USAID FROM THE AMERICAN PEOPLE

PEPFAR U.S. President's Emergency Plan for AIDS Relief

ASSESSMENT OF INFECTION PREVENTION AND PATIENT SAFETY COMMODITIES IN ETHIOPIA

AIDSTAR-One
AIDS SUPPORT AND TECHNICAL ASSISTANCE RESOURCES

OCTOBER 2012

This publication was made possible through the support of the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Agency for International Development under contract number GHH-I-00-07-00059-00, AIDS Support and Technical Assistance Resources (AIDSTAR-One) Project, Sector I, Task Order 1.

ASSESSMENT OF INFECTION PREVENTION AND PATIENT SAFETY COMMODITIES IN ETHIOPIA

The authors' views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the United States Government.

AIDS Support and Technical Assistance Resources Project
AIDS Support and Technical Assistance Resources, Sector I, Task Order 1 (AIDSTAR-One) is funded by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Agency for International Development (USAID) under contract no. GHH-I-00–07–00059–00, funded January 31, 2008. AIDSTAR-One is implemented by John Snow, Inc., in collaboration with Broad Reach Healthcare, Encompass, LLC, International Center for Research on Women, MAP International, Mothers 2 Mothers, Social and Scientific Systems, Inc., University of Alabama at Birmingham, the White Ribbon Alliance for Safe Motherhood, and World Education. The project provides technical assistance services to the Office of HIV/AIDS and USG country teams in knowledge management, technical leadership, program sustainability, strategic planning, and program implementation support.

Recommended Citation
Lisi, Anna, Dagim Aschenaki, and Fekadu Abebe. 2012. *Assessment of Infection Prevention and Patient Safety Commodities in Ethiopia*. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order 1.

Acknowledgments
AIDSTAR-One Ethiopia is grateful to the Ministry of Health for their active involvement throughout the assessment as well as for their cooperation during data collection, especially in coordinating the respective health bureaus and health care facilities allowing data collectors access to the health facilities. Special thanks to the members of the Infection Prevention and Patient Safety (IPPS) Technical Working Group (TWG) under the Medical Service Directorate of the MOH for their active role in data collection training, supervision, and overall coordination. Thank you to the teams of data collectors, supervisors, and data clerks, without them this study could not have happened. Thank you to Quail Rogers-Bloch, Cary Spisak, Susana de la Torre, Anna Lisi, Dr. Kurabachew Abera, Ariella Bock, Jennifer Pearson, Aaron Hawkins, Dr. Shewaminale Yohannes, and Regassa Bayissa for their valuable technical assistance. AIDSTAR-One thanks the United States Agency for International Development (USAID) and the United States President's Emergency Plan for AIDS Relief (PEPFAR) whose financial support made the assessment possible.

Abstract

Background: In Ethiopia, ensuring a sufficient and sustainable supply of infection prevention and patient safety (IPPS) commodities is an important strategy to combat the high risk of transmission of health care–associated infections. However, there is a lack of awareness on the proper utilization of IPPS commodities by health care workers, and a lack of accurate data on the quantity of essential IPPS commodities needed by the health care system to adequately protect workers, patients, and the community from health care–associated infections. **Methods:** This assessment 1) used a consultative approach to develop a national standardized and prioritized list of IPPS commodities for all levels of health care facilities, and 2) quantified the annual need of IPPS commodities for the four levels of health care facilities in Ethiopia. The total sample size was 166 health care facilities. Focus groups discussions were also held to address key issues. **Results:** The national list that was developed prioritizes each commodity as vital, essential, or nonessential, and serves as a reference to ensure that the commodities and supplies listed are available and considered at all levels of health care facilities (Table 1). The quantification provides the estimated average annual need for each of the vital and essential commodities in the prioritized list, as well as IPPS equipment needs (see Tables 7 and 8). In addition, the frequency and percentage of stockouts is presented. Stockouts for vital IPPS commodities in health care facilities in Ethiopia from July 2010 to June 2011 occurred for an average duration of 40.2 days. **Conclusions:** There is currently an inconsistent and inadequate supply of vital IPPS commodities. The results of this assessment provide reliable information to improve decision making in supply chain management of IPPS commodities and equipment, and should be used to advocate for needed financing. The assessment also revealed a lack of knowledge by health care staff on the proper use and utilization of IPPS commodities. It is recommended that budgets be earmarked to provide training on commodities and equipment use and maintenance to ensure improved knowledge and practices by health facility staff.

AIDSTAR-One
John Snow, Inc.
1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
E-mail: info@aidstar-one.com
Internet: aidstar-one.com

CONTENTS

Acronyms ix
Introduction 1
Objectives 2
Methods 3
Focus Group Discussions 5
Ethical Considerations 5
Limitations 5
Findings 7
Standardized Infection Prevention and Patient Safety Commodities List 7
Facility Services and Practices 13
Estimated Need 17
Availability and Stock Status 22
Focus Group Discussion Results 23
Recommendations and Conclusions 25
References 27
Appendix 1: Infection Prevention and Patient Safety Commodity Needs Assessment Tool 29

ACRONYMS

cm	centimeter(s)
ft	feet
g	gram(s)
ICU	intensive care unit
in	inch(es)
in^2	inches squared
IPPS	infection prevention and patient safety
L	liter(s)
m	meter(s)
mL	milliliter(s)
mm	millimeter(s)
VEN	vital, essential, and nonessential
WHO	World Health Organization

INTRODUCTION

Infections that are acquired in health care facilities are a major health concern, particularly in developing countries such as Ethiopia. This is due to poor sanitary conditions, poor health care waste management, and lack of awareness regarding infection prevention and patient safety (IPPS; Anteneh et al. 2005). Health care–associated infections include those that are bacterial, such as urinary tract infections, wound infections, and airborne infections such as tuberculosis, and those that are nonbacterial, such as HIV and hepatitis from contact with blood (Anteneh et al. 2005).

According to the World Health Organization (WHO; 2002), in developing countries the estimated proportion of injections administered with injection equipment that was reused in the absence of sterilization ranges from 15 to 50 percent. Annually, unsafe injections worldwide cause an estimated 8 to 16 million cases of hepatitis B virus infections, 2.4 to 4.5 million cases of hepatitis C virus infections, and 80,000 to 160,000 cases of HIV infections. Prevalence of such health care–associated infections in Ethiopia was around 6 percent in 2009, as reported in a study of two hospitals (Nejad et al. 2011). With an HIV prevalence rate of 2.4 percent, and 9.2 percent in the city capital of Addis Ababa (Addis Ababa HIV/AIDS Prevention & Control Office 2010), awareness of IPPS practices and commodities is especially important in Ethiopia.

Most health care–associated infections are preventable through simple and effective strategies, such as training of health professionals and patients, and ensuring continuous availability of essential commodities. Essential IPPS commodities include soap for handwashing, personal protective equipment such as heavy duty gloves to protect waste handlers, disinfectants, safe injection devices, waste management commodities such as safety boxes for used needles, and supplies and equipment for housekeeping, linen processing, and food safety. In Ethiopia, a wide range of initiatives have been carried out to address IPPS, including establishment of the Infection Prevention and Patient Safety Technical Working Group. The group was established to bring together members from the Federal Ministry of Health, U.S. Government partners, and WHO to discuss important IPPS issues and collaborate on solutions to address these issues. Notable accomplishments of the working group include:

- Development and publication of Infection Prevention Guidelines (2005)
- Development of Health Sector Reform Guidelines—Chapter 7: Infection Prevention and Control (2010)

  Development and publication of Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers (2010).

As a result of these efforts, priority areas have been identified, training materials/curricula have been developed and provided to professionals at different levels in the health care system, and appropriate reference documents such as manuals or standard operating procedures have been implemented in facilities. While the accomplishments achieved so far are encouraging, there are still gaps, which include a lack of awareness on the proper utilization of the commodities by health care workers and a lack of accurate data on the quantity of essential IPPS commodities needed by the health care system at all levels. Key areas for improvement include the following:

- Lack of a national standardized list of essential IPPS commodities

- Absence of safe injection supplies in the national list of essential pharmaceuticals
- Shortages and inconsistent supply of IPPS commodities
- Lack of information on the availability and functionality of IPPS equipment

  Major funding gaps.

A national quantification review of HIV commodities is conducted annually by the Pharmaceutical Fund and Supply Agency with the support of the Supply Chain Management System, a U.S. President's Emergency Plan for AIDS Relief–funded project. The 2010 review recommended a comprehensive assessment of IPPS supplies. In response, the Federal Ministry of Health in collaboration with the AIDSTAR-One project (funded by the U.S. President's Emergency Plan for AIDS Relief through the U.S. Agency for International Development) conducted the recommended comprehensive assessment, and results are presented in this report. The results in this report are a first step in addressing the areas for improvement. The findings present a standardized list of supplies and equipment, and a quantification of the national need of IPPS commodities on a yearly basis by level of facility, as well as information on the availability and functionality of IPPS equipment. The assessment findings:

- Provide information to improve the supply chain for IPPS commodities so that logistics decisions (such as regarding selection, forecast, supply planning, and distribution) can be evidence-based.
- Provide information that can be used to generate forecasting assumptions in future quantification exercises.
- Describe the existing status/conditions of IPPS supplies and equipment use at the facility level.

  Provide information for advocacy and funding, and to facilitate donor coordination.

The results of this assessment provide reliable information to inform decision making in supply chain management of IPPS commodities and will serve as a reference on which to base key assumptions and considerations for future quantification exercises. The data should be used to help reduce uncertainty in financing needs and to help improve the currently inconsistent and inadequate supply of IPPS commodities at health facilities. The end goal is for health care workers, patients, and the community to be better protected from health care–associated infections by having an adequate supply of essential IPPS commodities, leading to improved quality of patient care.

