Guideline

Checklist for infection control in the emergency department

Junichi Sasaki,[1] Yasukazu Shiino,[2] Yasuyuki Kato,[3] Daisuke Kudo,[4] Masahisa Fujita,[5] Isao Miyairi,[6] Toru Mochizuki,[7] Hiroshi Okuda,[8] Tadashi Nagato,[9] Yoshiko Nabetani,[10] Takeshi Takahashi,[11] on behalf of The Committee for Infection Control in the Emergency Department[12] and The Joint Working Group[13,14,15,16]

[1]Department of Emergency and Critial Care Medicine, Keio University School of Medicine, Tokyo, [2]Department of Acute Medicine, Kawasaki Medical School, Kurashiki, [3]Department of Infectious Diseases, International University of Health and Welfare School of Medicine, Narita, [4]Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine, Sendai, [5]Infection Control Team, Nippon Medical School Hospital, Tokyo, [6]Division of Infectious Diseases, National Center for Child Health and Development, Tokyo, [7]Infection Control Team, Nippon Medical School Musashikosugi Hospital, Kawasaki, [8]Division of Comprehensive Medicine, Tohoku University Graduate School of Medicine, Sendai, [9]Department of Internal Medicine, Chugoku Central Hospital, Fukuyama, [10]Division of Nursing, Osaka University Hospital, Osaka, [11]National Hospital Organization Kumamoto Medical Center, Kumamoto, [12]Japanese Association for Acute Medicine, Tokyo, [13]Japanese Society for Infection Prevention and Control, Tokyo, [14]Japanese Association for Infectious Diseases, Tokyo, [15]Japanese Society for Emergency Medicine, Tokyo, and [16]Japanese Society for Clinical Microbiology, Tokyo, Japan

The risk of encountering human-to-human infections, including emerging infectious diseases, should be adequately and appropriately addressed in the emergency department. However, guidelines based on sufficient evidence on infection control in the emergency department have not been developed anywhere in the world. Each facility examines and implements its own countermeasures. The Japanese Association for Acute Medicine has established the "Committee for Infection Control in the Emergency Department" in cooperation with the Japanese Association for Infectious Diseases, Japanese Society for Infection Prevention and Control, Japanese Society for Emergency Medicine, and Japanese Society for Clinical Microbiology. A joint working group has been established to consider appropriate measures. This group undertook a comprehensive and multifaceted review of infection control measures for emergency outpatients and related matters, and released a checklist for infection control in emergency departments. This checklist has been prepared such that even small emergency departments with few or no emergency physicians can control infection by following the checklist, without committing any major errors. The checklist includes a control system for infection control, education, screening, and vaccination, prompt response to suspected infections, and management of the risk of infection in facilities. In addition, the timing of the check and interval at which the check is carried out are specified as categories. We hope that this checklist will contribute to improving infection control in the emergency department.

Key words: emergency room (ER), environmental improvement, infection prevention, occupational infection, vaccinations

A list of names, affiliations, and conflicts of interest of all members of the Infection Control Committee in the emergency department is provided at the end of this report.
This checklist does not include the need for review by the ethics committee and content related to the Personal Information Protection Act.
The Committee for Infection Control in the Emergency Department and the Joint Working Group Members are in Appendix 2.

Corresponding: Junichi Sasaki, MD, PhD, Department of Emergency and Critical Care Medicine, Keio University School of Medicine, 35 Shinanomachi, Shinjuku-ku, Tokyo 160-8582, Japan. E-mail: sasakij@1989.jukuin.keio.ac.jp.

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TABLE OF CONTENTS

INTRODUCTION

IN THE EMERGENCY department, there is a risk of encountering several human-to-human infections, including emerging diseases. Thus, infection control should be adequate and appropriate. However, while emergency outpatient care should be prompt, diagnosis is often difficult due to the complexity of collecting information from patients and their families. Hence, there is a high risk in the delay in infection control. The solution could be to enhance occupational infection control for health-care workers in emergency departments (including paramedics who transport victims). However, no guidelines or manuals based on sufficient evidence on infection control in the emergency department have been prepared worldwide. For this reason, those who engage in medical treatment in the emergency department have great anxiety and rely on old empirical procedures and notification from the government to examine and implement their own response plans. In addition, there are large disparities between the operating systems of emergency departments. Therefore, it is undesirable to strongly recommend items with scientific evidence to impose a heavy burden on each facility and its medical staff. Considering the current situation, it is necessary to consider the perspective of not only emergency medicine but also infection control in the emergency department.

INITIATIVES OF THE JAPANESE ASSOCIATION FOR ACUTE MEDICINE

IN JANUARY 2011, the Japanese Association for Acute Medicine (JAAM) established the "Committee for Infection Control in the Emergency Department" and organized the "Joint Working Group", together with the Japanese Society for Infection Prevention and Control, the Japanese Association of Infectious Diseases, Japanese Society for Emergency Medicine, and the Japanese Society for Clinical Microbiology, to examine the countermeasures against infection in the emergency department of the five societies. In this Joint Working Group, from the standpoint of a professional academic organization, a comprehensive and multifaceted examination of infection control and related matters in the emergency department was carried out. As the first step, we undertook three surveys on the current situations using a questionnaire: infection control measures in emergency departments at facilities certified as educational institutions for board-certified acute care physician by JAAM,[1] infection control measures in prehospital care for national fire departments,[2] and microbiological testing system in emergency departments for clinical microbiological technician-registered facilities certified by the Japanese Society for Clinical Microbiology.[3] The second step was to disseminate the infection control measures, taking into account the peculiarities of the emergency department based on these findings, to the world as academic societies. As a result, we have released the "Checklist for Infection Control in the Emergency Department."

