

Pharmacy Infection Control: Wastages and Spill Cleaning

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ABSTRACT

Objective: In this study, we aimed to illustrate pharmacy infection control wastages and spill cleaning policy as a new initiative in Saudi Arabia. **Methods:** This narrative review of pharmacy infection control emphasizes wastages and spill cleaning. A literature search was done using various databases containing PubMed, Medline, and Google Scholar. About specific pharmacy practice infection control policies and procedures. The search time was from the 1960s to October 2021. The topic was English, including narrative review, systemic review, meta-analysis, and guidelines across hospitals and community pharmacy services. Moreover, the national and international guidelines of general research in hospital practice. The committee of pharmacy research formulated and consisted of various experts, including clinical pharmacists, drug information pharmacists, and infection control specialists. The first author drafted the policy guidelines, and the second author reviewed and corrected them. The third author, an infection control specialist, revised the final document. The study emphasizes policy and procedures related to wastage and spill cleaning for pharmacy infection control. **Results:** The wastages and spill cleaning policy of pharmacy infection control consisted of various items, including the types of pharmacy wastages (biohazard wastages, non-biohazard wastages, sharp material), steps in the management of pharmacy wastages, spill kit contents, and cleaning of spill material. **Conclusion:** The policy and procedures of wastages and spill cleaning are new initiative procedures aimed at pharmacy infection control. In pharmacy settings, it is part of the biohazard and safety foundation. As such, waste management and spill clean-up policies are critical in pharmaceutical care services to improve safe disposal.

Keywords: Pharmacy, Infection Control, Wastages, spill cleaning, Saudi Arabia.

INTRODUCTION

Each healthcare organization's pharmacy department provides a variety of services to patients.¹⁻³ That includes many patients, including adults, children, and newborns.^{1,3} Some waste must be removed and disposed of in an appropriate location for each complete service. Expired medications, empty vials or bags, sensitive material, needles, syringes, remaining PPE, blood analysis in pharmacokinetics or forensic laboratories, disinfectant solution after cleaning, and solid packaging of medications are examples of wastage.⁴ A specialized waste removal company will remove these waste materials from the pharmacy. Furthermore, any spillage during the preparation of chemotherapy medications or radioactive substances must be cleaned up to avoid pharmacy contamination.⁶ Several guidelines and regulations addressed infection control waste and spill clean-up.⁷⁻¹² Other literature discussed pharmacy wastage and spill kit management.^{5-6,13-20} Additional investigations revealed varying levels of compliance with wastage material disposal by the healthcare professionals.²¹⁻²⁴ However, few publications on pharmacy policy regarding wastage and spillage of critical materials were found during the literature review. The authors were unaware of the current review, which had been published locally and internationally. This study aims to establish a pharmacy policy on wastage and spill kit material as part of infection control in pharmacies.

MATERIALS AND METHODS

It is a narrative review of pharmacy infection control. A literature search was performed from PubMed, Medline, and Google Scholar databases. That's about special topics related to infection control in pharmacy practice. The search time was from the 1960s to October 2021. The terms were in English and included narrative review, systemic review, meta-analysis, and guidelines. Policies of the last ten years were searched across all hospitals or community pharmacies. The pharmacy services in the search included inpatient, outpatient, and ambulatory care pharmacy, satellite pharmacy, extemporaneous preparation unit, repackaging unit, pharmacy store, drug information center, and clinical pharmacy services. Furthermore, the hospital practice's national and international infection control guidelines.²⁵⁻²⁶ that include the Centers for Disease Control and Prevention (CDC) of the United States of America, the Saudi Center for Diseases Control (SCDC), the World Health Organization (WHO), the American Society of Health-System Pharmacist (ASHP), and the United States Pharmacopeia (USP).⁵⁻²⁰ The committee of pharmacy infection control contains various members, including clinical pharmacists, community pharmacists, and infection control specialists. The first author drafted the policy guidelines, and the second author reviewed and corrected them. The third author, who is an infection control specialist, revised it. The policy included topics such as environmental and workplace, staff

immunization and occupational safety, pharmacy basic hygiene, quality of pharmacy infection control, pharmacy infection control competency, and pharmacy infection control education and training. The AGREE (Clinical practice guidelines) guided the reporting of the results of this study.²⁷