OBJECTIVES

The objective of this assessment is to determine the national need of IPPS supplies and equipment. Specifically, the assessment will:

- Prioritize and standardize a list of IPPS supplies and equipment.
- Quantify the annual national demand of IPPS supplies and equipment by level of health care facility, according to the standardized and prioritized list developed.

METHODS

To begin the assessment of equipment and commodities, a standardized and prioritized list of IPPS supplies needed to be developed. First, a draft list of these commodities for Ethiopia was developed based on a desk review of key sources including the National Infection Prevention Guidelines, the Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers, Hospital Reform Guidelines, the National Drug List, Health Care Waste Management Guidelines, the National HIV/AIDS Quantification Report, as well as other recommendations. Next, in June 2011, a consultative workshop was held with participants from national partners, health care institutions, and the national IPPS advisory technical working group to standardize and prioritize the list. The list was prioritized based on vital, essential, and nonessential (VEN) analysis using standard criteria adapted from WHO guidelines (Holloway and Green 2003). Only products categorized as vital and essential were quantified for the assessment.

A quantification of the supplies and equipment needed in Ethiopia, based on the prioritized list, was conducted in selected health facilities categorized based on their level of health service delivery in all regions of Ethiopia from January 15 to February 9, 2012. The target of the study was all public health facilities in Ethiopia, and the study consisted of a sample of public health facilities that were categorized based on the level of health care delivery (i.e., specialized, zonal, and district hospitals, and health centers). The total sample size was 166 health care facilities, and the sample size in each level was 14 specialized hospitals, 36 district hospitals, 26 zonal hospitals, and 90 health centers. The sample size was calculated to estimate the quantity of IPPS commodities required at each level of the health care facilities with 95 percent confidence in the results and a 10 percent margin of error above and below the estimate. A stratified sampling method was used; due to large disparities in population sizes between each facility level, it was not feasible to sample proportional to size, so non-proportional allocation was used for each stratum. The sample was drawn at random from reference population in each of these strata.

Consultative workshops were organized to standardize the assessment tool using expert opinions. The data collection instrument was pre-tested in four health care facilities from each level prior to the training of the data collectors, and recommendations were incorporated. Eleven teams—each with one supervisor and two data collectors—completed the data collection. The trained data collectors were made up of health professionals with experience and knowledge in infection prevention and control in health care facilities. The training of the data collectors included providing material on the topic, line by line review of the survey tool (see Appendix 1), and practice conducting the survey at a facility not included in the sample. In addition, supervisors were trained to review the completed data collection questionnaires for accuracy and completeness.

- Data used to estimate the quantities needed of each commodity are drawn from four main sources:
- Review of inventory-related documents (e.g., stock cards, financial records, etc.)
- Interviews with facility personnel (e.g., store manager, IPPS case managers, nurses, waste handlers, etc.)
- Physical count of commodities

- Review of health service statistics data.

The first point of reference were the stock cards and financial records, and estimation based on this data follows the standard consumption calculation. If these records were unreliable (i.e., did not exist, were incomplete, etc.), estimation of the commodities is based on data collected during interviews and observations made during facility visits. Given that different usage protocols exist for different types of commodities, unique approaches were used to estimate the amount of commodities needed. The following sections summarize approaches that were used in estimating various commodity types.

Hand Hygiene Products

Data for this category was estimated using stock records and financial transactional records, as well as service records and professional judgment. For example, the annual requirement of liquid soap for handwashing purposes in a health care facility was estimated based on patients served in outpatient, laboratory, delivery, surgical, and inpatient departments. The average annual number of hospitalized patient days was calculated, the amount of liquid soap used for an application was estimated at 5 mL, and an estimated average frequency of use by health workers was considered in estimating the annual requirement. The annual requirement of dispensers of alcohol-based hand rub solution was estimated by multiplying the number of health care workers who would likely need hand antisepsis by the estimated frequency of replacement of the dispenser due to wear out, damage, or those that go missing. The annual requirements of a vessel for handwashing purposes with a faucet fixed to it was estimated using the professional judgment of health care workers at the service delivery points, as well as consideration of the number available, time in use, and estimated lifetime of the vessel.

Personal Protective Equipment

Most of the commodities in this category were quantified by taking into consideration the number of health care workers who need the equipment and how often the specific commodities need to be replaced. The average values of these two variables were multiplied to estimate the annual requirement of the commodities for each level of facility. This information was collected using interviews of health care workers at the service delivery points. Also taken into consideration is that each worker receives his or her own equipment that is not to be shared. Other estimations such as the requirement of surgical gloves, disposable gloves, and drapes were estimated using stock record reviews and review of financial transaction records. In instances where stock record data were unavailable, service statistics were utilized to estimate the required amount. For example, due to significant stockouts of elbow-length gloves, the annual requirement was estimated using the average number of vaginal deliveries, caesarean sections, and manual vacuum aspirations.

Chemical Agents, Dressing Materials, and Safe Injection Devices

The annual requirements of these three categories were calculated based on a combination of information from stock records and financial transaction record reviews.

Health Care Waste Management Commodities

The quantities of health care waste management commodities (waste bins, bin liners, and safety boxes) were calculated based on three variables: 1) the number of points of waste generation, 2) the amount of each type of waste generated at these points in a day, and 3) how often waste was removed from the points of generation.

Blood Drawing/Phlebotomy Collection Supplies

The annual requirement of blood drawing devices was quantified based on the average number of blood drawings done in each level of the health care facilities. The requirement of the blood collection set and tourniquet was estimated based on review of stock records.

Equipment

The annual requirement of the equipment for IPPS was obtained from interviews based on the professional judgment of health care workers at the service delivery points in every level of the health care facilities. The average estimated quantities obtained were adjusted based on the average number of functional equipment available, average service time of the equipment, and the average estimated lifespan of the equipment. The values of these variables were collected through interviews of health care workers and inventory of functional equipment at the service delivery points and in the stores.

FOCUS GROUP DISCUSSIONS

In addition to the survey, six focus group discussions with health care workers from four facilities were held with a moderator and notetaker to augment key findings from interviews, surveys, and inventories. The key issues from the field notes and tape recordings for each session were transcribed and summarized into major themes.

ETHICAL CONSIDERATIONS

The study protocol and tools were reviewed and agreed upon by the Ethiopia Federal Ministry of Health, Medical Service Directorate, and official letters from the Ministry of Health were submitted to the respective regions, zones, and health facilities. Institutional review board exemption was granted from the Western Institutional Review Board in November 2011. The study referred to the national IPPS guidelines in developing tools and summarizing and analyzing the results. All study participation was voluntary, and verbal informed consent was obtained. There were no financial incentives. Any observation of deviations from the standard practice that could harm clients or patients was to be documented and communicated to the responsible body for corrective measures at the conclusion of the data collection.

LIMITATIONS

The method of the study does not fully account for quality issues, damaged goods, and exact functionality of equipment. While adjustments of stock due to damage were accounted for, this was often based on the judgment and observation of staff. In addition, failure of equipment can be corrected with maintenance, but in this assessment it is accounted as non-functional.

FINDINGS

STANDARDIZED INFECTION PREVENTION AND PATIENT SAFETY COMMODITIES LIST

In June 2011, a national consultative workshop was held to determine a complete list of IPPS commodities. Participants from the Infection Prevention and Patient Safety Advisory Technical Working Group and other stakeholders prioritized the list using VEN analysis (Table 1), based on WHO guidelines developed for VEN categories. The assessment examines all vital and essential commodities from this list. This list should serve as a reference to ensure that the commodities and supplies listed are available and considered at all levels of health care facilities.

Table 1. List of Infection Prevention and Patient Safety Commodities

Description of the Items	Level of Priority
Hand Hygiene Products	
Soap/detergent: Bar soap: weight 100–200 g Liquid soap: preferred; volume 250–300 mL; the liquid soap with liquid soap dispenser Plain or antiseptic/antimicrobial (preferred)	Vital
Liquid soap dispenser 200–500 mL	Vital
Glycerin 98% 500 mL or 1,000 mL: U.S. Pharmacopeial grade/pharmaceutical grade	Essential
Ethyl alcohol 60–90% 1 L (70%): Not denatured with a small amount of wood (methyl) alcohol	Vital
Personal towel: size 30 × 30 cm, made of cotton and squared	Vital
Alcohol-based hand rub solution dispenser: 100–150 mL and personal	Essential
Moisturizing skin care products: Hand lotions, 500–1,000 mL	Nonessential
Soft stick: With pointed end or used for cleaning underneath the fingernails, autoclavable	Nonessential
Nail brush: Soft and used for cleaning underneath the fingernails, autoclavable	Essential
Scrub-up brush or sponge, soft: Used for cleaning the skin	Vital
Vessel for pouring water/handwashing bucket: If no running water available; buckets with faucets fixed to it	Vital