OVERVIEW OF THIS CHECKLIST

THE PURPOSE OF the "Checklist for Infection Control in the Emergency Departments" is to ensure that appropriate infection control measures can be carried out without major errors in small-scale emergency departments, where the number of full-time physicians in the emergency department is small or unstaffed, if preparations are made in accordance with this checklist. This checklist includes the management system for infection control, education/medical examination/vaccination system, response to suspected infection, and infection risk management for facility structure/hardware. Furthermore, assuming that all items are different, the timings and intervals to be checked are specified as categories, as follows:

1. Once a year: Mainly to check the facility structure/hardware and management system
2. Quarterly (always): Mainly to confirm software aspects, such as procedures
3. Specific: Items aimed at new hires, introduction of goods, and update of information, taking into account the epidemic situation of infectious diseases
4. Temporary: Pandemics and responses to emerging infectious diseases

Management system

Organization

Item 1. The hospital's infection control committee includes a chief of emergency outpatient care.

Category

Once a year

Commentary

Emergency departments are visited by patients with various diseases and serve as a gateway for patients who need to be hospitalized. Invasive procedures, such as emergency device insertion and medical examination of patients with infectious disease, are common in the emergency department. In addition, in the event of a disaster or infectious disease outbreak, it is often assumed that emergency departments will be the contact point for the patient. Therefore, emergency departments are considered departments where patients are prone to health-care-associated infections. However, as medical care is undertaken based on limited information, it is often impossible to fully evaluate the risk of infection. Indeed, in the Middle East respiratory syndrome (MERS) epidemic in South Korea in 2015, tertiary care emergency departments became the primary place of transmission.[4]

In addition to the practice of infection control in emergency care outpatients, it is critical for the entire hospital to recognize and work on the importance of infection control in emergency care. The Infection Control Committee in emergency departments (not only physicians but also those who are dedicated to emergency outpatients and managing the substance) collects information on health-care-associated infections and decides on measures to be taken.[5] It is expected that the specialty of emergency departments will raise the interest of individuals in other departments and that measures for infection control in emergency departments will be improved.

Item 2. The Emergency Headquarters, which is set up in the event of an emerging or re-emerging infectious disease, such as pandemic influenza, includes a person in charge of the emergency department.

Category

Temporary.

Commentary

Emergency departments are expected to become the point of contact for patients during epidemics of emerging and re-emerging infectious diseases, such as the pandemic influenza. In fact, during the acute outbreak of severe acute respiratory syndrome (SARS) in 2003, pandemic influenza in 2009, and MERS in South Korea in 2015, a large number of patients visited emergency departments.[4] Because some patients are admitted to the ward from the emergency department, performing countermeasures for infection in the emergency department is also an issue in the entire hospital. In addition, during disasters, such as earthquake, influenza, and viral gastroenteritis are prevalent in evacuation centers, and it is expected that patients will visit emergency departments. During the occurrence of such disasters, infection control could be necessary, and emergency departments are recognized to play an important role.

From this point of view, it is desirable that the person in charge of emergency departments (a person who not only is a physician but also manages the emergency outpatient department) participates in the headquarters established at the time of the epidemic of emerging or re-emerging infectious diseases, such as pandemic influenza.[6]

Item 3. A system is available to provide 24-h consultation to infection control specialists when needed.

Category

Once a year.

Commentary

Infection control includes emergency procedures, such as preventing post-exposure onset after a needlestick injury. It is also assumed that when emerging or re-emerging infectious diseases, such as pandemic influenza, become epidemic, the number of emergency outpatients will increase rapidly, and the waiting area should be expanded. In emergency departments, where 24-h medical care is often carried out, it is necessary to assume that this event could occur at night or on holidays. When these cases emerge, it is often necessary to make emergency judgments, such as assessing the risk of infection and certifying the procedures by experts.

In-hospital infection control specialists (those who are involved in the in-hospital infection control department or those prescribed in the in-hospital infection control manual) who have experience and knowledge, are required in the emergency department whenever necessary (evening and holidays). It is important to establish a system that allows consultation.[7]

Item 4. An infection control manual specifically for emergency departments has been prepared, or the infection control manual includes items related to emergency departments and is regularly reviewed and revised.

Category

Once a year.

Commentary

Emergency departments are visited by patients with various diseases and serve as the gateway for patients who need to be hospitalized. Invasive procedures, such as emergency device insertion, or infectious diseases, such as influenza or viral gastroenteritis, are common in the emergency department. Emergency departments are often the point of contact for patients during emergencies, such as disasters and pandemic influenza. Medical care is often carried out in limited space and time, and emergency departments are considered to be the departments where health-care-associated infections are likely to develop. It is desirable to have an infection control manual that takes into account the special characteristics of emergency departments.[7] According to a survey of specialized medical institutions by the Japanese Society for Emergency Medicine, undertaken in 2015, 51 facilities (16.8%) did not have an infection control manual for emergency departments.[1] An emergency department item could be included in the hospital infection manual, instead of an infection control manual dedicated to emergency departments. It is important that they are reviewed and revised regularly.

Education, medical examination, and vaccination systems

Management and education on infection control

Item 5. In addition to full-time staff, training on infection control is provided to all staff involved in the emergency department.