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Pharmacy infection control: waste and spill cleaning

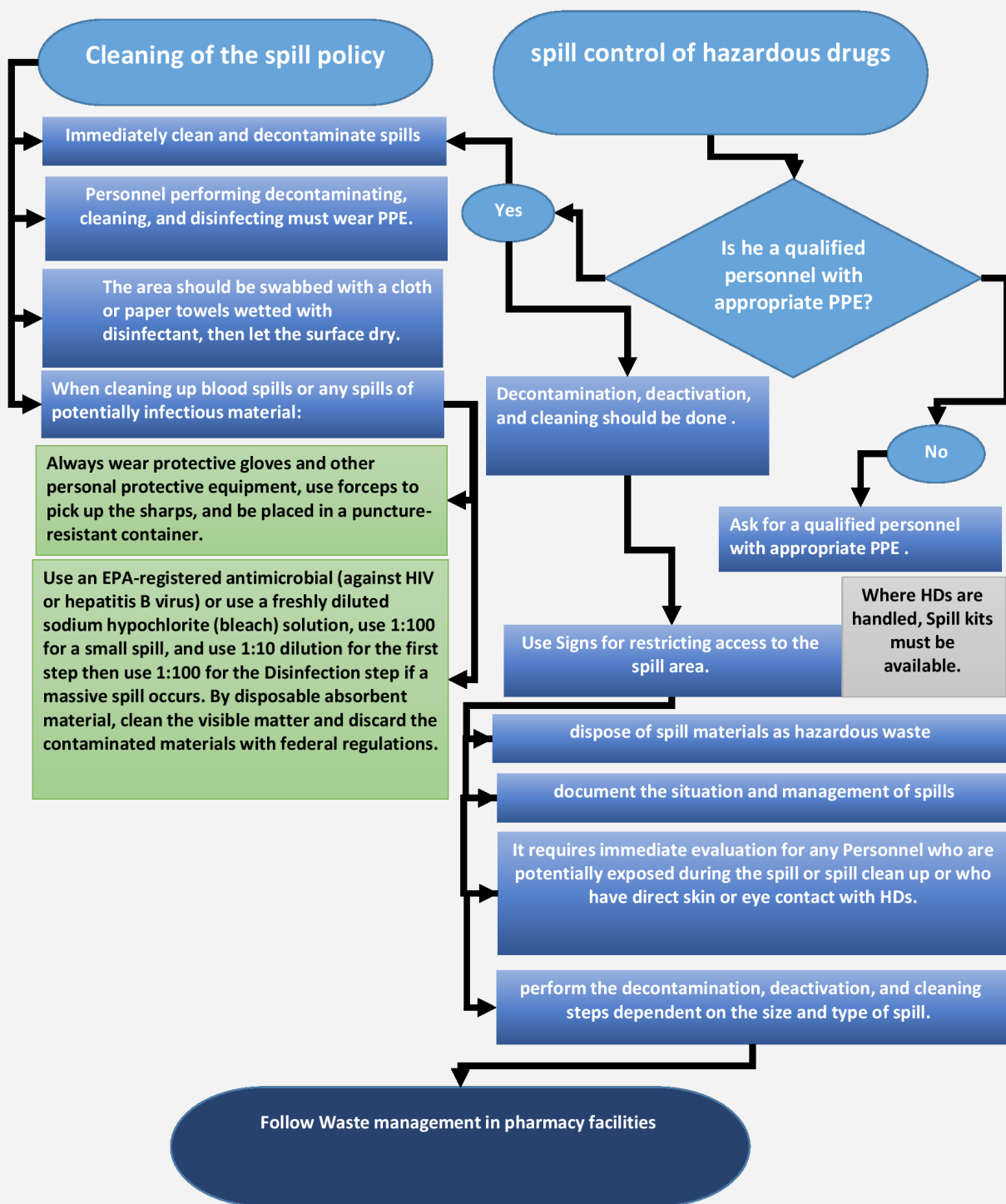


Figure 1: Steps of cleaning spills for non-hazardous, hazardous materials, and pharmacy waste flow chart.

