IHMM CERTIFIED PANDEMIC PREPAREDNESS SECIALIST [CPPS] EXAMINATION STUDY GUIDE

IHMM CPPS
Study Guide

Preparing for the CPPS examination, even as a CHMM or CSHM, is a detailed task made easier if one dedicates the time to following the resources provided in this study guide. As previously described, the CPPS blueprint is a reflection of what one will find covered in the CPPS examination.These resources, coupled with the CPPS blueprint, will assist you with preparing for the CPPS examination. In addition to providing the resources used to construct the examination from the blueprint, we also provide 2 sample exam questions, multiple choice answers, the correct answer, and the rationale for why the correct answer is correct.

Certified Pandemic Preparedness Specialist™ (CPPS™) Examination Study Guide

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IHMM
INSTITUTE OF HAZARDOUS MATERIALS MANAGEMENT

Some of this material was generated by artificial intelligence and then subsequently reviewed and validated by the subject matter experts from the IHMM Microcredential Task Force.

Domain 1: Microbiology Fundamentals

1. Fundamentals of Microbiology (Jeffrey Pommerville, 11th Edition) (Link: https://www.amazon.com/Fundamentals-Microbiology-Jeffrey-Pommerville/dp/1284100952)

Synopsis: This book provides a comprehensive introduction to microbiology, covering microbial structure, function, genetics, and infectious diseases. **Importance:** Understanding microbiology is foundational for recognizing how pathogens spread and interact with hosts, aiding in disease prevention and response.

2. CDC On-Demand Laboratory Training - Basic Microscopy (Link: https://www.cdc.gov/lab-training/php/courses/basic-microscopy.html)

Synopsis: This training covers essential microscopy techniques used in clinical diagnostics. **Importance:** Enables professionals to identify pathogens, a crucial skill in pandemic response.

3. CDC On-Demand Laboratory Training - Fundamentals of PPE in Clinical Laboratories (Link: https://www.cdc.gov/lab-training/php/courses/microbiology-series.html)

Synopsis: This course outlines the appropriate use of personal protective equipment (PPE) in laboratory settings. **Importance:** Proper PPE use minimizes the risk of pathogen transmission among healthcare and laboratory personnel.

4. CDC On-Demand Laboratory Training - Basic Molecular Biology (Link: https://www.cdc.gov/lab-training/php/courses/microbiology-series.html)

Synopsis: Focuses on nucleic acid extraction techniques for identifying infectious agents. **Importance:** Molecular diagnostics play a key role in pandemic surveillance and response.

5. CDC On-Demand Laboratory Training - Core Microbiology Skills (Link: https://www.cdc.gov/lab-training/php/courses/microbiology-series.html)

Synopsis: Provides a foundation in microbiological techniques and practices. **Importance:** Strengthens the ability to detect and analyze microbial pathogens.

6. CDC On-Demand Laboratory Training - Routine Microscopy Procedures (Link: https://www.cdc.gov/lab-training/php/courses/microbiology-series.html)

Synopsis: Details standard laboratory microscopy practices for pathogen detection. **Importance:** Supports accurate identification of infectious agents during outbreaks.

> **Sample Multiple Choice Question #1:** Which of the following techniques is essential for identifying microbial pathogens in a clinical setting?

A) Gram staining

B) Gel electrophoresis

C) Western blot

D) Spectroscopy

Correct Answer: A) Gram staining

Rationale: Gram staining is a fundamental microbiological technique used to classify bacteria based on their cell wall properties, aiding in the identification and treatment of infections. *(Source: Fundamentals of Microbiology, Jeffrey Pommerville, 11th Edition)*

Sample Multiple Choice Question #2: Which of the following is the primary reason why Gram staining is used in microbiology?

A) To visualize viral particles

B) To differentiate bacterial species based on cell wall composition

C) To detect fungal spores in clinical samples

D) To measure bacterial growth rates

Correct Answer: B) To differentiate bacterial species based on cell wall composition

Rationale: Gram staining is a fundamental microbiological technique that differentiates bacteria based on their cell wall properties, which helps guide appropriate antibiotic treatment.

Case Study: Implementing Microbiological Surveillance in a Public Health Agency

A pandemic preparedness specialist was tasked with enhancing the microbial surveillance capabilities of a national public health agency. By implementing rapid diagnostic tools, including PCR and antigen testing, the specialist improved pathogen detection rates. They also conducted microbiology training for staff, ensuring early detection of infectious agents and reducing outbreak response times.