Category

Once a year.

Commentary

The staff involved in the management of emergency departments have a variety of occupations (including reception staff, cleaning staff, and security guards, in addition to medical staff in a narrow sense), on a full- or part-time basis. Regardless of the type of employment, training on infection control needs to be carried out, assuming that all employees are at risk of infection.[7] The goal is to ensure that infection control can be implemented even during emergencies. If there are mid-career recruits, it is necessary to provide training at the time of recruitment. Training content should include performing standard precautionary measures (including the use of personal protective equipment [PPE] to prevent exposure to blood and body fluids), securing peripheral venous lines,[8] and controlling infections in drug dispensing and administration, depending on the type of job. Checking the flow from the reception to the waiting room and enforcing cough etiquette for patients with respiratory symptoms (cough, flu-like symptoms, increased respiratory secretions, etc.) are important contents for the reception staff. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, it is advisable to hold temporary training on national case definitions, suspected patient triage procedures, and use of PPE.

Item 6. Training to properly attach and detach the N95 mask and regular fit tests are carried out.

Category

Once a year.

Commentary

The fit test (preferably a quantitative method) allows you to check the size and shape of the N95 mask that suits you, state of fitting, and state of leakage, numerically, and acquire knowledge and skills to prevent occupational exposure. According to the US Centers for Disease Control and Prevention (CDC) guidelines,[9] the fit test is intended to ensure the safety of health-care professionals and train on proper wearing methods.

The rules for the N95 mask fit test are not implemented in Japan, but they must be carried out when accepting a job or when assigned to a department with high exposure risk. The US Occupational Safety and Health Administration[10] requires that a fit test be carried out when the N95 mask is introduced, once a year thereafter, and when there is a change in weight or facial appearance or at the request of the wearer.

Item 7. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, information on case definitions, infection control methods, etc., will be promptly disseminated.

Category

Temporary.

Commentary

When a specific infectious disease has spread, prompt information sharing and countermeasures are particularly important in emergency outpatient departments. The disclosure of information on the occurrence of infectious diseases, such as pandemic influenza, and measures to be implemented are also specified in the Japanese law – Act on the Prevention of Infectious Diseases and Medical Care for Patients with Infectious Diseases (Infectious Diseases Control Law).[11]

Additionally, measures related to "designated infectious diseases" in the Infectious Diseases Control Law and "designated infectious diseases" related to other highly pathogenic avian influenza will also affect the hospital business continuity plan (BCP) in the event of an emergency. Therefore, it is important to establish in-hospital governance regarding information collection, sharing, and dissemination so that it can respond to public notices promptly, even if it is temporary.

Screening for tuberculosis (TB)

Item 8. Regular medical examinations for TB are provided at the time of employment and at least annually.

Category

Once a year.

Commentary

Regular health examinations for TB are specified in Japan under the Infectious Diseases Control Law.[11] A medical institution is designated as a company that conducts regular health examinations for health-care workers and is required to conduct a health examination annually. The target person also has a duty to consult. Medical examinations mainly focus on chest X-ray examinations. In addition, if a person contacts a patient with TB, a contact check-up is undertaken as needed. Separate from medical examination, if cough persists for more than 2 weeks, health-care workers should also be examined for possible TB by chest X-ray.

To date, many medical institutions perform tuberculin tests during employment. However, the use of interferon-gamma release assay (IGRA) has recently been recommended because of the effects of childhood bacille Calmette–Guérin vaccination. In Japan, it is recommended that staff working in an environment constantly exposed to *Mycobacterium tuberculosis*, such as a TB ward, undergo regular examinations even after joining the company. In contrast, it is unusual for emergency departments to undertake the procedure uniformly. Guidelines in the USA, a country with low TB prevalence, recommend that facilities treating at least three patients with TB in the previous year be assessed as moderate risk and that health-care workers should undergo an annual tuberculin test or IGRA.[12] This guideline aims to identify relatively early infections within 2 years and treat latent TB infection (preventive oral administration) to prevent the onset in staff.

Bacille Calmette–Guérin vaccination is not recommended for emergency departments at the time of employment.

Vaccination

Item 9. Influenza vaccination is recommended and managed.

Category

Once a year.

Commentary

Prevention of infection with vaccination is considered the most effective defense against influenza. Regarding the effects of influenza vaccination, if vaccine and epidemic strains are similar, 70–90% of healthy adults aged <65 years will have 70–90% prevention of onset. The prevention effect is 30–40%. However, similar vaccinations have been reported to be 50–60% effective in preventing hospitalization and pneumonia and 80% effective in preventing death.[13]

Aggressive vaccination is recommended, especially for health-care professionals at high risk of contact with patients with influenza, from the perspectives of preventing occupational infections to oneself, transmission of infection to patients and other staff members at facilities, and absenteeism due to influenza.[13] Emergency outpatients among medical professionals are at higher risk of contact with patients with influenza, and it is strongly recommended that all emergency department staff who are eligible for vaccination be vaccinated.

As vaccination needs to focus on adverse events to be administered to healthy individuals, it is necessary to

enhance interviews and pay attention to the health status after vaccination. In addition, as an organizational effort, it is necessary to manage the information related to implementation (i.e., person receiving the vaccination, vaccination date, lot number).

Item 10. Measles, varicella, rubella, mumps, and hepatitis B virus immunity (vaccination frequency, antibody titer) have been confirmed and managed.