Waste Management in Pharmacy facilities

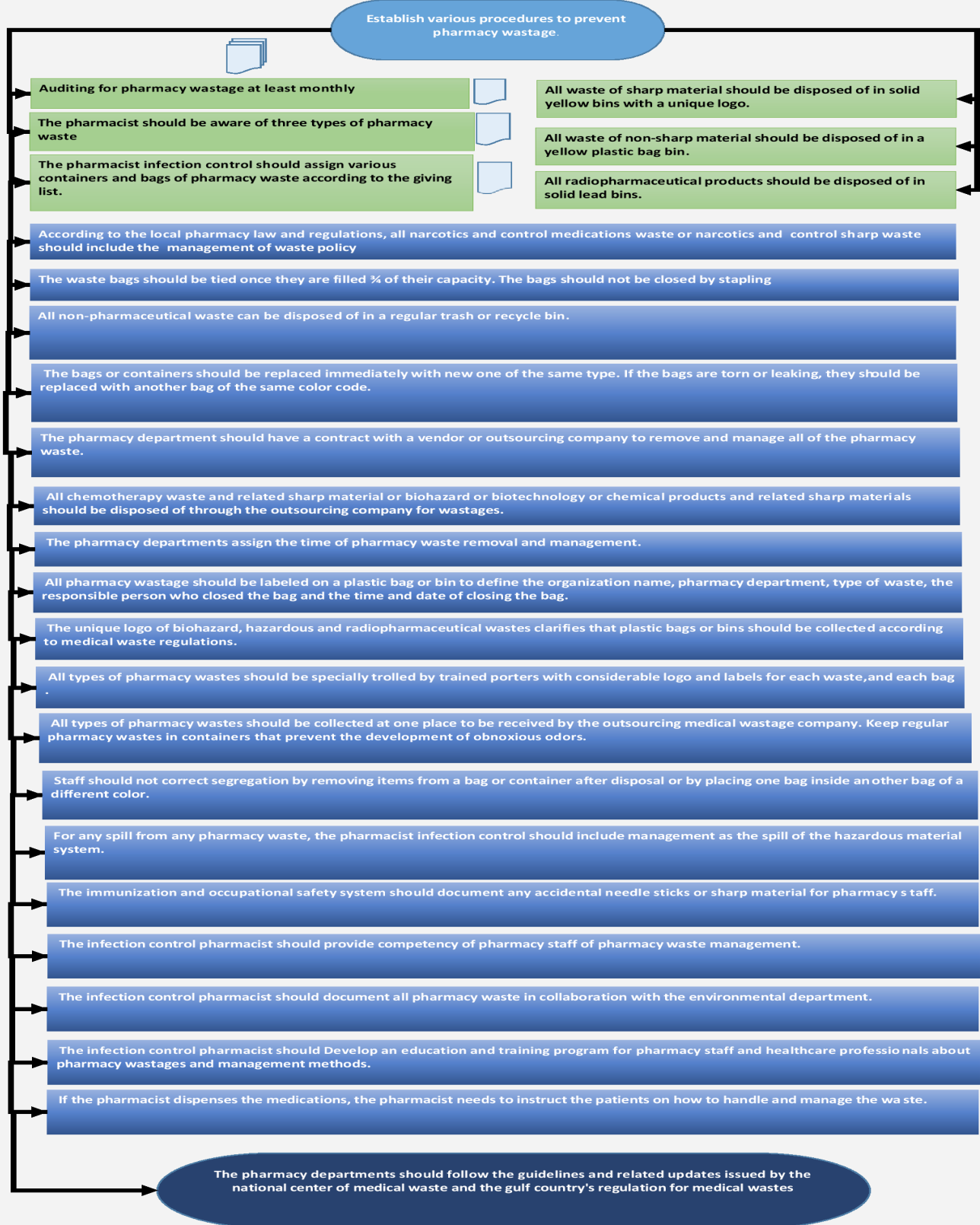


Figure 2: Steps policy and procedures for pharmacy management wastages.

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RESULTS AND DISCUSSION

All pharmacists should adhere to the following policies and procedures for cleaning spills for non-hazardous and hazardous materials, as well as pharmacy waste, as explained in Figure 1.^{5-15,28-31}

Cleaning up the Spill

1. Clean up and decontaminate spills immediately.
2. Personnel performing decontamination, cleaning, and disinfection must wear personal protective equipment (PPE).
3. Wipe down the area with a disinfectant-soaked cloth or paper towels and allow it to dry.
4. When cleaning up blood spills or other potentially infectious material spills:

5. Always wear protective gloves and other personal protective equipment, pick up sharps with forceps, and place them in a puncture-resistant container.