Domain 2: Virology

7. Columbia University Virology Lecture Series (YouTube) (Link: https://www.youtube.com/watch?v=4WwBQ3q_t5c)

Synopsis: A series of virology lectures by Professor Vincent Racaniello covering virus structures, replication, and immune responses. **Importance:** Essential for understanding viral behavior, which informs pandemic response strategies.

8. Basic Virology (Wagner, Hewlett, Bloom, Camerini, 3rd Edition) (Link: https://www.wiley.com/en-us/Basic+Virology%2C+3rd+Edition-p-9781405147156)

Synopsis: Comprehensive textbook on viral pathogenesis and epidemiology. **Importance:** Aids in understanding how viruses spread and how to mitigate their impact.

> **Sample Multiple Choice Question #1:** Which of the following best describes how viruses replicate?
>
> A) Binary fission
>
> B) Mitosis
>
> C) Utilizing host cellular machinery
>
> D) Independent metabolic activity
>
> **Correct Answer:** C) Utilizing host cellular machinery
>
> **Rationale:** Viruses lack independent metabolic activity and must hijack host cells to replicate. *(Source: Basic Virology, Wagner et al., 3rd Edition)*
>
> **Sample Multiple Choice Question #2**: What is the primary method viruses
>
> use to reproduce?
>
> A) Binary fission
>
> B) Budding off independently
>
> C) Utilizing host cellular machinery
>
> D) Spontaneous generation
>
> **Correct Answer:** C) Utilizing host cellular machinery

Rationale: Viruses lack the necessary components for independent replication and must hijack a host cell's machinery to produce new virions. (Source: Basic Virology, Wagner et al., 3rd Edition)

Case Study: Managing Viral Outbreaks in an Urban Hospital

During an outbreak of a novel respiratory virus, a hospital hired a pandemic preparedness specialist to lead containment efforts. The specialist coordinated virology testing protocols, enforced patient isolation procedures, and established a cross-functional team to manage infection control. Their work resulted in a 40% reduction in hospital-acquired infections.

Domain 3: Biosafety and Risk Management

9. WHO Laboratory Biosafety Manual (4th Edition) (Link: https://www.who.int/publications/i/item/9789240011311)

Synopsis: Guidelines for safe laboratory practices when handling infectious materials. **Importance:** Ensures biosafety measures are upheld to prevent laboratory-acquired infections.

10. WHO Biorisk Management Guide (Link: https://www.who.int/publications/i/item/9789241596893)

Synopsis: Framework for managing biological risks in laboratory and healthcare environments. **Importance:** Helps institutions develop robust biosafety protocols.

11. Biosafety in Microbiology and Biomedical Laboratories (CDC, 6th Edition) (Link: https://www.cdc.gov/labs/BMBL.html)

Synopsis: Guidance on containment, risk assessment, and response to biological hazards. **Importance:** Protects workers from exposure to infectious diseases.

12. CDC Biosafety Lab Levels Infographic (Link: https://www.cdc.gov/mmwr/preview/mmwrhtml/su6002a1.htm)

Synopsis: Visual representation of biosafety levels (BSL-1 to BSL-4) and associated protocols. **Importance:** Clarifies risk levels and necessary precautions for different pathogen categories.

Sample Multiple Choice Question #1: Which biosafety level (BSL) requires full-body, air-supplied positive pressure suits for handling dangerous pathogens?

A) BSL-1

B) BSL-2

C) BSL-3

D) BSL-4

Correct Answer: D) BSL-4

Rationale: BSL-4 facilities handle highly infectious agents like Ebola, requiring the highest containment protocols. *(Source: CDC Biosafety Lab Levels Infographic)* (Link: https://www.cdc.gov/mmwr/preview/mmwrhtml/su6002a1.htm)

Sample Multiple Choice Question #2: What is the main purpose of a biosafety cabinet (BSC) in a laboratory?

A) To provide storage for hazardous materials

B) To protect laboratory workers and the environment from infectious agents

C) To sterilize laboratory equipment automatically

D) To increase oxygen levels in laboratory spaces

Correct Answer: B) To protect laboratory workers and the environment from infectious agents

Rationale: Biosafety cabinets (BSCs) are essential laboratory equipment designed to prevent the spread of infectious agents by providing controlled airflow and filtration. (Source: Biosafety in Microbiology and Biomedical Laboratories (CDC, 6th Edition), WHO Laboratory Biosafety Manual (4th Edition))

Case Study: Developing Biosafety Protocols for a Research Laboratory

A government research facility working with high-risk pathogens lacked standardized biosafety measures. A pandemic preparedness specialist introduced rigorous BSL-3 and

BSL-4 protocols, conducted risk assessments, and trained lab personnel in biosafety practices. These measures significantly decreased the risk of accidental pathogen exposure.

