult IV Push Medications
  - List time for IV push injection (give over x minutes) on pharmacy label and MAR; use prefilled/ready to administer/ready to use - dilution only if necessary
  - Consider issues when giving injections via Y-site connections when pumps are outside patient room (timing to patient, inadvertent bolus of drugs in extension set)



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**Planning for anticipated shortage of pumps/ infusion administration sets**

- Potential role of gravity infusion:
  - Hydration, some IV antibiotics, non-high alert medications and others (may need to assess as need arises)
  - Return to drop counting (10, 15, 20, 60 drops per mL sets) and time taping?
    - Influence of bag height, IV access type, position of patient arm, etc. can influence gravity flow
  - Tubing with dial-calibrated IV flow rate regulators vs. flow control clamp (preset a dial to specific number to roughly equal the mL/hour flow rate)
    - Does not eliminate counting drops to ensure a flow rate as close to accurate as possible
    - Take into account patient age, morbidity, severity of illness
- Elastomeric devices
- Volumetric burette tubing (e.g., certain antibiotics via syringe then dilute)



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**Planning for anticipated shortage of pumps/ infusion administration sets**

- Hypodermoclysis (subcutaneous gravity infusion)
  - Mainly for hydration (ER, Urgent Care, LTC, etc.)
  - Slow infusion 1,500 mL/24 hours x 2 sites (1 mL/min per site)
  - Thighs, upper arms, chest, abdomen
  - Can be done by non-medical personnel with minimal supervision
  - Saline or dextrose; KCl can be added
    - Can be used with hyaluronidase injected locally or via Y-connection
    - Medications have been administered via subcutaneous infusion
  - Can use more than one subcutaneous infusion at a time
  - Access Infusion Nurse Society standards



Reference | Sazon M, et al. Hypodermoclysis: An Alternative Infusion Technique. American Family Physician; <https://www.aaafp.org/afp/2003/11/10/p1575.html> ©2020 ISMP | www.ismp.org | 9

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# Medication Safety During the COVID-19 Pandemic: What Have We Learned in the United States?

  
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## Patient taking hydroxychloroquine right after discontinuing azithromycin develops QTc prolongation and cardiac arrest

Special Edition Newsletter: April 9, 2020  
<https://ismpp.org/acute-care/special-edition-medication-safety-alert-april-9-2020/covid-19>

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### Problem

- On admission to the hospital, this patient's ECG showed a QTc interval of 460 ms. A borderline QTc for women is between 451-470 ms, and an abnormally long QTc is above 470 ms.
- The day oral hydroxychloroquine was started, the patient's ECG showed a QTc of 490 ms. Three days later, the patient's QTc was 515 ms.
- On the fifth and last day of taking hydroxychloroquine, the patient experienced ventricular fibrillation and coded.



  
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### Safe Practice Recommendations

- This adverse event reinforces ECG monitoring of all patients who receive these medications in combination (or close together).
- Azithromycin has a half-life up to 72 hours, hydroxychloroquine up to 40 days, and chloroquine up to 5 days.
- Discontinuing one drug and starting another too soon may result in a similar adverse event.

  
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**Independent double check**

Special Edition Newsletter: May 14, 2020  
<https://ismp.org/acute-care/special-edition-medication-safety-alert-may-14-2020-covid-19>

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**Problem**

- Need to conserve personal protective equipment (PPE) had led to consideration of suspending or modifying independent double checks at the bedside prior to administration of high-alert medications to COVID-19 patients.
- Abandoning independent double checks and making changes to the requirements to document in electronic health records (EHRs) compromises patient safety and can lead to unsafe practice habits in the future.

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**Safe Practice Recommendations**

- Consider placing fewer independent double checks strategically at the most vulnerable points of the medication use process.
- Also, video conferencing technologies can be utilized to allow independent double checks to be conducted virtually especially in the pharmacy.
- This technology can reduce the number of people in the cleanroom, it will also reduce the need for PPE.

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## Failure to engage barcode medication administration (BCMA)

Special Edition Newsletter: May 14, 2020  
<https://ismmp.org/acute-care/special-edition-medication-safety-alert-may-14-2020-covid-19>

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### Problem

- A hospital noticed that several COVID-19-related errors were undetected before reaching patients due to a failure to engage BCMA at the bedside.
- These errors were associated with COVID-19-induced staffing changes, which resulted in redeploying operating room (OR) nurses, who were not familiar with BCMA, to other patient care units.
- One error involved a redeployed OR nurse who administered an albuterol inhaler instead of the intended **BREO ELLIPTA**(fluticasone furoate and vilanterol) inhaler after failing to use the unfamiliar BCMA technology.