Description of the Items	Level of Priority
Personal Protective Equipment	
Plastic apron: • Made of heavy-duty neoprene, latex, nitrile, or other water-impervious material • Medium- to heavy-duty splash protection • Resistant to abrasions, chemicals, and puncture from needles and other medical sharps, and moisture proof • Cover upper body from waist to neck, lower body from waist to below knees, coupled in back • Should have cotton ties and neck loop for easy on/off • Minimum of 0.5 mm thickness • Sizes: Small, medium (approx. 35 × 45 in), and large (35 × 55 in)	Vital
Apron: Made of cloth; white in color	Vital
Protective foot wear/safety shoes or boots: • Closed boots or shoes of different sizes • Uppers and sole made of polyurethane, sole made of a vulcanized nitrile rubber • Sliding sole construction • Minimum sole puncture protection of 1,200 N • Slip-resistant sole: deep tread with coefficient of friction > 0.5	Vital
Heavy duty/utility gloves: • Made of heavy-weight neoprene, latex, nitrile, or other water-impervious material; weight 200 g • Sharp puncture resistant • Cuff should reach at least 75 mm from the upper arm surface when the elbow is flexed at 90 degrees • Palm thickness minimum of 0.5 mm • Sizes: Small (7), medium (8), and large (9) • Not polyvinyl chloride if disposed by incineration	Vital
Protective eye wear/safety glasses or goggles: • Material: Polycarbonate • Glasses with side protection and goggle design • Lens: Impact and heat resistance, molded, and 2.2 mm thick with anti-fog coating • Self-extinguishing foam and heat-resistant materials • At minimum, four indirect ventilation slots • Wide contact between goggle and face • Unobstructed peripheral vision • Adjustable support strap • Capable of being disinfected/chemical resistant	Vital
Face shield: • Molded polycarbonate or polycarbonate with aluminum binding • 100% ultraviolet light protection with polycarbonate face shield • Protect from minor impacts, sparks, and splashes • Anti-fog coating and chemical resistant	Vital
Hair cover/cap: • Made of cloth; white (food handlers) and green (operating room) • Made of fluid-resistant materials	Vital

Description of the Items	Level of Priority
Face mask: • Fluid resistance and with ear loop • Made of cloth and green in color • Size: Standard	Vital
Cover gown: • White and light in color, made of fluid-resistant materials, not dense for steam sterilization • Lightweight cotton cloth (with a thread count of 140/in^2) does not provide effective barrier and should not be counted as "in stock"	Vital
Scrub suit: • Green in color, made of fluid-resistant materials and not dense for steam sterilization • Lightweight cotton cloth (with a thread count of 140/in^2) does not provide effective barrier and should not be counted as "in stock"	Vital
Heavy-duty gloves for incinerator operator: • Made of leather and/or insulated with aramid blends, Terrycord, or cotton blends • Sizes: Small (7), medium (8), and large (9) • Safety cuff design that protects upper wrist • Solid abrasion and puncture resistance, and heat protection up to 480°C without breaking down	Essential
Protective respirators (dusk masks) for incinerator operators: • Replaceable dual-cartridge, half-mask respirator • Bayonet or push-in mounted filters in cartridge or canister form; able to remove 99.9% of dust and non-oil–based mists • Self-extinguishing, heat-resistant materials (silicone or thermal plastic polymer/thermoplastic elastomer mask) • Adequate inhale valves and exhale valve to enable easy breathing • Wide sealing flange for a secure seal with special nose bridge • Unobstructed peripheral vision • Elastic straps for a good fit	Vital
Respirators (airborne isolation precaution): N95 or N99 disposable particulate, air purifying respirator or equivalent	Vital
Drapes: Green in color, sterilizable, not dense, and should be made of fluid-resistant material	Vital
Sterile surgical gloves: • Sizes: 6, 6.5, 7, 7.5, and 8; latex preferred over nitrile • Volume proportion: Nitrile 1% of latex	Vital
Disposable/clean examination gloves: • Sizes: Small, medium, and large; latex preferred over nitrile • Volume proportion: nitrile 1% of latex	Vital
Elbow-length gloves: • Sterile • Sizes: Small, medium, and large; latex preferred over nitrile	Vital
Chemicals Agents used as Chemical Sterilants, Disinfectants, and Antiseptics	
Antiseptics	
Ethyl or isopropyl alcohol 60–90% 1 L	Vital
Chlorhexidine gluconate 2–4%	Vital
Chlorhexidine gluconate 1.5% and cetrimide 15% solution (e.g., Savlon 5 L)	Essential

Description of the Items	Level of Priority
Iodine (3%) aqueous (Lugol solution) 1 L	Essential
Iodine (3%) in 70% alcohol (tincture solution) 1 L	Essential
Iodophors 7.5–10% (e.g., 10% povidone-iodine) 1 L	Vital
Chloroxylenol 0.5–4% (e.g., Dettol) 1 L	Nonessential
Triclosan 0.2–2%	Nonessential
Hydrogen peroxide 30% solution 1 L	Vital; as antiseptic
Chemical sterilants or high-level disinfectants	
Chlorine 3% or 5% solution 1 L (e.g., Berekina)	Vital
Glutaraldehyde 2% solution 1 L	Nonessential
Formaldehyde (35–40%) solution 1 L (specific concentrations)	Essential
Hydrogen peroxide 30% solution 1 L	Nonessential
Dressing Materials	
Adhesive zinc oxide plasters 2.5 cm or 10 cm or 12.5 cm × 10 m or 5 m, white	Vital
Cotton 100 g or 500 g	Vital
Gauze bandage 12 × 5 cm, 10 × 10 cm, pack of 12 rolls	Vital
Gauze, absorbant, nonsterile 90 cm × 9 0m	Vital
Vaseline gauze, sterile	Essential
Safe Injection Devices	
Disposable syringe with needle: 2 mL, 3 mL, 5 mL, 10 mL, 20 mL, and 50 mL	Vital
Auto-disable syringe with needle: 0.5 mL, 1 mL, 2 mL, 3 mL, 5 mL, and 10 mL	Essential
Retractable syringes with needle: Automatic 2 mL, 3 mL, 5 mL, and 10 mL	Nonessential
Insulin syringe and needle	Vital
Safety box/sharp containers: • Waterproof, puncture-proof cardboard (not plastic), and puncture resistance > 15 N • Color: Yellow • Sealable tops that cannot open once they are full and sealed • Volume: 1.25 L (for community health workers), 5 L (for health care facilities) • Pictorial instructions printed on the box to describe the use and the disposal of the box • Sufficient thickness • Resistant to chemical or liquid permeation or degradation • Sharps aperture (38 mm diameter) and marking • Biohazard marking (> 50 mm diameter)	Vital
Intravenous cannula: Sterile, disposable 16 g, 18 g, 20 g, 22 g, and 24 g	Vital
Spinal needle: Disposable, sterile 0.9 × 90 mm 20 g, 22 g, 24 g, and 25 g	Vital
Butterfly needle: 23 g	Vital
Needle removers: • The needle collection container is removable from the cutter. • The hole located on the device must be large enough to insert the needle. • There should be a lever to separate the needle from the syringe.	Nonessential

Description of the Items	Level of Priority
Health Care Waste Management Commodities	
Medical waste bins: • Made of a noncorrosive material (e.g., plastic) • Have a lid that fits tightly and is easily opened and closed (with pedal) • Leak-proof and washable • Must have handles • Size: 61 cm tall with a diameter of 40 cm (small size) • Large ones should have wheels • Color-coded (yellow and black)	Vital
Medical waste plastic bin liners/biohazard bags: • Made of plastic sufficiently thick (minimum thickness 1.5 mil) • Low-density or linear-low-density polyethylene • Bag size must not exceed 44 gallons (38 in × 46 in) but depends on the bin size • 165 g impact resistance • 35 kg load rating (min.) • Tear strength by MD and TD methods 480 g • Yellow with "biohazard" or "infectious waste" printed in black, marking should include the universal biohazard symbol • Closure: Twist ties or other restraining devices	Vital
Large waste containers: Yellow and black color coded and should have wheels, size: 91 cm tall with a diameter of 76 cm	Vital
Autoclavable biohazard bag: Must be made of polypropylene plastic that does not melt at the temperature 116–135°C	Nonessential
Wheel barrow	Vital
Blood Drawing/Phlebotomy/Collection Supplies	
Tube, vacuum/vacutainer/needle 18–24 g, 1.5 ft	Essential
Vacutainer tube with EDTA 5 mL (purple, red, and tiger topped tubes)	Essential
Vacutainer holder	Essential
Sterile blood collection plastic bag, intravenous tubing, and large gauge hypodermic needle	Vital
Tourniquet or blood pressure cuff, latex rubber 75 cm	Essential
Equipment	
Steam sterilizer or autoclave	Vital
Dry heat/oven/sterilizer	Vital
Biosafety cabinet level 3	Vital
Biosafety cabinet level 2	Vital
Laundry machine	Vital
Dryer machine	Essential
Ironing machine	Essential
Boiler	Essential
Steamer	Essential

Description of the Items	Level of Priority
Housekeeping Products	
Trolley: Four wheels and carry three buckets for housekeeping/triple bucket technique	Essential
Mops and brooms	Vital
Plastic buckets	Vital
Disinfectant cleaning solution (e.g., Dettol®)	Vital
Cleaning solution/detergents: Should not contain ammonia	Vital
Food Safety Products	
Apron: Made of cloth and white in color, size: small, medium, and large	Vital
Trolley: With shelves and covered stainless steel	Vital
Hair cap: Made of cloth and white in color	Vital
Stove for cooking food	Vital
Three bucket system, stainless steel	Vital
Linen Processing Products	
Plastic bag/laundry bag, leakproof	Vital
Cabinet: With shelves, enclosed, and made of stainless steel or wood	Vital
Water tanks or containers	Vital
Trolley/carts: Covered stainless steel	Vital
Biological indicators	Essential
Chemical indicators	Essential
Surgical Safety	
Pulse oximetry	Vital
Oxygen saturation	Vital

Compiled from Federal Ministry of Health 2004, 2005, 2008, 2010; Making Medical Injections Safer, John Snow International, and PATH 2010; USAID | DELIVER PROJECT 2009; and WHO 2007.

FACILITY SERVICES AND PRACTICES

The data collection for the assessment of IPPS equipment and commodities sample included 15 specialized hospitals, 35 district hospitals, 24 zonal hospitals, and 88 health centers. To determine the annual estimates of commodities needed for each level of facility, the survey tool collected data on services provided at the facilities, facility practices, and types of health care workers at each facility. Table 2 shows the average number of types of heath care workers at each type of facility at the time of the survey. Figure 1 provides the types of waste treatment methods used and shows that the majority of the health care facilities (90.7 percent) use incineration for waste treatment. For instrument processing, most of the health care facilities use steam sterilization (76.5 percent) and dry heat sterilization (60.5 percent), and about a third use chemical sterilization (31.5 percent; Figure 2). Table 3 shows health service statistics by level of health care facility from June 2010 to September 2011.