Category

Specific.

Commentary

When a medical professional develops measles, chickenpox, rubella, or mumps, it could become a source of infection for surrounding patients and medical professionals, in addition to the possibility of deterioration of the individual's health. For this reason, it is desirable for medical personnel to acquire immunity.[14] Especially in the emergency department, many patients are referred for symptoms, such as sudden fever and rash, and the risk of contact with affected patients is high. Therefore, it is strongly recommended to acquire various immunities. As these four diseases could have their immunity attenuated over the years after vaccination, multiple vaccinations (in principle, twice a year for those aged ≥1 year) are recommended. In addition, there are cases where immunity cannot be obtained even after vaccination and cases where vaccination is inappropriate. For this reason, it is necessary to manage the history of vaccination in childhood, results of antibody titer measurement, and history of vaccination in recent years. Such manage on a regular basis will lead to prompt response in the event of contact with an affected person.[13]

Health-care workers are more likely to come into contact with the patient's blood and body fluids, especially in emergency departments, where many open procedures are carried out and the risk of exposure to blood and body fluids is extremely high. In addition, patient information is often unavailable, and attention must be paid to blood-borne infections. The hepatitis B virus is the most infectious blood-borne pathogen, and infection is established by needlestick injuries and cuts with sharp instruments used in patients and exposure of blood and body fluids to mucous membranes. Based on the patient's background and health-care provided, the emergency department staff should be vaccinated with hepatitis B vaccine and have sufficient immunity.

Item 11. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, there is a system that allows temporary vaccination in cooperation with the government.

Category

Once a year and temporary.

Commentary

Medical facilities could be subject to specific vaccinations (medical field) based on the provisions of the Act on Special Measures for Pandemic Influenza. To receive specific vaccinations, hospital operators need to register with the specific vaccination management system. To register, it is necessary to be in a medical service business and have a BCP.[15]

Registered hospital operators must endeavor to provide medical services continuously even in the event of pandemic influenza. Therefore, it is necessary for the business operator to know the number of vaccine recipients in the facility and determine the vaccination order in advance.

Emergency departments are likely to be the first to treat emerging and re-emerging infectious diseases, such as pandemic influenza, and among the facilities with the highest priority for vaccination. Emergency department staff should ensure that vaccination targets are highly prioritized.

Response to suspected infection *In the hospital*

Early recognition and initial response

Item 12. In the event of a prior telephone call from the patient or at the patient reception desk, the information obtained by the first staff contacting the patient to recognize the infectious disease is created in a checklist format and updated as appropriate.

Category

Quarterly (always).

Commentary

A checklist is needed to screen for patients with a possible infection during a telephone call or at the emergency outpatient reception[9] (Fig. 1).

Emerging infectious diseases are screened based on the travel history and symptoms based on the notification of the government, and the patient is guided to an isolation area. In addition, if necessary, patients are screened for airborne, droplet, and contact-borne diseases based on symptoms and contact history and guided to isolation areas. It is assumed that staff members other than physicians and nurses will listen in a short time, and questions will be prepared in a checklist format on paper. Screening targets are examined according to the circumstances of each facility.

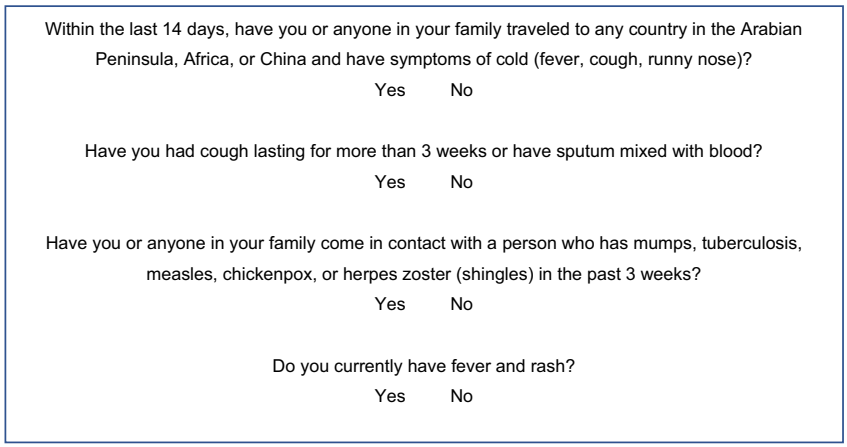

Fig. 1. Example of a questionnaire on infectious diseases (These contents are not recommended and should be prepared in accordance with the circumstances of each facility).

Screening for emerging infectious diseases is based on travel history and symptoms of the relevant country or region in accordance with the notification of the government.

A history of fever or weight loss is confirmed to be useful in screening for pulmonary TB. From a crisis management perspective, additional questions may be expected, such as questions on cough that lasts for more than 3 weeks, blood in the sputum, and contact with a patient with TB.[16]

For measles,[17] rubella, and varicella, the patient is examined for red bumps (rash) on the body, fever, and history of contact with a patient with measles or varicella.

In patients with severe vomiting and diarrhea, or norovirus infection, the vomit is aerosolized and causes disease transmission.[18] The patients are instructed to use a toilet that is different from that of other patients.[19]

Emerging infectious diseases need to be recreated each time there is notification from the government, including case definitions.

Item 13. In the case of telephone contact, there are explanatory systems and easy-to-read signs that guide a patient with suspected infectious disease to the appropriate entrance.

Category

Quarterly (always) and temporary.