  
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### Safe Practice Recommendations

- The hospital learned that redeployed nurses require orientation to the patient population, technologies, processes, and medications typically used on the newly assigned unit.



  
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## Leadership support is vital

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Special Edition Newsletter: May 1, 2020  
<https://ismmp.org/acute-care/special-edition-medication-safety-alert-may-1-2020/covid-19>

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## Problem

- As caregivers work in under-resourced environments and deal with the ever-increasing threat of risk of infection during this stressful, unpredictable COVID-19 crisis, they look to leadership for support for their well-being, health, and safety.



  
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## Safe Practice Recommendations

- Creating a safe haven
- Creating an environment of trust and fairness to restore fair and just compassion
- Balancing critical information with positive updates to help employees establish a positive mindset
- Communicating transparently
- Being a visible leader
- Providing opportunities for connectedness
- Encouraging employee self-care

  
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## Revisiting the need for MDI common canister protocols

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Special Edition Newsletter: March 26, 2020  
<https://ismp.org/acute-care/medication-safety-alert-march-26-2020/covid-19>

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### Problem

- Patients infected with the coronavirus (COVID-19 virus) often require inhaled bronchodilator medications (e.g., albuterol, levalbuterol).
- Because nebulizer therapy with bronchodilators for presumptive or confirmed COVID-19 patients may not be safe due to the generation of aerosols, which increases the risk that respiratory droplets will remain in the air and spread the virus, delivery of these drugs via metered-dose inhalers (MDIs) is preferred.
- As a result, use of these inhalers has skyrocketed during the pandemic and there is concern about inhaler drug shortages.

  
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### Safe Practice Recommendations

- If a decision is made to move forward with a common MDI canister protocol, we encourage organizations to carefully analyze the process being considered to prevent inadvertent sources of transmission and to emphasize in the protocol the importance of hand hygiene and dual canister disinfection.
- Organizations should consider excluding patients with presumptive and confirmed COVID-19 infection, or at least segregating common canisters used by presumptive and confirmed COVID-19 patients from those used for the general patient population.
- ISMP continues to encourage manufacturers to provide smaller “institutional” containers of MDIs to prevent unnecessary waste and lower the cost.

  
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**Pharmacist Order Verification Tips**

Special Edition Newsletter: April 3, 2020  
<https://ismmp.org/acute-care/special-edition-medication-safety-alert-april-3-2020-covid-19>

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**Problem**

- When verifying medication orders, hospitals have suggested that pharmacists can help in the efforts to reduce the frequency of staff entering patient rooms and/or limit the time spent in the room, thus conserving personal protective equipment (PPE) and reducing staff exposure.
- By considering these strategies during order verification, pharmacists can also conserve medications, compounding materials, and administration sets that may be in short supply.

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**Safe Practice Recommendations**

- Consider recommending alternate methods of infusion
- Switch patients from IV to oral
- Use IV push medication administration
- Coordinate and limit medication administration times
- Review appropriate use of metered-dose inhalers (MDIs) or nebulizer therapy
- Use alternatives for medications in short supply
- Review COVID-19 treatment closely

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## Remdesivir drug labeling confusion

Special Edition Newsletter: May 14, 2020  
<https://ismpp.org/acute-care/special-edition-medication-safety-alert-may-14-2020-covid-19>

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### Remdesivir Product labeling for EUA:

<p><b>Liquid</b></p>  <p><b>Remdesivir Injection</b> 100 mg/20 mL (5 mg/mL) Store at 20°C to 25°C (68°F to 77°F); excursions permitted to 15°C to 30°C (59°F to 86°F) (see USP Controlled Room Temperature). See package insert for full prescribing information. GILEAD</p>	<p><b>Lyophilized</b></p>  <p><b>Remdesivir Lyophilized Powder</b> 100 mg/20 mL (5 mg/mL) Store at 20°C to 25°C (68°F to 77°F); excursions permitted to 15°C to 30°C (59°F to 86°F) (see USP Controlled Room Temperature). See package insert for full prescribing information. GILEAD</p>
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Both the carton and label say:  
 100 mg/20 mL (5 mg/mL) and "must be diluted prior to use"  
 Requires refrigerated storage