Domain 4: Emergency and Pandemic Preparedness

13. Principles of Risk Management and Insurance (Rejda, McNamara, 14th Edition) (Link: https://www.pearson.com/store/p/principles-of-risk-management-and-insurance/P100000662636)

Synopsis: Explores risk assessment, mitigation, and financial protections in crisis situations. **Importance:** Helps businesses and governments develop financial resilience during pandemics.

14. NFPA 101 & NFPA 1600 (National Fire Protection Association) (Link: https://www.nfpa.org/codes-and-standards/nfpa-1600-standard-development/1600)

Synopsis: Standards for emergency management and business continuity. **Importance:** Establishes protocols for organizational preparedness and response.

> **Sample Multiple Choice Question #1:** Which organization provides standards for business continuity planning in the event of pandemics and other disasters?
>
> A) CDC
>
> B) WHO
>
> C) NFPA
>
> D) OSHA
>
> **Correct Answer:** C) NFPA
>
> **Rationale:** The NFPA 1600 standard outlines essential guidelines for emergency management and continuity planning. *(Source: NFPA 1600)*
>
> **Sample Multiple Choice Question #2**: Which element is critical in a business continuity plan (BCP) for pandemic preparedness?
>
> A) Increasing the company's stock market investments

B) Ensuring remote work capabilities and continuity of operations

C) Reducing employee salaries during the crisis

D) Increasing the number of physical office locations

Correct Answer: B) Ensuring remote work capabilities and continuity of operations

Rationale: A well-structured business continuity plan ensures organizations can maintain essential functions during pandemics, including remote work implementation and supply chain management. (Source: NFPA 1600, Principles of Risk Management and Insurance, Rejda & McNamara, 14th Edition)

Case Study: Business Continuity Planning for a Corporate Headquarters

A multinational corporation needed a pandemic preparedness plan to maintain operations during COVID-19. A specialist developed a remote work policy, secured PPE for essential staff, and implemented health screenings. The company successfully maintained productivity while ensuring employee safety.

Domain 5: Project and Occupational Health Management

15. A Guide to the Project Management Body of Knowledge (PMBOK, 6th Edition) [Link: https://www.amazon.com/Project-Management-Knowledge-Guide-Sixth-Practice/dp/1628253827]

Synopsis: Best practices in project management for crisis and emergency response. **Importance:** Provides a structured approach to managing pandemic-related projects.

16. ISO WD3 45006:2023 - Occupational Health and Safety Guidelines [Link: https://www.iso.org/standard/64361.html]

Synopsis: Standards for managing workplace infectious disease risks. **Importance:** Helps businesses develop protocols to protect employees during pandemics.

Sample Multiple Choice Question #1: What is the primary focus of ISO 45006:2023?

A) Fire safety regulations

B) Occupational health and safety in preventing infectious diseases

C) Financial risk management

D) Structural engineering standards

Correct Answer: B) Occupational health and safety in preventing infectious diseases

Rationale: ISO 45006:2023 provides guidelines for managing infectious disease risks in workplace environments. *(Source: ISO WD3 45006:2023)*

Sample Multiple Choice Question #2: What is the primary goal of ISO 45006:2023 guidelines?

A) To regulate fire safety in industrial settings

B) To provide financial risk management protocols

C) To establish occupational health and safety measures for infectious diseases

D) To standardize architectural safety codes

Correct Answer: C) To establish occupational health and safety measures for infectious diseases

Rationale: ISO 45006:2023 provides guidelines to help organizations implement infection control measures to protect workers from diseases in workplace environments. (Source: ISO WD3 45006:2023 - Occupational Health and Safety Guidelines)

Case Study: Workplace Safety and Infection Control in a Manufacturing Plant

A manufacturing plant faced a severe risk of workforce disruption due to infectious disease transmission. A pandemic preparedness specialist implemented daily symptom screening, enhanced ventilation systems, and created staggered shifts to reduce exposure. These interventions resulted in a 60% decline in workplace infections.