Table 2. Average Number of Health Care Workers by Level of Health Care Facility

						Waste Handlers	Health Extension Worker
Specialized hospital	46	142	14	6	24	88	0
Zonal hospital	15	71	9	6	12	38	0
District hospital	6	35	5	4	7	20	0
Health center	0	11	2	3	3	3	12

Figure 1. Types of Waste Treatment Methods Used in Health Care Facilities

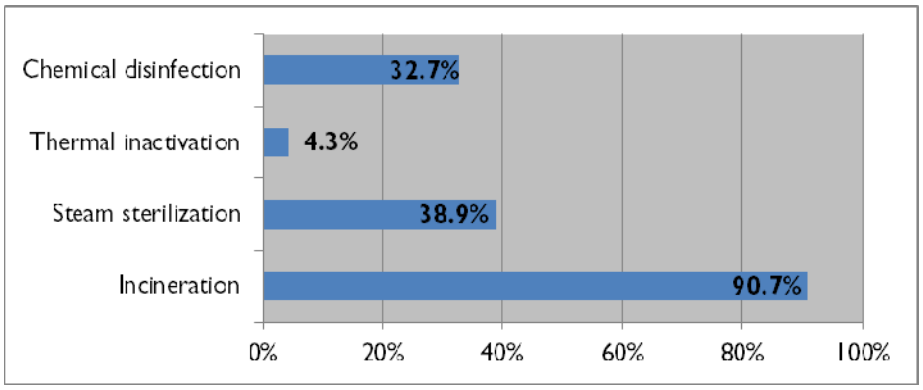

Figure 2. Types of Sterilization Techniques Employed in Health Facilities

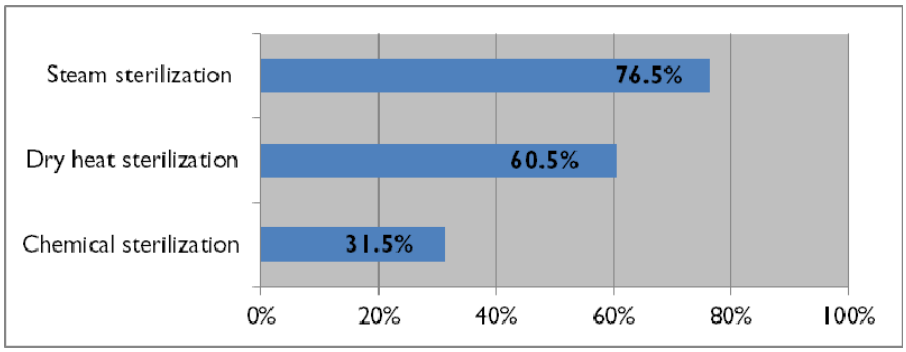

Table 3. Health Service Statistics by Level of Health Care Facility (June 2010 to September 2011)

Service	Level of Health Care Facility			
	Specialized Hospital	*Zonal Hospital*	*District Hospital*	*Health Center*
Average number of outpatient visits	78,878	51,922	34,359	16,457
Average number of inpatient visits (admissions)	9,220	4,553	2,388	85
Average number of beds (other than delivery)	244	139	64	5
Average bed occupancy rate	54%	40%	35%	12%
Average number of intensive care units	2	1	0	0
Average intensive care unit occupancy rate	27%	16%	N/A	N/A
Average number of staff attending intensive care units	9	3	N/A	N/A
Average number of therapeutic injections given	42,889	27,917	11,447	6,238
Average number of injections in maternal and child health (immunizations and family planning)	7,235	4,492	4,449	8,824
Average number of isolation rooms	2	2	2	0
Average number of health professionals attending isolated patients	5	4	4	N/A
Average number of patients served in a laboratory	78,447	69,196	25,247	10,472
Average number of blood drawings	34,350	21,142	9,365	1,709
Average number of blood collection (number of donors)	932	1,047	153	0
Average number of finger pricks done (blood film and rapid diagnostic test)	10,182	17,681	6,026	4,173
Average number of surgical beds	6	4	3	0
Average number of patients surgically operated (major surgery)	1,768	1,034	562	0
Average number of professionals attending each surgery	6	6	5	N/A
Average number of surgical deliveries (caesarean section)	700	260	144	0
Average number of minor surgery operations	1,278	1,010	551	93
Average number of delivery beds/couches	6	4	4	2
Average number of vaginal deliveries	2,571	1,089	528	289
Average number of pelvic examinations done	8,546	8,143	1,834	1,178
Average number of intrauterine device insertion and removal	83	119	70	49
Average number of manual vacuum aspiration	354	174	137	48
Average number of implants insertion and removal	321	252	451	260
Average number of vasectomies performed	4	1	2	0
Average number of tubal ligation done	17	31	25	1
Average number of finger pricks done (HIV testing and counseling and rapid diagnostic test)	31,825	17,553	11,241	9,392

Key: N/A = not available.

Table 4 shows the average number of health care workers who require personal protective equipment by level of facility and how often it should be replaced. Table 5 provides data on

average waste generation by level of health care facility, and Table 6 shows average linen processing capacity. These data were used to determine the annual estimations provided in Table 7.

Table 4. Average Number of Health Care Workers Requiring Personal Protective Equipment, by Level of Health Care Facility

Personal Protective Equipment	Unit	Average Number of Workers Who Require Equipment				How Often the Equipment Needs to be Replaced
		SP	*ZH*	*DH*	*HC*	
Plastic apron: heavy plastic or rubber	Pcs	127	43	25	11	Once every six months
Protective foot wear: closed boots or shoes	Pairs	120	41	25	10	Once a year
Heavy-duty gloves: sized small, medium, or large	Pairs	100	48	33	9	Once a month
Heavy-duty gloves: heat resistant during incineration, canvas or leather	Pairs	64	24	15	5	Once a quarter
Protective eye wear: clear plastic goggle or safety glass	Pcs	81	39	23	10	Once a year
Face shield	Pcs	58	32	14	8	Once a quarter
Hair cover/cap: white cloth	Pcs	68	33	23	9	Once every six months
Hair cover/cap: green cloth	Pcs	51	27	16	7	Once every six months
Face mask: with earlobe, standard size, green cloth	Pcs	114	51	31	13	Once every six months
Cover gown: white cloth	Pcs	242	128	71	26	Once every six months
Scrub suit: green cloth	Pcs	53	23	13	5	Once every six months
Respirators N95 or N99	Pcs	34	16	10	6	Two pcs per week
Apron: cloth	Pcs	98	40	21	9	Once every six months
Protective respirators (dust mask)	Pcs	131	47	36	11	Once a month
Personal towel: 30 cm × 30 cm, made of cotton	Pcs	241	127	62	25	Once every six months

Key: SP = specialized hospital, ZH = zonal hospital, DH = district hospital, HC = health center, Pc = pieces.

Table 5. Waste Generation by Level of Health Care Facility

	Specialized Hospital	Zonal Hospital	District Hospital	Health Center
General Waste				
Average number of waste generation points	108	51	36	14
Average amount of waste generated in a day per liter	1,868	498	371	162
Average frequency of waste removal in a day	2	2	2	1
Infectious Waste				
Average number of waste generation points	93	44	30	11
Average amount of waste generated in a day per liter	1,239	421	397	113
Average frequency of waste removal in a day	2	2	2	1
Sharp Waste				
Average number of waste generation points	70	43	26	11
Average amount of waste generated in a day per liter	195	95	91	32
Average frequency of waste removal in a day	1	1	1	1

Table 6. Linen Processing Capacity by Level of Health Care Facility

	Specialized Hospital	Zonal Hospital	District Hospital	Health Center
Average amount of linens processed per day (in kg)	602	132	78	14
Average capacity of laundry machines available (in kg)	66	92	135	10
Average capacity of drying machines available (in kg)	301	126	63	N/A

The assessment also collected data on commonly selected antiseptics: ethyl alcohol was the most commonly used (92.6 percent), followed by iodine solution (79 percent), chlorhexidine solution (75 percent), and hydrogen peroxide 3 percent solution (42 percent). The majority of the health care facilities reported that the availability of antiseptics (89.5 percent) was the most common factor in the selection of antiseptics. Other factors taken into account are safety (45 percent), efficacy (39.5 percent), cost (22.8 percent), and availability due to donation (4.9 percent).

ESTIMATED NEED

The estimated average annual need for each of the vital and essential commodities in the prioritized list for Ethiopia is reflected in Table 7. The methods discussed previously in this report were used to determine the quantities using the survey tool, review of financial and stock records, review of health service statistics, and interviews. These tables should be used by decision makers to ensure that commodities are available at each facility level to avoid stockouts and provide the highest level of safety for health care workers, patients, and the community.