6. Use an EPA-registered antimicrobial (against HIV or hepatitis B virus) or a freshly diluted sodium hypochlorite (bleach) solution, diluted at 1:100 for a small spill, 1:10 for the first step, 1:100 for the Disinfection step if a large spill occurs. Clean the visible matter with disposable absorbent material and dispose of the contaminated materials following national regulations.

Spill control of hazardous drugs

1. Only qualified and trained personnel with appropriate PPE should perform decontamination, deactivation, and cleaning.
2. Signs must be used to restrict access to the spill area.
3. Spill kits must be available wherever HDs are handled.
4. Spill materials must be disposed of as hazardous waste.
5. The spill situation and management must be documented.
6. Any personnel who may have been exposed to HDs during the spill or clean-up or who have had direct skin or eye contact with HDs, must be evaluated immediately.
7. Depending on the size and type of spill, perform the decontamination, deactivation, and cleaning steps.

Waste management in pharmacy facilities¹³⁻²⁰

The infection control pharmacist suggested following this policy and procedures for pharmacy management wastages, as explored in Figure 2.

1. Try implementing various procedures to reduce pharmacy waste, such as standardized dosing and dilution of medications and recycling parenteral medicines. Besides, removing unused medications from the nursing section, automatic stop orders, and standardized TPN used readymade medications.
2. Use pharmacy auditing at least monthly for pharmacy waste.
3. The pharmacist should be aware of three types of pharmacy waste: sharp solid needles, semi-solid products such as suppositories, soft waste syrups, and parenteral medications. In addition, expired medications, remnants of parenteral medications, needles, and syringes are examples of waste. Additional waste classifications include hazardous and non-hazardous waste.
4. The pharmacist infection control should assign the following containers and bags of pharmacy waste.
 - 1) Non-hazardous Pharmaceutical Waste
Medication, including non-chemotherapy and non-biohazard medications
 - 2) Non-hazardous Pharmaceutical Sharp Waste
Any empty ampule or vial of non-chemotherapy or non-biohazardous medications
 - 3) Biohazardous waste,
Any waste that posed a risk of infection.
 - 4) Biohazardous sharp waste
Any empty ampule or vial waste had a high risk of infection.
 - 5) Chemotherapy waste
Any expired or unused chemotherapy medications
 - 6) Chemotherapy sharp wastes
Any empty chemotherapy ampoule or vial Medications
 - 7) Biotechnology waste
Any expired or unused biotechnology medications.
 - 8) Biotechnology Sharp wastes
Any biotechnology medication ampoule or vial that is empty
 - 9) Radiopharmaceutical waste
Any expired or remnants of radiopharmaceutical medications.
 - 10) Radiopharmaceutical sharp wastes
Any empty ampule or vial of radiopharmaceutical Medications