Both the carton and label say:  
 100 mg/vial and "must be reconstituted and diluted prior to use"  
 Requires storage below 30 °C (86 °F)

### Remdesivir Product labeling for Clinical Trials:

<p><b>FOR CLINICAL TRIAL USE ONLY.</b>  <b>Remdesivir (GS-5734) Injection, 5 mg/mL</b>          Contains 10 mL.          Store at 20°C to 25°C (68°F to 77°F); excursions permitted to 15°C to 30°C (59°F to 86°F) (see USP Controlled Room Temperature).          See package insert for full prescribing information.          Caution: New Drug. Limited by Federal (FDA) and State (California) Laws.          Sponsor: Gilead Sciences, Inc. 260 Lakeside Dr., Foster City, CA 94024, USA. Tel: +1 650 445 5205. GILEAD</p>	<p><b>FOR CLINICAL TRIAL USE ONLY.</b>  <b>Remdesivir (GS-5734) Lyophilized Powder for Injection, 100 mg</b>          Contains 1 vial.          Store at 20°C to 25°C (68°F to 77°F); excursions permitted to 15°C to 30°C (59°F to 86°F) (see USP Controlled Room Temperature).          See package insert for full prescribing information.          Caution: New Drug. Limited by Federal (FDA) and State (California) Laws.          Sponsor: Gilead Sciences, Inc. 260 Lakeside Dr., Foster City, CA 94024, USA. Tel: +1 650 445 5205. GILEAD</p>
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**Injection, 5 mg/mL** (circled in red)

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## Error

The technician inadvertently used 2 vials to prepare each subsequent remdesivir dose, exactly as he had just done minutes before when preparing several loading doses.

➔

A pharmacist failed to catch the error during the checking process (there was no barcode available to scan on the vials), and the erroneous 200 mg doses (which were labeled as 100 mg doses) were administered to multiple patients that day.



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## Problem

- ISMP received a report last week about a hospital compounding issue due in part to label confusion with the investigational drug remdesivir.
- Some facilities have received this drug, manufactured by Gilead Sciences, under a compassionate use program during a period of expanded access and through an emergency use authorization (EUA) program issued by the US Food and Drug Administration (FDA).



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## Safe Practice Recommendations

- To prevent errors, consider adding a printed barcode label to each remdesivir container so barcode scanning can be used for product and dose verification.
- Pharmacies may also want to consider affixing an auxiliary label to remdesivir injectable solution vials to note the total amount of drug (100 mg) contained within if it is not clear.
- Also provide prescribers, pharmacy staff, and nurses with a Fact Sheet<sup>1</sup> and/or Pharmacy Guide<sup>2</sup> on remdesivir provided by the manufacturer.



<sup>1</sup> [https://www.gilead.com/media/1165/pdf/remdesivir\\_eua\\_fact\\_sheet\\_for\\_hcp\\_01\\_may2020.pdf](https://www.gilead.com/media/1165/pdf/remdesivir_eua_fact_sheet_for_hcp_01_may2020.pdf)  
<sup>2</sup> [https://profrmed613.azurewebsites.net/Assets/Downloads/remdesivir\\_pharmacy\\_guide.pdf](https://profrmed613.azurewebsites.net/Assets/Downloads/remdesivir_pharmacy_guide.pdf)

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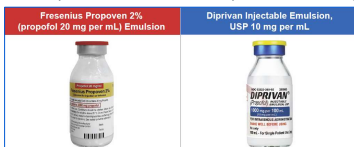
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## Importing drugs from other countries during COVID-19

- Propofol 2% (Fresenius Propoven) when only 1% has been available in US



- Distribution of neuromuscular blockers (vecuronium and rocuronium) without normal wording on vial caps



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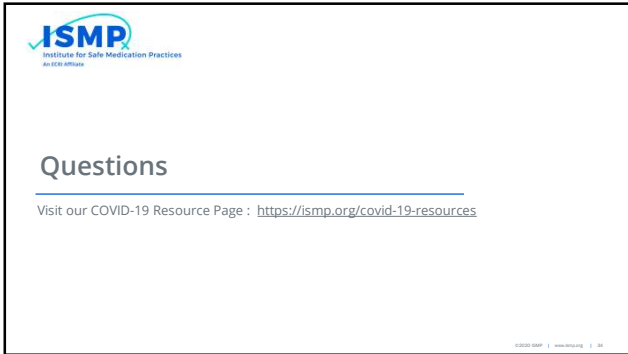
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