Table 7. Quantity of Infection Prevention and Patient Safety Commodities Required by Level of Health Care Facility for 2012–2013

Description of Items	Unit	Average Requirement: Specialized Hospital	Average Requirement: Zonal Hospital	Average Requirement: District Hospital	Average Requirement: Health Center	Priority/ Remarks
Hand Hygiene Products						
Bar soap, 100–200 g	Pieces	3,092	2,035	1,283	300	Vital; quantity required for alternative to liquid soap
Liquid soap	250 mL	10,063	5,788	2,693	1,094	Vital; quantity required for alternative to bar soap
Alcohol-based hand rub solution dispenser 100–150 mL	Pieces	960	453	231	66	Essential
Glycerin 98%, 500 mL	500 mL	128	64	22	15	Vital
Ethyl alcohol 60–90% (70% is most common)	1,000 mL	1,456	401	134	46	Vital
Nail brush	Pieces	24	33	4	0	Essential
Scrub-up brush or sponge, soft	Pieces	852	60	46	46	Vital
Personal towel, size: 30 cm × 30 cm, made of cotton and squared	Pieces	482	254	124	50	Vital
Personal Protective Equipment						
Drapes, green in color, sterilizable	Pieces	592	346	188	11	Vital
Surgical gloves, size 6	Pairs	0	0	0	0	Vital
Surgical gloves, size 6.5	Pairs	11,900	8,000	4,101	202	Vital
Surgical gloves, size 7	Pairs	50,165	20,897	11,508	876	Vital
Surgical gloves, size 7.5	Pairs	69,097	37,427	15,598	3,818	Vital
Surgical gloves, size 8	Pairs	24,000	5,898	693	58	Vital
Disposable examination gloves, size small	Pairs	57,295	28,204	5,567	2,043	Vital
Disposable examination gloves, size medium	Pairs	166,808	103,720	48,422	6,029	Vital
Disposable examination gloves, size large	Pairs	41,487	27,309	22,664	2,794	Vital
Heavy-duty gloves, size small	Pairs	200	96	66	18	Vital
Heavy-duty gloves, size medium	Pairs	600	288	198	54	Vital

Description of Items	Unit	Average Requirement: Specialized Hospital	Average Requirement: Zonal Hospital	Average Requirement: District Hospital	Average Requirement: Health Center	Priority/ Remarks
Heavy-duty gloves, size large	Pairs	400	192	132	36	Vital
Elbow-length sterile gloves, size small	Pairs	604	254	135	56	Vital
Elbow-length sterile gloves, size medium	Pairs	1,812	762	405	169	Vital
Elbow-length sterile gloves, size large	Pairs	1,208	508	270	112	Vital
Plastic apron, heavy plastic or rubber	Pieces	254	86	50	22	Vital
Protective footwear, closed boots or shoes	Pairs	120	41	25	10	Vital
Heavy-duty gloves, heat-resistant during incineration, canvas or leather	Pairs	256	96	60	20	Vital
Protective eyewear, clear plastic goggle or safety glass	Pieces	81	39	23	10	Vital
Face shield	Pieces	232	128	56	32	Vital
Hair cover/cap, white cloth	Pieces	136	66	46	18	Vital
Hair cover/cap, green cloth	Pieces	102	54	32	14	Vital
Face mask, with ear lobe, standard size, green cloth	Pieces	3,632	1,060	514	235	Vital
Cover gown, white cloth	Pieces	484	256	142	52	Vital
Scrub suit, green cloth	Pieces	106	46	26	10	Vital
Apron, cloth	Pieces	196	80	42	18	Vital
Protective respirators (dust mask)	Pieces	1,572	564	432	132	Vital
Respirators N95 or N99	Each	3,536	1,664	1,040	624	Vital
Chemicals Agents Used as Chemical Sterilants, Disinfectants, and Antiseptics						
Chlorhexidine gluconate (2–4%)	1,000 mL	714	470	134	26	Vital
Iodine (3%) aqueous (Lugol solution)	1,000 mL	120	79	35	24	Essential
Iodine (3%) in 70% alcohol (tincture)	1,000 mL	359	64	31	17	Essential
Povidone-iodine aqueous solution 7.5% or 10%	1,000 mL	145	35	7	5	Vital
Chlorine 3% or 5% solution	500 mL	5,424	1,859	1,737	167	Vital
Formaldehyde 35–40% solution	1,000 mL	236	59	4	4	Essential
Hydrogen peroxide 30% solution	1,000 mL	689	17	15	13	Vital
Dressing Materials						
Adhesive plasters 2.5 cm or 10 cm or 12.5 cm × 10 m or 5 m	Roll	3,323	1,025	263	83	Vital
Cotton 100 g	Roll	3,103	1,434	529	163	Vital
Gauze bandage 12 × 5 cm, 10 × 10 cm	Roll	10,842	4,554	777	333	Vital

Description of Items	Unit	Average Requirement: Specialized Hospital	Average Requirement: Zonal Hospital	Average Requirement: District Hospital	Average Requirement: Health Center	Priority/ Remarks
Gauzes, absorbable, nonsterile, 90 cm × 90 m	Roll	885	518	82	31	Vital
Vaseline gauze, sterile	Roll	170	147	124	100	Essential
Safe Injection Devices						
Disposable syringe with needle, 2 mL	Pieces	20,313	13,905	2,649	2,541	Vital
Disposable syringe with needle, 3 mL	Pieces	23,558	5,075	4,401	3,198	Vital
Disposable syringe with needle, 5 mL	Pieces	120,977	42,782	27,370	14,350	Vital
Disposable syringe with needle, 10 mL	Pieces	38,156	18,425	6,759	4,107	Vital
Disposable syringe with needle, 20 mL	Pieces	5,407	1,809	565	480	Vital
Disposable syringe with needle, 50 mL	Pieces	651	503	354	24	Vital
Auto-disable syringe with needle, 0.5 mL	Pieces	150	1,233	3,882	4,487	Essential
Auto-disable syringe with needle, 1 mL	Pieces	900	630	1,419	3,993	Essential
Auto-disable syringe with needle, 2 mL	Pieces	11,500	4,889	3,236	2,642	Essential
Auto-disable syringe with needle, 3 mL	Pieces	3,450	2,271	1,503	613	Essential
Auto-disable syringe with needle, 5 mL	Pieces	39,250	4,573	4,224	1,944	Essential
Auto-disable syringe with needle, 10 mL	Pieces	4,433	3,615	3,275	2,523	Essential
Insulin syringe and needle	Pieces	21,161	7,951	4,824	443	Vital
Intravenous cannula, 16 g	Pieces	2,216	2,138	677	100	Vital
Intravenous cannula, 18 g	Pieces	17,106	16,063	3,751	381	Vital
Intravenous cannula, 20 g	Pieces	6,294	3,847	1,925	62	Vital
Intravenous cannula, 22 g	Pieces	10,422	6,860	3,099	225	Vital
Intravenous cannula, 24 g	Pieces	9,805	3,628	3,069	223	Vital
Spinal needle, disposable, 0.9 × 90 mm, 20 g	Pieces	143	94	32	3	Vital
Spinal needle, disposable, 0.9 × 90 mm 22 g	Pieces	463	305	232	0	Vital
Spinal needle, disposable, 0.9 × 90 mm 24 g	Pieces	100	12	12	0	Vital
Spinal needle, disposable, 0.9 × 90 mm 25 g	Pieces	113	74	0	0	Vital
Butterfly needle 23 g	Pieces	5,148	1,179	290	20	Vital
Health Care Waste Management Commodities						

Description of Items	Unit	Average Requirement: Specialized Hospital	Average Requirement: Zonal Hospital	Average Requirement: District Hospital	Average Requirement: Health Center	Priority/ Remarks
Medical waste bin liners/biohazard bags, plastic, yellow	Pieces	67,890	32,120	21,900	4,015	Vital
Safety box 5 L	Pieces	14,235	6,935	1,278	1,062	Vital
Medical waste bin, black, color coded, size: 61 cm tall with a diameter of 40 cm	Pieces	108	51	36	14	Vital; estimated quantities can serve for the next five years
Medical waste bin, yellow, color coded, size: 61 cm tall with a diameter of 40 cm	Pieces	93	44	30	11	Vital; estimated quantities can serve for the next five years
Plastic bucket 20 or 30 L	Pieces	140	29	19	12	Vital
Plastic bags, leakproof	Pieces	4,187	1,857	1,079	300	Vital
Mops and brooms	Pieces	441	290	202	40	Vital
Blood Drawing/Phlebotomy/Collection Supplies						
Vacutainer needle 18–24 g, 1.5 ft	Pieces	17,950	6,100	4,211	1,198	Essential
Vacutainer tube with EDTA, 5 mL	Pieces	24,624	12,438	5,436	1,022	Essential
Vacutainer holder	Pieces	6,532	1,942	1,921	1,056	Essential
Blood collection set, sterile, plastic bag, intravenous tubing, and large gauge hypodermic needle	Set	1,066	470	130	40	Vital
Tourniquet or blood pressure cuff, latex rubber, 75 cm	Pieces	328	216	87	8	Essential

Table 8 provides IPPS equipment needs for 2012-2013, taking into account the current condition of available equipment and average time in use (as shown in the table). The table also includes the average estimated lifespan of the equipment. In many cases, the equipment has been in use longer than the estimated lifespan of the equipment, reflecting that equipment should be replaced.

Table 8. Average Equipment Functionality and Needs by Level of Health Care Facility

Equipment	Average Requirement for 2012–2013				Current Condition of Available Equipment		Average Estimate Lifespan in Years
	SP	ZH	DH	HC	Percentage of Functional Equipment	Average Time in Use in Years	
Steam sterilizer (autoclave) bench top	6	3	3	0	59%	10	6
Dry heat sterilizer (oven)	6	3	5	2	80%	8	4
Boiler	1	1	1	0	83%	4	3
Laundry machine	4	4	3	1	57%	10	5
Dryer machine	2	3	2	1	67%	6	5
Ironing machine	3	2	2	1	75%	6	6
Cabinets for linens	6	4	4	1	100%	5	2
Trolley for food handling	11	5	4	2	100%	5	2
Vessels for handwashing with faucets fixed to it	45	19	24	2	79%	4	4
Large waste containers, yellow color coded; 91 cm tall with a diameter of 76 cm	0	5	13	4	100%	2	3
Large waste containers, black color coded; 91 cm tall with a diameter of 76 cm	13	4	12	1	100%	1	3
Trolley for housekeeping	16	8	6	4	100%	2	1
Wheel barrow	32	9	6	3	73%	3	2
Water tanker, 1,000 L	5	4	4	2	89%	7	7

Key: SP = specialized hospital, ZH = zonal hospital, DH = district hospital, HC = health center.