Commentary

Most SARS[20] and MERS[4] infections have been transmitted in hospitals, including emergency departments, and organizations in various countries are calling for enhanced response in emergency departments.[9] In addition, common perennial infections and seasonal diseases, such as influenza and norovirus infection, can be transmitted to other patients.

Based on item 12, if a patient at risk is found through screening for an infectious disease during an interview, guidance will be provided to avoid inadvertent contact with other patients. If a telephone call is made in advance, guidance to a dedicated entrance or waiting in a car can be considered. If the severity is high, the staff should be notified of the symptoms of infection, and measures such as directing them to individually separated units should be considered.

The notices are intended for patients, attendants, and visitors, and it is important that they be described in plain text or figures and must include specific actions to be taken (Fig. 2). The purpose of the bulletin is to guide patients with infectious diseases to appropriate places or implement infection control.[9]

After guiding to a predetermined place, the following points should be considered:

1. Ask the patient to wash their hands.
2. If the patient has respiratory symptoms, such as cough or nasal discharge, instruct them to wear a surgical mask in principle. However, in infants in whom it is difficult to fit a mask or patients with severe respiratory disorders, instruct the patient to maintain a distance of ≥1 m. It is desirable to have a notice on the vending machine on the correct method of wearing the surgical mask.
3. Promote the use of surgical masks during the flu season.
4. For patients with diarrhea or vomiting, specify the toilet to be used, and guide them to wash their hands with soap and running water.[19]

When an emerging infectious disease develops, it is necessary to recreate notices, whenever there is notification from the government, including case definitions.

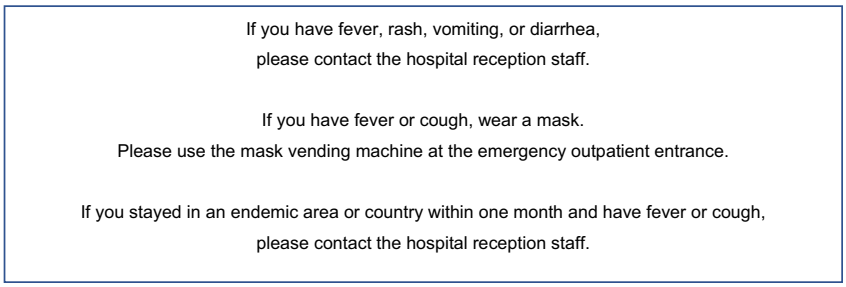

Fig. 2. Example of a bulletin to be presented at the entrance to the emergency department (These contents are necessary in order to direct patients with infectious diseases to the appropriate location or to implement infection control measures).

Item 14. When treating patients, the emergency department staff, including emergency receptionists, should wear surgical masks in principle.

Category

Quarterly (always) and temporary.

Commentary

Staff who work in the emergency department are often exposed to acute respiratory infections, so it is essential to wear surgical masks when in contact with patients, regardless of occupation.[21,22] There are also reports of transmission between staff.[23] It is known that many acute infectious diseases are transmitted several days before the onset of the disease. Therefore, masks should be worn by staff in emergency departments even if they are not directly involved in patient treatment.

After examining a patient with a respiratory infection, the surface of PPE, such as a surgical mask, is considered contaminated, and replacement is important.[24] It is necessary to learn the correct surgical mask attachment/detachment method and hand hygiene before and after. Even in the transmission of Ebola virus, inappropriate use of PPE has been a source of transmission and has killed many health care workers.[25] When performing procedures exposed to wet body fluids, aerosolization is assumed, and an eye shield is required in addition to a surgical mask.

The use of surgical masks is inappropriate for treating certain emerging infectious diseases suspected of airborne transmission. For TB, an N95 mask must be worn, and for measles and varicella, medical staff who have been confirmed to receive immunization should provide medical treatment.[13]

When an emerging infectious disease develops, it is necessary to recreate notices, whenever there is notification from the government, including case definitions.

Item 15. Inquiry forms or questionnaires (including the destination and length of stay and risk of exposure to infectious diseases) are used for the emergency outpatient staff, including receptionists, to conduct triage in Japanese and foreign languages (English, it is desirable to include the language used in the disease endemic area).

Category

Quarterly (always) and temporary.

Commentary

To ensure that the measures described in item 12 are implemented, a clerk needs a questionnaire on severity assessment and estimation of the route of infection.[26]

Ideally, in addition to Japanese, the questionnaire should be available in other languages, such as English, Chinese, and Korean. However, if it is difficult for each facility to prepare its own, a publicly available questionnaire will be used instead.[27]

When an emerging infectious disease develops, it is necessary to recreate notices, whenever there is notification from the government, including case definitions. The content is updated temporarily or quarterly.

Item 16. An infection screening system has been prepared in advance.

Category

Once a year.

Commentary

An emergency clinic is a place where the risk of encountering infectious diseases is high, so a system is needed to classify patients according to their travel history and symptoms. The system for implementing the measures described in

items 12–17 requires the cooperation of multiple departments and occupations and should be developed with an in-hospital arrangement.[28]

Screening is undertaken based on the questionnaires, but it is necessary to clarify "who and where" to carry out the screening. By incorporating infectious disease screening into the workflow from patient visits to reception and consultation, a smooth response is possible. First, check for the presence of fever, rash, and respiratory symptoms using a questionnaire and create a notice to encourage the patient self-report the symptoms. In addition, the roles of each staff member will be clarified, and a double/triple safety net will be established so that no staff will be missed. For example, the reception staff asks a patient with respiratory symptoms to wear a surgical mask, guides them to a predetermined waiting area, and contacts a triage nurse. Triage nurses will dictate the details of route-specific precautions for pathogens postulated based on the symptoms and medical history. The physician who undertakes the medical treatment consults with the administrator or infection control team for the decision to release from isolation based on the diagnosis. The response differs depending on the organization, structure, and resources of each hospital and requires adjustments centered on the site.