Domain 6: International Standards

17. ISO 45001 Occupational Health and Safety Management Systems. [https://www.iso.org/standard/63787.html]

Synopsis: ISO 45001 is the international standard for occupational health and safety management systems, providing a structured, risk-based framework to prevent workplace injuries, illnesses, and fatalities. It integrates leadership accountability, worker participation, hazard identification, and continual improvement using the Plan-Do-Check-Act model. **Importance:** lies in helping organizations demonstrate due diligence, comply with legal requirements, reduce incidents and costs, protect workers, and align safety management with broader quality and environmental systems, strengthening organizational resilience and credibility.

Sample Multiple Choice Question 1

Which requirement of ISO 45001 places **direct responsibility on top management** for the effectiveness of the occupational health and safety management system?

A. Conducting internal audits
B. Demonstrating leadership and commitment to OH&S
C. Maintaining documented information
D. Performing routine workplace inspections

Correct Answer: B

Rationale (Correct):
ISO 45001 explicitly requires top management to demonstrate leadership and commitment by integrating OH&S into business processes, establishing policy, and ensuring accountability.

Rationale (Incorrect):

- **A:** Internal audits may be delegated and are not solely a top management responsibility.
- **C:** Document control can be assigned to operational or administrative staff.
- **D:** Routine inspections are typically performed by supervisors or safety staff, not top management.

Sample Multiple Choice Question 2

Under ISO 45001, when an organization identifies an OH&S hazard, what is the **preferred method** for addressing the associated risk?

A. Relying on personal protective equipment (PPE)
B. Eliminating the hazard or applying the hierarchy of controls
C. Training employees to work around the hazard
D. Accepting the risk if incidents have not occurred

Correct Answer: B

Rationale (Correct):
ISO 45001 requires risks to be addressed using the **hierarchy of controls**, prioritizing elimination and substitution over administrative controls and PPE.

Rationale (Incorrect):

- **A:** PPE is the least effective control and should not be the first option.
- **C:** Training alone does not adequately control hazards.
- **D:** ISO 45001 does not permit accepting risks solely due to lack of past incidents.

18. ISO 45006 Managing Infectious Diseases.
[https://www.iso.org/standard/64361.html]

Synopsis. ISO 45006 provides guidance for organizations on **preventing, controlling, and managing infectious disease risks** within an occupational health and safety management system, aligned with ISO 45001. It addresses preparedness, exposure assessment, controls, communication, worker consultation, and continuity planning for outbreaks and pandemics.

Its importance lies in strengthening organizational resilience, protecting worker health, supporting regulatory compliance, reducing operational disruption, and embedding infectious disease management into formal OHS governance rather than relying on ad hoc or emergency-only responses.

Sample Multiple Choice Question 1

According to ISO 45006, what is the **primary purpose** of integrating infectious disease management into an organization's occupational health and safety management system?

A. To replace public health authority requirements
B. To ensure infectious disease risks are managed systematically and proactively
C. To eliminate the need for emergency response planning
D. To transfer responsibility for disease control to employees

Correct Answer: B

Rationale (Correct):
ISO 45006 emphasizes a **systematic, risk-based approach** to identifying, assessing, and controlling infectious disease risks within an ISO 45001-aligned OHSMS.

Rationale (Incorrect):

- **A:** ISO 45006 complements, not replaces, public health regulations.
- **C:** Emergency preparedness remains a core requirement.
- **D:** Responsibility remains with the organization, not individual employees.

Sample Multiple Choice Question 2

Under ISO 45006, which control measure should be considered **first** when managing infectious disease risks in the workplace?

A. Providing personal protective equipment (PPE)
B. Implementing engineering or administrative controls to reduce exposure
C. Relying on employee self-reporting of illness
D. Suspending operations indefinitely

Correct Answer: B

Rationale (Correct):
ISO 45006 follows the **hierarchy of controls**, prioritizing engineering and administrative controls over PPE and individual behaviors.

Rationale (Incorrect):

- **A:** PPE is a secondary measure and not the preferred first control.
- **C:** Self-reporting alone is insufficient to manage exposure risks.
- **D:** Indefinite suspension is not a practical or required control measure.

Case Study - Integrating ISO 45001 and ISO 45006 in Pandemic Preparedness and Response

Background

A Certified Pandemic Preparedness Specialist (CPPS) is employed by a mid-sized manufacturing company with 600 employees across production, logistics, and administrative functions. Following lessons learned from COVID-19 and emerging infectious disease threats, senior leadership directs the CPPS to formalize pandemic preparedness within the organization's occupational health and safety management system.