AVAILABILITY AND STOCK STATUS

There is an inconsistent supply of vital IPPS commodities in health facilities in Ethiopia. The quantitative survey show that stockouts for vital IPPS commodities in health care facilities in Ethiopia from July 2010 to June 2011 occurred for an average duration of 40.2 days (18.6 days for specialized hospitals, 54.2 days for zonal hospitals, 48 days for district hospitals, and 40 days for health centers). For instance, the average duration of stockouts of size 7.5 surgical gloves was 9 days and medium size disposable examination gloves was 15.5 days. The average percentage of vital IPPS commodities with inadequate stock at the time of the survey was 37 percent in specialized hospitals, 34 percent in zonal hospitals, and 20 percent in both district hospitals and health centers. Additionally, vital IPPS commodities were also overstocked at the time of the survey—an average of 27 percent were overstocked in specialized hospitals, 41 percent in zonal hospitals, 68 percent in district hospitals, and 22 percent in health centers—which can lead to commodity expiration and wastage. Table 9 lists the 10 vital commodities that had the longest average duration of stockout.

Table 9. Vital Infection Prevention and Patient Safety Commodities with the Longest Average Duration of Stockout Between July 2010 to June 2011

Commodity	Average Duration of Stockout (in days)
Respirators: N95 or N99	319.5
Disposable syringe with needle: 20 mL and 50 mL	118.5
Surgical gloves: sizes 6, 6.5, 7, 7.5, and 8	111.2
Butterfly needle: 23 g	108
Spinal needle: 20 g, 22 g, 24 g, and 25 g	99
Drapes	79
Povidone-iodine aqueous solution: 7.5% or 10%	69
Hydrogen peroxide 30% solution	67
Chlorhexidine gluconate 2–4%	63
Scrub-up brush or sponge	61

FOCUS GROUP DISCUSSION RESULTS

Focus group discussions were conducted with health care workers in January 2012 to provide qualitative input on IPPS commodities and issues related to supply and training. Table 10 shows the issues that were discussed in the focus groups, broken into themes.

Table 10. Infection Prevention and Patient Safety Commodities Related Issues in Health Care Facilities—Focus Group Discussions among Health Care Workers

Theme	Infection prevention and patient safety–related issue
Leadership and coordination	• Some facilities do annual planning for supplies. However, some have limited involvement of staff working at service delivery points in selection and quantification. • There is intermittent and ad hoc supply of some commodities and an inconsistent supply associated with donation. Some supplies are entirely dependent on donations (e.g., biohazard bags, elbow-length gloves, sharps containers, respirators). In addition, there is weak regulation of donated products at the facilities (e.g., supplying products that are close to expiration). • The Drug and Therapeutics Committee does not work closely enough with the Infection Prevention Committee. • Procurement does not always adhere to staff recommendations and preferences. • Some commodities are supplied only for specific programs (targeting only certain departments). • Infection prevention training for health care workers has different standards among partners, leading to disparity in the messages.
Financing and procurement	• There is a lack of or shortage of budget allocation for IPPS commodities and infrastructure. • Sometimes procurement of IPPS commodities is not possible due to a lack of options in the local market or because of poor quality (such as with wall-mounted liquid soap dispensers). • Price was the only trusted criteria in most procurement processes.
Utilization of commodities and service delivery	• There is rationing of supplies among departments and staff (such as with personal protective equipment). • There is reuse of consumable supplies due to shortages (e.g., sharp containers and non-recommended dilution of antiseptics and disinfectants). • There is a lack of lockable cabinets at service delivery points, which results in waste and damage of supplies. • There is inappropriate utilization of commodities by health care workers and clients (e.g., personal protective equipment, waste bins, equipment, chemicals). Misuse of supplies is common in most health facilities (e.g., waste bins, glycerin, soap). • There is a lack of client education on proper IPPS practices and proper handling of commodities. • Work load is an issue.
Logistics	• There is poor inventory and warehouse management in health facilities, and the supply source of some products is not known (e.g., respirators and sharps containers). • Inadequate supply and frequent stockouts of IPPS commodities is common. • Some commodities have inappropriate packaging and labeling (e.g., 20 L jerry can of alcohol). • Some health facilities are implementing interfacility reporting and resupply mechanisms to better coordinate stock within the facility.

Theme	Infection prevention and patient safety–related issue
Capacity and systems strength	• There are weak infrastructures, including road access at the facility and a lack of or shortage of water supply. • There is limited technical capacity of some health care workers, including the following: – End users of equipment are not trained on equipment operation and job aids are not available. – Staff does not have capacity on procurement and financial codes. – There is a lack of trained personnel to regularly and continuously monitor equipment and its operation. – There is a lack of knowledge and skills required by health care workers on proper IPPS practices. • Preventive maintenance of medical equipment is not routinely practiced. • Use of medical equipment beyond its lifetime.
Quality issues	• Supplying commodities that are not suitable to the working situation (e.g., location of handwashing facilities and their simplicity and appropriateness, unsuitable size for personal protective equipment). • Supply of poor quality products: Supplies with problem of packaging, labeling, effectiveness, durability, and safety.

RECOMMENDATIONS AND CONCLUSIONS

1. **National standardized list of IPPS commodities:** The results of this assessment provide a national list of IPPS commodities for Ethiopia, categorized as vital, essential, and nonessential. This list should serve as a reference to ensure that the commodities included are available and considered at all levels of health care facilities (specialized hospitals, zonal hospitals, district hospitals, and health centers). The commodities in this list should be considered for inclusion in the national list of essential medical equipment and supplies.
2. **Estimated need for IPPS commodities:** This assessment provides an estimated annual national need of IPPS commodities for each level of health care facility in Ethiopia and provides functionality of medical equipment. To ensure that health care facilities at all levels are properly equipped to protect workers, patients, and the community, the estimated need should be used by decision makers for supply chain management of IPPS commodities and serve as a reference on which to base key assumptions and considerations for future national quantifications.
3. **Shortages of IPPS commodities:** This assessment revealed a need to increase the availability of the commodities and strengthen their inventory control system in order to address stockouts and inadequate and inconsistent supply. The inventory management procedures for IPPS commodities in health care facilities are not effective, and this could have contributed to the high frequency of stockouts. It was recommended in the focus group discussions that professionals should be consulted on procurement selection and quantification, and budgets should be earmarked for IPPS commodities outlined in this report. The data from this assessment could also be used to advocate for funding to meet IPPS commodity needs in Ethiopia.
4. **Utilization of IPPS commodities and equipment use/maintenance:** This assessment also revealed that training on the proper use of supplies and equipment needs improvement. Focus group participants recommend that training should be provided for all health care workers on IPPS supplies, for all end users on the operation of medical equipment, and for technicians on the maintenance and management of medical equipment. The training should be done jointly with continuous supervision to improve the utilization of IPPS commodities and infrastructures.

For health care workers, patients, and the community to be better protected from health care–associated infections, an adequate supply of IPPS commodities are needed. The results of this assessment provide reliable information to improve decision making in supply chain management of IPPS commodities and equipment. The results should be used to advocate for the financing needed and to improve the currently inconsistent and inadequate supply of IPPS commodities at health facilities. In addition, it is recommended that budgets be earmarked to provide training on commodities and equipment use and maintenance to ensure improved knowledge and practices by health facility staff.

REFERENCES

Addis Ababa HIV/AIDS Prevention & Control Office. 2010. AA-HAPCO website. Available at http://aahapco.org/ (accessed June 2012).

Anteneh, Tadesse, Tariku Lambiyo, Keneni Gutema, et al. 2005. *Infection Control in Health Care Facilities for the Ethiopian Health Center Team*. Addis Ababa, Ethiopia: Ethiopia Public Health Training Initiative, The Carter Center, Ethiopia Ministry of Health, and the Ethiopia Ministry of Education.

Federal Ministry of Health. 2010. *Ethiopian Hospital Reform Implementation Guidelines*. Vol.1, Version 1. Addis Ababa, Ethiopia: Federal Ministry of Health.

Federal Ministry of Health. 2005. *Infection Prevention Guidelines for Health Care Facilities in Ethiopia*. Addis Ababa, Ethiopia: Federal Ministry of Health.

Federal Ministry of Health. 2004. *Infection Prevention and Patient Safety Reference Manual for Service Providers and Managers for Health Care Facilities in Ethiopia*. Addis Ababa, Ethiopia: Federal Ministry of Health.

Federal Ministry of Health. 2008. *Health Care Waste Management Guidelines*. Addis Ababa, Ethiopia: Federal Ministry of Health.

Holloway, Kathleen, and Terry Green. 2003. *Drug and Therapeutics Committees: A Practical Guide*. Geneva, Switzerland: World Health Organization. Available at http://apps.who.int/medicinedocs/en/d/Js4882e/ (accessed September 2012).

Making Medical Injections Safer, John Snow International, and PATH. 2010. *Personal Protective Equipment and Segregation Supply Specifications for Health Care Waste Management*. Available at www.path.org/publications/files/TS_ppe_specs.pdf (accessed September 2012).

Nejad, Sepideh Bagheri, Benedetta Allegranzi, Shamsuzzoha B. Syed, Benjamin Ellis, and Didier Pittet. 2011. Health-Care-Associated Infection in Africa: A Systematic Review. *Bulletin of the World Health Organization* 89(10):757–765.

USAID | DELIVER PROJECT. 2009. *Logistics of Health Care Waste Management: Information and Approaches for Developing Country Settings*. Arlington, VA: USAID | DELIVER PROJECT, Task Order 1.