Item 17. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, infection screening systems based on case definitions, including suspected cases, will be strengthened.

Category

Temporary.

Commentary

In addition to the usual infection screening system, if a specific infectious disease becomes epidemic, the system must be promptly strengthened according to the route and severity of the infection.[28] Following the communication from the government, it is necessary that the procedures for strengthening the system and notification be clearly specified as in-hospital decisions.

When a particular infectious disease is widespread, a notification from the government is sent to the hospital clerk. The office clerk in the hospital receives this and informs the necessary department. The point of contact is usually the in-hospital infection control officer, but depending on the situation at the facility, the emergency or other departments could be contacted.

When strengthening the screening system on a temporary basis, it is necessary to clarify the person in charge in advance. After consulting with stakeholders, including emergency departments, it is important that the person notified is authorized to present and implement concrete measures. The minimum required action must be promptly implemented at the discretion of the actual medical field. When necessary, consultations will be held at meetings involving temporary hospital infection prevention committees and other executives, depending on the disease and situation to be dealt with, and the decisions will be made known throughout the hospital.

Item 18. The flow of patients and health-care professionals to special or specific rooms equipped with negative pressure, high-efficiency particulate air (HEPA) filters, etc., is well known and implemented.

Category

Quarterly (always) and temporary.

Commentary

A special or specific room equipped with negative pressure, HEPA filters, etc. (see item 42), should be used for patients with airborne precautions (pulmonary TB, measles, varicella/disseminated shingles: all suspected). To shield and prevent the spread of the droplet nuclei discharged by the patient, it is necessary to immediately isolate them in the examination room.[9] If respiratory symptoms are present, patients who need precautionary measures are selected by infection route. Therefore, to respond promptly in cooperation with receptionists, it is necessary to provide procedures for response and wear PPE to educate patients and attendants. Directing an infectious patient to the consultation room immediately can minimize occupational exposure and the number of individuals exposed in general waiting areas. Checking the hardware and software aspects of such measures is necessary as a preventive measure in an emergency if it is necessary to confirm and disseminate them during normal times.

Item 19. The basic flow line, isolation method, and response for each major symptom (fever/rash, gastrointestinal symptoms, respiratory symptoms) are documented in a manual. The flow of patients with suspected infections and that of other patients and staff are well established.

Category

Quarterly (always).

Commentary

Appropriate route-specific precautions can reduce the risk of transmission when patients develop symptoms or signs of infectious disease or arrive at medical facilities.[9]

Although it is difficult to treat all patients who require transmission-based precautions, it is recommended that transmission-based precautions be implemented empirically while waiting for test results.[9] Consideration must also be provided to prevent exposure during patient transfer and waiting. For this reason, it is necessary to develop procedures for responding to new infectious diseases, designated infectious diseases, etc., for the establishment or guidance of visiting places, receptions, waiting areas, and alternatives.

Patient flow and spatial separation are carried out to avoid contact with the patient. This is mainly an additional measure when an emerging infectious disease is assumed. Although somewhat controversial, restricting access to congested areas is part of transmission-based precautions and can provide a certain consensus as a measure against infections in individuals with underlying diseases.

1. Points to consider in patient flow (airborne infection or suspicion):
   a. Providing access from a dedicated or designated entrance (preferably contacting the hospital in advance).
   b. Waiting in a dedicated waiting room (negative pressure air conditioning, HEPA filter air cleaning, opening windows after ensuring safety).
   c. Securing dedicated passages for inspections and other transportations or avoiding congested areas.
2. Points to keep in mind in patient flow (droplet infection or suspicion):
   a. Using a dedicated waiting room or separate the waiting area.
   b. Avoiding congested areas during inspections and other transportations.
3. Other common items:
   a. Screening symptoms.
   b. Enforcing cough etiquette for patients and staff.
   c. Provide announcements, notices, etc.
   d. Disseminating information to response staff.

Specific measures to prevent infection

Item 20. Personal protective equipment required for standard precautions is available in sufficient quantities in various sizes and ready for use when needed.

Category

Quarterly (always) and temporary.

Commentary

In the Ebola outbreak in Guinea, Liberia, and Sierra Leone from 2014 to 2016, health-care workers were 21–32 times more at risk than the general population. It has been reported that one of the causes was due to improper use or lack of PPE for health-care workers at the forefront of the field.[29] This report suggests that it is important to have sufficient supplies in each size for infection control and ready to use. The importance of PPE that can be used immediately when needed is included in the checklist for the addition of regional countermeasures to prevent infection in Japan. It is important to confirm that there is no shortage daily, but we will investigate the use quarterly and examine the necessary amount.

It is also important to prepare an N95 mask for emergency outpatients because unexpected contact with patients with TB could occur in an emergency outpatient service where an unspecified number of patients are treated.