Application of ISO 45001

Using ISO 45001, the CPPS first establishes **leadership accountability** by working with top management to update the OH&S policy to explicitly include infectious disease risks. The CPPS conducts a **context-of-the-organization analysis**, identifying external public health authorities, supply-chain dependencies, and vulnerable worker populations.

Hazard identification and risk assessment processes are updated to include **biological hazards**, integrating them into routine OH&S risk registers. Operational controls are

defined for contractors, visitors, and high-density work areas, while emergency preparedness plans are revised to address large-scale outbreaks and workforce absenteeism.

Application of ISO 45006

Building on the ISO 45001 framework, the CPPS applies ISO 45006 to develop **infectious disease–specific controls**. Exposure pathways are mapped by job function, and risk-based controls are implemented using the **hierarchy of controls**, including ventilation upgrades, physical distancing protocols, staggered shifts, hygiene stations, and vaccination accommodation policies.

The CPPS establishes procedures for **health surveillance, symptom reporting, contact tracing coordination**, and clear communication aligned with public health guidance. Training modules are delivered to supervisors and employees to ensure awareness, compliance, and worker participation.

Outcomes

By integrating ISO 45001 and ISO 45006, the CPPS creates a **durable, auditable, and scalable pandemic preparedness program**. The organization improves regulatory defensibility, minimizes operational disruption during outbreaks, protects worker health, and demonstrates due diligence to regulators, insurers, and stakeholders—positioning the CPPS as a critical leader in organizational resilience and public health preparedness.

Appendix: Glossary and Case Studies

Glossary of Terms

1. Pathogen - A microorganism that causes disease.
2. Biosafety Level (BSL) - Classification of lab containment protocols for handling infectious agents.
3. Personal Protective Equipment (PPE) - Equipment used to protect individuals from exposure to infectious agents.
4. Risk Assessment - The process of evaluating potential risks associated with infectious diseases.
5. Business Continuity Plan (BCP) - A strategy to ensure operations continue during emergencies like pandemics.

Microbiology Fundamentals

6. Gram Staining - A laboratory technique used to differentiate bacterial species into Gram-positive and Gram-negative based on cell wall properties.
7. Antigen - A substance that induces an immune response, often a protein on the surface

of pathogens.
8. PCR (Polymerase Chain Reaction) - A laboratory method used to amplify and detect DNA sequences, commonly used in disease diagnostics.
9. Culture Media - Nutrient-rich solutions used to grow microorganisms in laboratory settings.
10. Microscopy - The use of microscopes to examine microorganisms, aiding in their identification and classification.

Virology

11. Virion - A complete, infectious virus particle composed of genetic material and a protein coat.
12. Host Cell - A living cell that a virus infects and uses to replicate.
13. Viral Envelope - A lipid membrane that surrounds some viruses, aiding in host cell entry.
14. Reverse Transcriptase - An enzyme used by retroviruses to convert RNA into DNA, enabling integration into the host genome.
15. Immunogenicity - The ability of a pathogen or vaccine to provoke an immune response.

Biosafety and Risk Management

16. Biosafety Cabinet (BSC) - A ventilated laboratory workspace designed to protect personnel and the environment from biohazards.
17. Containment - The use of physical and procedural measures to prevent the release of infectious agents.
18. Decontamination - The process of eliminating or neutralizing infectious agents from surfaces, equipment, or environments.
19. Biological Risk Assessment - The evaluation of potential hazards posed by biological agents in laboratory or healthcare settings.
20. Laboratory Acquired Infection (LAI) - An infection contracted by a laboratory worker due to exposure to pathogenic organisms.

Emergency and Pandemic Preparedness

21. Pandemic - A global outbreak of an infectious disease that spreads across multiple countries or continents.
22. Epidemic - A rapid increase in the number of cases of a disease within a specific geographic area.
23. Quarantine - The restriction of movement for individuals exposed to a contagious disease to prevent its spread.
24. Contact Tracing - The process of identifying and notifying individuals who may have been exposed to an infectious disease.
25. Incident Command System (ICS) - A standardized approach to emergency management used for coordinating response efforts.

Project and Occupational Health Management

26. ISO 45006 - An international standard providing guidelines for workplace safety in managing infectious disease risks.

27. Occupational Health - The field of public health focused on ensuring worker safety and well-being in workplace environments.
28. Risk Mitigation - The implementation of strategies to reduce or eliminate risks associated with infectious diseases.
29. Infection Control - Procedures and policies designed to prevent the spread of infections in healthcare and workplace settings.
30. Ventilation Systems - Engineering controls that improve air circulation and reduce airborne pathogen transmission.