World Health Organization. 2002. *Injection Practices: Rapid Assessment and Response Guide*. Geneva, Switzerland: World Health Organization. Available at www.who.int/injection_safety/toolbox/en/RARG.pdf (accessed June 2012).

World Health Organization. 2007. *PQS Performance Specification and Independent Type-testing Protocol*. Geneva, Switzerland: World Health Organization.

APPENDIX 1: INFECTION PREVENTION AND PATIENT SAFETY COMMODITY NEEDS ASSESSMENT TOOL

Questionnaire

AIDSTAR-One Ethiopia Individual Consent Forms for the Need Assessment of Infection Prevention and Patient Safety Commodities

Consent for Interview

(*Greetings) My name is* _____.

I am a data collector assessing the requirements of infection prevention and patient safety commodities in Ethiopia. We have an official letter from the Ministry of Health to conduct this assessment [present the official letter from the Ministry of Health].Your health facility has been chosen at random to take part in this survey. The questions will take not more than 60 minutes but I will also observe infection prevention practices in the facility.

There is no risk to taking part in this survey. Taking part is your choice; you can choose not to answer any of the questions or tell me to stop at any time. If you decide you do not want to take part, you will not lose any employee benefits that you normally get. If you have any questions about the survey, you can ask now or contact Mr. Dagim Aschenaki (cell phone no: 0912184739).

Your name will not be kept on the forms we use to write down your answers, and neither you nor your facility will be identified in the report. Please make sure any questions you have are answered before you agree to take part.

Please let me know if you consent or agree to being interviewed by me. [Wait for verbal consent to be given before proceeding. If verbal consent not given, end the interview.]

General Instruction: *Meet with the appropriate personnel of the facility and interview the key informants, observe practices, and review morbidity and logistics records as indicated on each part of the questionnaire.*

All fields in the form must be filled in. There should be no blanks. If there is no data available, fill in "NR" or not recorded. If the facility does not have the commodity at all, fill in "NA" or not applicable.

General Background

Name of the facility: _____ Type/Level: _____
Region: _____ Zone/Sub-city: _____ Woreda: _____
Phone Number: _____ Unique ID: _____

Section 1: Interview the Head of the Facility.

Q101. Number of health care staff by category:
Physicians: _____ Nurses: _____ Midwives: _____
Health officers: _____ Laboratory professionals: _____
Waste handlers, including laundry workers: _____
Health extension workers: _____

Q102. Service statistics (last 12 months):

General Information:
Number of outpatient visits: _____
Number of inpatient visits (admissions): _____
Total number of beds (other than deliver bed): _____
Bed occupancy Rate: _____

Intensive Care Unit (ICU):
No. of ICUs:_____
ICU occupancy rate: _____
No. of staff attending ICU: _____
Frequency of ICU patient visit by health professional in a day: _____

Injections: No. of injections given:
1. Therapeutic injections: _____
2. Maternal and child health (family planning and Expanded Programme on Immunization): _____

Isolation:
No. of isolation rooms: _____
No. of health professionals attending isolated patients: _____
Frequency of visit of the isolation rooms by health professionals in a day: _____

Laboratory:
Total patients served: _____
No. of blood drawings done: _____
No. of blood collections done (no. of donors): _____
No. of finger pricks done (BF & RDT): _____

Surgery:

No. of surgical beds: _____
No. of patients surgically operated (major surgery): _____
No. of professionals attending each surgery: _____
No. of surgical deliveries (caesarean section): _____
No. of minor surgery operated: _____

Reproductive Health:

No. of delivery beds/couch/: _____ *(ensure that number of delivery beds is NOT included in total number of beds)*
No. of vaginal deliveries: _____
No. of pelvic examinations done: _____
No. of intrauterine device insertion and removal: _____
No. of manual vacuum aspiration: _____
No. of implants insertion and removal: _____
Vasectomy: _____
Tubal ligation: _____

HIV Testing and Counseling and RDT:

No. of finger pricks done: _____

Name of the facility: _____Region: _____
Unique ID: _____

Section 2: Interview environmental health expert. For each department, note the information related to waste generation and linen processing, and inventory the functionality of equipment at work sites.

Q201. Waste generation:

	Department	**Waste Category**	**Number of Waste Generation Points**	**Total Amount of Waste Generated in a Day (per liter)**	**How Often is Waste Removed in a Day?**
A	General outpatient department	General waste			
		Infectious waste			
		Sharp waste			
B	Medicine	General waste			
		Infectious waste			
		Sharp waste			
C	Pediatrics	General waste			
		Infectious waste			
		Sharp waste			
D	Obstetrics and gynecology	General waste			
		Infectious waste			
		Sharp waste			
E	Laboratory	General waste			
		Infectious waste			
		Sharp waste			
F	Surgery	General waste			
		Infectious waste			
		Sharp waste			
G	Emergency	General waste			
		Infectious waste			
		Sharp waste			
H	Maternal and child health	General waste			
		Infectious waste			
		Sharp waste			
I	Others, please specify	General waste			
		Infectious waste			
		Sharp waste			
	Total (A+B+C+D…I)	**General waste**			
	Total (A+B+C+D…I)	**Infectious waste**			
	Total (A+B+C+D…I)	**Sharp waste**			

Q202. What kind(s) of waste treatment methods are used? (Circle the responses; multiple responses are possible.)

a. Incineration
b. Steam sterilization/autoclave
c. Thermal inactivation
d. Chemical disinfection
e. Other _____

Q203. Laundry processing:

a. Capacity of laundry machine(s):_____, _____, _____, _____(in kg, note the capacity for each of the laundry machine available)
b. Capacity of drying machine(s):_____, _____, _____, _____ (in kg, note the capacity for each of the drying machine available)
c. Average amount of linens processed (including manual) per day (in kg):_____

Q204. Observe the available number and functionality of the equipment listed throughout the facility. Ask the environment health expert the following information. Note any relevant comments.

		Observation		Interview with Environmental Health Expert			
No.	**Equipment List**	**Number Available at Work Sites**	**Number Functioning**	**Time in Use (in years)[1,2,3]**	**Estimated Total Life Span[2,3]**	**Total Number Needed in Facility**	**Comments**
1	Laundry machine						
2	Dryer machine						
3	Ironing machine						
4	Cabinet for linens (with enclosed and stainless steel shelves)						
5	Trolley for food handling(with covered stainless steel shelves)						
6	Vessels for pouring water/handwashing bucket with faucets fixed to it						
7	Large waste containers; for central waste collection 1.1. Yellow color coded						
	1.2. Black color coded						
8	Trolley for housekeeping (four wheels and carry three basins)						
9	Wheel barrow						
10	Water tank/container						

When there is more than one ***functioning*** piece of equipment, average and record the time in use (in years).

If the environmental health expert does not know answer, write "DK" or "Don't know" in the cell.

If the equipment is not available, write not applicable or "NA" in the cell.

Name of the facility: _____ Region: _____ Unique ID: _____

Section 3: Interview the matron nurse or case team leader. Note the responses to the questions below.

Q301. What kind(s) of sterilization techniques are employed? (Circle the responses; multiple responses are possible.)

a. Chemical sterilization
b. Steam sterilization
c. Dry heat sterilization
d. Other_____

Q302. What antiseptics solution(s) do you select commonly? (Circle the responses; multiple responses are possible.)

a. Ethyl alcohols (60–90 percent)
b. Chlorhexidine (2–4 percent) solutions or containing products
c. Iodine 3% Lugol or tincture solution
d. Iodophors (7.5–10 percent) (e.g., povidone iodine 10 percent)
e. Chloroxylenol (e.g., Dettol)
f. Triclosan (0.2–2 percent)
g. Hydrogen peroxide 3 percent
h. Other: _____

Q303. What are the common reasons for selecting the antiseptics? (Refer to Q302.) (Circle the responses; multiple responses are possible.)

a. Availability
b. Safety
c. Efficacy
d. Cost
e. Other: _____

Q304. Observe the available number and functionality of the equipment listed throughout the facility. Ask the matron nurse or case team leader about the life of the equipment. Note any relevant comments.

		Observation		Interview with Matron Nurse or Case Team Leader			
No.	**Equipment List**	**Number Available at Work Sites**	**Number Functioning**	**Time in Use (in years) [1, 2,3]**	**Estimated Total Life Span (in years)[2,3]**	**Total Number Needed at the Work Sites**	**Comments**
1	Steam sterilizer/autoclave						
2	Dry heat sterilizer/oven						
3	Boiler						
4	Steamer						

1. When there is more than one functioning piece of equipment, average and record the time in use (in years).
2. If the matron nurse or case team leader does not know the answer, write "DK" or "Don't know" in the cell.
3. If the equipment is not available, write not applicable or "NA" in the cell.

Q305. For each item in the list, note the number of staff who need the item and how often the item needs to be replaced. (An item may need to be replaced due to age, damage, or another situation which makes the item unusable.) Use this code to denote the frequency of replacement of the item: 1 = once a day, 2 = once a week, 3 = once a month, 4 = once a quarter, 5 = once every six months, and 6 = once a year.