In addition, as for stockpiling of items related to infection prevention, in normal times, PPE used for standard and transmission-based precautions should be sufficient. In the case of a pandemic, there are reports that the estimated period of stockpiling of PPE is 8 weeks,[30] but stockpiling should be undertaken in accordance with the government's action plans and guidelines.[31]

Item 21. In response to symptoms, such as trauma and vomiting, emergency departments are prepared so that items necessary for infection control can be used immediately.

Category

Quarterly (always).

Commentary

As mentioned in item 20, in the prevention of infection, it is important that the necessary items are readily available in sufficient quantities. Immediate care is difficult because patients with various symptoms are examined in the emergency department. Packaging of necessary items according to standard and transmission-based precautions is considered useful for infection control. For this purpose, methods, such as a single package of articles to be used, arrangement of articles on a shelf, and cart for each symptom or transmission, can be considered.

Item 22. Even when inserting peripheral venous catheters, clean operations are carried out according to the hospital manual.

Category

Quarterly (always).

Commentary

The incidence of catheter-related bloodstream infections (CRBSIs) due to peripheral venous catheters has been reported to be 0–2.2%,[32] which is considered generally to be low due to the short detention period.

However, securing peripheral venous lines in the emergency department significantly increases the incidence of CRBSI.[8,33] In urgent situations, infection control could be inadequate.

In addition, in patients with chronic skin lesions caused by atopic dermatitis or psoriasis vulgaris or with insufficient skin preservation, normal skin bacterial flora, such as *Staphylococcus* spp. and *Bacillus* spp., proliferate. The risk of bloodstream infection in securing peripheral catheters is increased.

With aging, the number of patients with skin lesions and insufficient cleansing increases. Therefore, it is necessary to be more careful in securing peripheral venous lines.

Item 23. Even when infection is not suspected, standard precautions (gloves, eye guards, surgical masks, etc.) are used in carrying out tracheal intubation.

Category

Quarterly (always).

Commentary

Standard precautions are based on the concept that all patients' blood, body fluids, secretions, vomit, excrement, wounds, mucous membranes, etc., must be regarded as sources of infection. This indicates that it is necessary to carry out non-specific infection measures before the diagnosis of the infectious disease is confirmed, rather than undertaking measures against infections specific to the causative microorganism or disease. In addition, there is a need to carry out infection control measures that consider body fluids, secretions, or exudates that can transmit pathogens as vectors of infection.[34] Personal protective equipment, such as gloves, long-sleeved gowns, eye protection (goggles or face shields), and face masks (surgical masks, treatment masks, or particulate respirators), should be used during aerosol-generating procedures with a consistently high risk of pathogen transmission. Currently available evidence suggests that the risk of transmission is consistently higher when tracheal intubation is carried out alone or in combination with other procedures (e.g., cardiopulmonary resuscitation and bronchoscopy).[35] From the above discussion, even in patients without suspected infection, compliance with standard precautions is necessary because of the risk of exposure to secretions and blood in the respiratory tract and oral cavity.

Item 24. Urinary catheters are not routinely inserted in patients who have been admitted.

Category

Quarterly (always).

Commentary

Urinary tract infections account for approximately 40% of health-care-associated infections, and approximately 80% have been caused by urinary catheter placement.[36,37] As indwelling urinary catheters themselves pose a risk of urinary tract infection, not inserting unnecessary urinary catheters into hospitalized patients can prevent urinary tract infection and health-care-associated infections.[38] It is very important for infection control in emergency departments to examine indications without routine insertion of a urinary catheter. Indications for urinary catheters include urinary retention and bladder dysfunction, and it is recommended that the indwelling catheter be kept for as long as necessary. Careful consideration is needed for urinary catheterization in patients at high risk, such as women, elderly patients, and those with immune dysfunction.

Item 25. Urinary catheter insertion is carried out aseptically.

Category

Quarterly (always).

Commentary

As mentioned in item 24, urinary tract infections account for approximately 40% of health-care-associated infections, and approximately 80% have been caused by indwelling urinary catheters.[36,37] To prevent urinary tract infection as much as possible, it is necessary to pay attention to aseptic operation when inserting a urinary catheter to prevent urine reflux and bacterial invasion from the circuit.[39] Aseptic procedures include the following: (i) ensuring hand hygiene and wearing gloves,[40,41] (ii) using sterile gloves, drapes, sponges, lubricating jellies, and other sterilizing equipment, (iii) cleaning the urinary opening and surrounding area before catheter insertion using specific disinfectants or sterile solutions, (iv) maintaining a closed urination circuit after aseptic insertion of the catheter.[38,41] The infection manager checks quarterly whether the urinary catheter is inserted

aseptically and provides guidance and reconfirmation if the sterile technique has not been followed.

Item 26. When there is a risk of exposure to blood and body fluids, eye guards and surgical masks are used for medical examinations, thoracic drainage, and lumbar puncture.

Category

Quarterly (always).

Commentary

As in item 23, the standard precaution states that all patients' blood, body fluids, secretions, vomit, excrement, wounds, mucous membranes, etc. must be regarded as sources of infection.[34]

Based on this concept, standard precautions should be adhered to when examining patients at risk for thoracic drainage, lumbar puncture, or blood fluid exposure. According to the statistics for each tissue exposed to blood and body fluid, 60.1% of the eyes were more exposed than other tissues, and exposure to unprotected skin and mucous membranes was reported in 82.1%.[42] Therefore, it is necessary to use eye guards thoroughly.

Item 27. Careful consideration should be given to central venous catheter insertion. If inserted, the central line-associated bloodstream infection (CLABSI) prevention bundle must be followed.