- 11) Chemical waste, any expired or remnants of chemical material used in the manufacture of extemporaneous medications
- 12) Chemical sharp wastes
Any empty ampoule or vial of chemical material used for extemporaneous medications.
- 13) Non-pharmaceutical waste
Any remaining pharmaceutical papers or labels, waste, or cartons
- 14) Controlled medications waste
Any expired or remnants of controlled medications.
- 15) Control sharp waste
The empty ampoule or vial of controlled medications
- 16) Narcotics waste
Any expired or remnants of narcotic medications.
- 17) Narcotic sharp waste
The empty ampoule or vial of narcotic medication
5. All sharps waste should be disposed of in a solid yellow bin with a unique logo. Disposable syringes with needles, including discarded sterile sharps, scalpel blades, and other sharp items, should be stored in puncture-resistant containers as close to the point of use as possible.
6. Non-sharp waste should be disposed of in a yellow plastic bag bin. These bags should be easily accessible and conveniently located near the point of generation. The waste bags should be of acceptable quality and appropriate size (maximum capacity of 100 liters) for each area. Waste separation instructions should be posted at each waste collection point to remind staff of the procedures.
7. Solid lead bins should be used to dispose of all radiopharmaceutical products.
8. According to local pharmacy laws and regulations, all narcotics and control medications waste or narcotics and control sharp waste should include management.
9. Non-pharmaceutical waste can be disposed of using regular trash or recycling bins.
10. Once the waste bags have been filled to three-fourths of their capacity, they should be tied. Stapling should not be used to close the bags.
11. Replace the bags or containers immediately with new ones of the same type. If the bags are torn or leaking, replace them with another bag of the same color code.
12. The pharmacy department should contract with a vendor or outsourcing company to remove and manage pharmacy waste disposal.
13. All chemotherapy waste and related sharp material, biohazard or biotechnology or chemical products, and related sharp material should be disposed of through the outsourcing company.
14. The pharmacy department should hire a vendor or outsource the removal and management of pharmacy waste.
15. Pharmacy departments must allocate time for pharmacy waste removal and management.
16. All pharmacy waste should be labeled on a plastic bag or bin explored the organization name, pharmacy department, type of waste, the responsible person who closed the bag, and the time and date the bag was closed.
17. According to medical waste regulations, a unique logo of biohazard, hazardous, and radiopharmaceutical wastes should be presented on plastic bags or bins.
18. All types of pharmacy wastes are specially taken away by trained porters with considerable logos and labels for each type of waste, and each bag should not fill more than three-quarters of the original containers. During intramural transport, garbage should be transported in separate trolleys (hazardous and non-hazardous). These trolleys should be cleaned and disinfected with an appropriate disinfectant daily.
19. An outsourcing medical waste company should collect all pharmacy waste in one location. Keep regulated pharmacy waste in containers that keep noxious odors in a way.
20. The staff should not correct segregation by removing items from a bag or container after disposal or placing one bag inside another of a different colour. If general and hazardous wastes are mixed by accident, the resulting mixture should be treated as hazardous healthcare waste.
21. The pharmacy infection control should include management as the hazardous material spill system for any spill from any pharmacy waste.
22. The immunization and occupational safety system should address any pharmacy staff's accidental needle sticks or sharp material.
23. The infection control pharmacist should ensure the competency of pharmacy staff in pharmacy waste management.
24. In collaboration with the environmental department, the infection control pharmacist should document all pharmacy waste.
25. The infection control pharmacist should establish a pharmacy waste education and training program for pharmacy staff and healthcare professionals.
26. If the pharmacist dispenses the medications, the pharmacist must instruct them on properly disposing of them. Any medicines that have not been used or are expired should be returned to a community pharmacy. If pharmacy drug take-back is unavailable, patients should inquire about the flush list of medications they can flush. Otherwise, if the medicines are not on the flush list, patients can dispose of them by putting them in a plastic bag and throwing them away with the regular garbage.
27. Pharmacy departments should adhere to the guidelines and updates issued by the National Center for Medical Waste and the Gulf Country's medical waste regulation.^{20,32}

CONCLUSION

The pharmacy wastes and spill cleaning coverage and methods are critical components of pharmacy infection control management devices. Therefore, management accreditation must implement the policy and tactics to put biohazard liquid and sharp fabric wastes with excellent methodology. Furthermore, the policy will protect pharmacy employees and healthcare providers from biohazard and sharp cloth-related issues and improve environment prevention contamination in the pharmacy setting. As a result, waste and spill clean-up coverage is strongly encouraged in the pharmacy practice in Saudi Arabia.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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None

CONSENT FOR PUBLICATIONS

Informed consent was obtained from all the participants.


ETHICAL APPROVAL

This research is exempted from research and ethical committee or an institutional review board (IRB) approval. <https://www.hhs.gov/ohrp/regulations-and-policy/decisioncharts-2018/index.html>

ABBREVIATIONS

PPE: personal protective equipment; **CDC:** Centers for Disease Control and Prevention; **SCDC:** Saudi Center for Diseases Control; **WHO:** World Health Organization; **ASHP:** American Society of Health-System Pharmacist; **USP:** United States Pharmacopeia (USP); **AGREE:** Appraisal of Guidelines for Disease Control and Prevention; **EPA:** Environmental Protection Agency; **HIV:** Human Immunodeficiency Virus; **HDs:** Hazardous; **TPN:** Total Parenteral Nutrition; **IPC:** Infection Prevention and Control; **IV:** Intravenous; **KSA:** Kingdom of Saudi Arabia; **MOH:** Ministry of Health

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