No.	Description of the Item	Unit	Number of People who Require the Item	How Often the Item Needs to be Replaced (Circle one)
1	Plastic apron; heavy plastic or rubber	Pieces		1 2 3 4 5 6
2	Protective footwear; closed boots or shoes	Pair		1 2 3 4 5 6
3	Heavy-duty gloves; small, medium or large size	Pair		1 2 3 4 5 6
4	Heavy-duty gloves; heat resistant during incineration, canvas or leather	Pair		1 2 3 4 5 6
5	Protective eyewear: clear plastic goggle or safety glass	Pieces		1 2 3 4 5 6
6	Face shield	Pieces		1 2 3 4 5 6
7	Hair cover/cap; white cloth	Pieces		1 2 3 4 5 6
8	Hair cover/cap; green cloth	Pieces		1 2 3 4 5 6
9	Face mask; with earlobe, standard size, green cloth	Pieces		1 2 3 4 5 6
10	Cover gown; white cloth	Pieces		1 2 3 4 5 6
11	Scrub suit; green cloth	Pieces		1 2 3 4 5 6
12	Respirators N95 or N99	Pieces		1 2 3 4 5 6
13	Apron, cloth	Pieces		1 2 3 4 5 6
14	Protective respirators (dust mask)	Pieces		1 2 3 4 5 6
15	Personal towel; 30 cm × 30 cm, made of cotton	Pieces		1 2 3 4 5 6

Name of the facility: _____ *Region:* _____ *Unique ID:* _____

Section 4: Review medical store records and interview store manager, dispensing pharmacy professional, and head of the pharmacy to collect information related to annual consumption of the items listed.

The following steps should be followed:

1. *Review stock records and note inventory levels, receipts, adjustments, and stockouts.*
2. *Review financial transaction records (Model 22) if stock record for the specific item is unavailable and note the quantity issued for the last six months (use column F) and use store manager's estimation for adjustments and days of stockouts (use columns C and E).*
3. *Interview store manager to gather additional information and fill gaps from the stock records and financial records review. If there is no stock management system or if the data are found to be unreliable, the store manager's professional judgment will be used to estimate monthly consumption (use column G).*
4. *All fields in the form must be filled in.* ***There should be no blanks.*** *If there is no data available, fill in "NR" or not recorded. If the facility does not have the commodity at all, fill in "NA" or not applicable.*

Table definitions:

A. Beginning inventory: Stock on hand 12 months ago (***Based on stock records***)
B. Quantity received: Total quantity received during the last 12 months (***Based on stock records***)
C. Adjustments: Quantities expired, damaged, and adjustments during the last 12 months (***Based on stock records***)
D. Ending inventory: Current stock on hand (***Based on physical count or stock records***)
E. Days of stockouts during the last 12 months (***Based on stock records***)
F. Quantity issued (***Based on financial records***)
G. Estimated average monthly consumption (***Based on interview with store man or head of pharmacy***)

If the facility does not have the commodity at all fill in "NA" or "not applicable." If there is no data available, fill in "NR" or "not recorded."

No	Item Description	Unit	Beginning Inventory (A)	Quantity Received (B)	Adjustments (C)	Ending Inventory (D)	Days of Stockouts (E)	Quantity Issued (F)	Estimated Monthly Consumption (G)
1	Bar soap; 100–200 g	Pieces							
2	Liquid soap	250 mL							
3	Liquid soap dispenser; 200–500 mL	Pieces							
4	Glycerin 98% 500 mL	500 mL							
5	Ethyl alcohol 60–90% (70%)	1,000 mL							

No	Item Description	Unit	Beginning Inventory (A)	Quantity Received (B)	Adjustments (C)	Ending Inventory (D)	Days of Stockouts (E)	Quantity Issued (F)	Estimated Monthly Consumption (G)
6	Nail brush	Pieces							
7	Scrub-up brush or sponge, soft	Pieces							
8	Drapes; green in color, sterilizable	Pieces							
9	Surgical gloves, size 6	Pairs							
10	Surgical gloves, size 6.5	Pairs							
11	Surgical gloves, size 7	Pairs							
12	Surgical gloves, size 7.5	Pairs							
13	Surgical gloves, size 8	Pairs							
14	Disposable examination gloves, size small	Pairs							
15	Disposable examination gloves, size medium	Pairs							
16	Disposable examination gloves, size large	Pairs							
17	Heavy-duty gloves, small	Pairs							
18	Heavy-duty gloves, medium	Pairs							
19	Heavy-duty gloves, large	Pairs							
20	Elbow-length sterile gloves, small	Pairs							
21	Elbow-length sterile gloves, medium	Pairs							
22	Elbow-length sterile gloves, large	Pairs							
23	Chlorhexidine gluconate (2–4%)	1,000 mL							
24	Chlorhexidine gluconate (2–4%) and cetrimide 15% solution (e.g., Savlon)	1,000 mL							
25	Iodine (3%) aqueous (Lugol solution)	1,000 mL							
26	Iodine (3%) in 70% alcohol (tincture solution)	1,000 mL							

No	Item Description	Unit	Beginning Inventory (A)	Quantity Received (B)	Adjustments (C)	Ending Inventory (D)	Days of Stockouts (E)	Quantity Issued (F)	Estimated Monthly Consumption (G)
27	Povidone-iodine aqueous solution 7.5% or 10%	1,000 mL							
28	Chlorine 3% or 5% solution (e.g., Berekina)	500ml							
29	Formaldehyde 35–40% solution	1,000 mL							
30	Hydrogen peroxide 30% solution	1,000 mL							
31	Adhesive plasters, 2.5 cm or 10 cm or 12.5 cm × 10 m or 5 m	Roll							
32	Cotton, 100 g	Roll							
33	Gauze bandage, 12 × 5 cm, 10 × 10 cm	Roll							
34	Gauzes, absorbable, non-sterile 90 cm × 90 m	Roll							
35	Disposable syringe with needle, 2 mL	Pieces							
36	Disposable syringe with needle, 3 mL	Pieces							
37	Disposable syringe with needle, 5 mL	Pieces							
38	Disposable syringe with needle, 10 mL	Pieces							
39	Disposable syringe with needle, 20 mL	Pieces							
40	Disposable syringe with needle, 50 mL	Pieces							
41	Auto-disable syringe with needle, 0.5 mL	Pieces							
42	Auto-disable syringe with needle, 1 mL	Pieces							

No	Item Description	Unit	Beginning Inventory (A)	Quantity Received (B)	Adjustments (C)	Ending Inventory (D)	Days of Stockouts (E)	Quantity Issued (F)	Estimated Monthly Consumption (G)
43	Auto-disable syringe with needle, 2 mL	Pieces							
44	Auto-disable syringe with needle, 3 mL	Pieces							
45	Auto-disable syringe with needle, 5 mL	Pieces							
46	Auto-disable syringe with needle, 10 mL	Pieces							
47	Insulin syringe and needle	Pieces							
48	Plastic bucket 20 or 30 L	Pieces							
49	Safety box 5 L	Pieces							
50	Intravenous cannula, 16 g	Pieces							
51	Intravenous cannula, 18 g	Pieces							
52	Intravenous cannula, 20 g	Pieces							
53	Intravenous cannula, 22 g	Pieces							
54	Intravenous cannula, 24 g	Pieces							
55	Spinal needle; disposable, 0.9 × 90 mm 20 g	Pieces							
56	Spinal needle; disposable, 0.9 × 90 mm 22 g	Pieces							
57	Spinal needle; disposable, 0.9 × 90 mm 24 g	Pieces							
58	Spinal needle; disposable, 0.9 × 90 mm 25 g	Pieces							
59	Butterfly needle 23 g	Pieces							
60	Medical waste bin liners/biohazard bags; plastic, yellow	Pieces							
61	Vacutainer needle 18–24 g × 1.5’	Pieces							

No	Item Description	Unit	Beginning Inventory (A)	Quantity Received (B)	Adjustments (C)	Ending Inventory (D)	Days of Stockouts (E)	Quantity Issued (F)	Estimated Monthly Consumption (G)
62	Vacutainer tube with EDTA 5 mL	Pieces							
63	Vacutainer holder	Pieces							
64	Blood collection set; sterile, plastic bag, intravenous tubing and large gauge hypodermic needle	Set							
65	Tourniquet or blood pressure cuff, latex rubber 75 cm	Pieces							
66	Plastic bags, leakproof	Pieces							
67	Mops and brooms	Pieces							
68	Biological indicator of sterilization	Pieces							
69	Chemical indicator of sterilization	Pieces							
70	Face mask; standard size	Each							
71	Respirators N95 or N99	Each							
72	Vaseline gauze, sterile	Roll							
			Number available in the store						
73	Steam sterilizer or autoclave	Each							
74	Dry heat/oven/sterilizer	Each							
75	Biosafety cabinet level 3	Each							
76	Biosafety cabinet level 2	Each							
77	Boiler	Each							
78	Steamer	Each							

Notes:

Section 5: Semistructured guided for focus group discussions.

This focus group guide is used for both nurse professionals and waste handlers that are working in a health care facility. The objective of the focus group is to understand the health care workers' experience and opinions related to a specific IPPS commodity.

The list of subjects to explore found in the following is preliminary. The topic guide will be developed based on any gaps identified following the analysis of the quantitative survey. The respondents do not have to strictly follow the sample subjects; they can undergo free-flowing discussion, and the moderator may raise issues if he/she feels the subject was not sufficiently covered in the discussion.

General Information:

Date: _____
Name of moderator: _____
Name of note-taker: _____
Name of the health care facility: _____
Type of respondents: _____
Number of respondents: _____

Sample subjects to explore:

1. How do you choose specific IPPS commodities for use?
   Probe: Do you need to use these commodities?
2. Have you experienced shortages and stockouts of IPPS commodities?
   Probe: What sorts of commodities? How frequently?
3. Why do you think there are shortages and stockouts of IPPS commodities?
4. How can we improve estimating the amounts needed for these commodities?
5. What are barriers to using personal protective equipment appropriately?
   Probe: Can size of personal protective equipment be a barrier to using them appropriately? How do you determine the size needed?
6. What do you think about the quality of the IPPS commodities (from the list we provided you)?

For more information, please visit aidstar-one.com.

AIDSTAR-One
John Snow, Inc.
1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
Email: info@aidstar-one.com
Internet: aidstar-one.com