Category

Quarterly (always).

Commentary

Most in-hospital bloodstream infections are associated with indwelling intravascular catheters. The incidence of CRBSI is higher for central venous catheters than for peripheral venous catheters.[43] The incidence of CLABSI has been reported to be 1.93/1,000 catheter-days in the emergency department. Because CLABSI is a risk factor for increased in-hospital mortality,[44] the most effective method of preventing CLABSI is to avoid inappropriate central venous catheterization. If a central venous catheter is determined to be necessary, a CLABSI prevention bundle should be followed.[45] The CLABSI prevention bundle consists of the following five practices that are useful for CLABSI prevention: (i) before inserting the catheter, the hands should be disinfected with an antibacterial soap or alcohol-based preparation, (ii) central venous catheter insertion should be carried out while ensuring maximum sterile barrier precautions, (iii) skin disinfection before insertion of the central venous catheter should be carried out with chlorhexidine at a concentration of >0.5%, and the catheter is inserted after the disinfectant has dried (iv) avoid the femoral vein at the site of the central venous catheter puncture, (v) immediately remove unnecessary catheters.

Item 28. When inserting a central venous catheter, the maintenance of cleanliness is monitored by a health-care professional who has not carried out the insertion procedure. If there is a violation, the procedure is discontinued.

Category

Quarterly (always).

Commentary

As described in item 27, when inserting a central venous catheter, the CLABSI prevention bundle should be followed.[45] In emergency departments, although clean operations may be difficult due to time constraints and complicated situations, efforts will be made to adhere to the CLABSI prevention bundle. For this reason, it is useful to avoid unnecessary insertion of the central venous catheter and to insert the catheter under the supervision of another health-care professional. In addition, an intervention was undertaken that included "giving the nurse the authority to stop the insertion of the central venous catheter when the required action was omitted." Furthermore, an improvement in the rate of adherence to clean operations and a decrease in the incidence of CLABSI were observed.[46] Therefore, it is thought that monitoring the maintenance of clean operations will lead to an improvement in the bundle adherence rate and decrease in the incidence of CLABSI.

Item 29. Procedures are in place for responding to suspected infections.

Category

Once a year.

Commentary

Patients with trauma or bleeding symptoms are often treated in emergency departments, and the risk of needlestick injuries and mucosal exposure to blood and body fluids is generally considered high, where invasive medical procedures are often undertaken.[5] If exposed to blood or body fluid that is positive for hepatitis B virus, hepatitis C virus, HIV, severe

febrile thrombocytopenia syndrome (SFTS) virus, etc., the exposed area is immediately washed with running water. Simultaneously, post-exposure preventive measures and screening must be carried out depending on the risk of infection.[47,48] Among the diseases in which droplets and droplet nuclei are transmitted, prior confirmation of immunity is important for measles, rubella, varicella, and mumps.[47] If unimmunized or unknown personnel are exposed, vaccines, globulin, or antivirals are administered[49] (see Table 1). In case of contact with a patient with meningococcal infection, the risk of infection is assessed based on the medical practice performed by the health-care worker and PPE worn. It is necessary to consider the indication of antimicrobial agents. As both cases require urgency, it is imperative that procedures to be followed after an exposure to specimens with a high risk of infection be described in the manual and that a 24-h consultation with a hospital infection control specialist be available. If contact is made with a patient with TB in an emergency department, it is advisable to determine the risk-specific procedures in advance with the relevant organizations.[50]

Table 1. Post-exposure actions

What to do after exposure to blood and body fluids	
Hepatitis B	HBs antibody (+): no treatment required
	HBs antibody (−): HBIG + HB vaccine
Hepatitis C	Monitoring (HCV-RNA, liver function)
HIV/AIDS	Antiviral drugs (emtricitabine/tenofovir + raltegravir)
Severe febrile thrombocytopenia syndrome (SFTS)	2-week monitoring (symptoms, blood cell calculations)
Response after droplet and droplet nuclei exposure (if the contact is not immunized or unknown)[49,84]	
Measles	Within 72 h: measles-containing vaccine
	Immunodeficiency within 6 days + pregnancy, etc.: globulin
Mumps	3-week monitoring
Rubella	3-week monitoring
Chickenpox	Within 72 h: chickenpox vaccine
	Within 7 days: acyclovir
Meningococcal infection	Ciprofloxacin
Tuberculosis	Contact person screening
Bird flu (H5N1/H7N9)	Oseltamivir

Improvement of environment

Item 30. Procedures for cleaning the examination room after use, improving the environment for frequent contact surfaces and contaminated sites (wet process), and providing appropriate drugs and concentrations for alcohol-resistant microorganisms are well known.

Category

Quarterly (always) and temporary.

Commentary

Examination room cleaning and surface disinfection are also important in the emergency department. Cleaning is the physical removal of dust, sand, and other invisible microorganisms.[7] When cleaning, use a brush or mop with a surfactant, detergent, water, or the like. Instruments, such as ultrasonic cleaners, may be used. Many microorganisms can be removed by cleaning. The effect is limited if only disinfection is carried out alone. Cleaning is essential before disinfection. Disinfection is less effective in inactivating microorganisms than sterilization but can remove almost all microorganisms. However, it should be noted that spores cannot be inactivated.

Regarding cleaning and surface disinfection in the emergency department, it is necessary to understand the distinctive features of the emergency department. In the consultation room (or consultation space) where the initial treatment is carried out, there is a continuous inflow and outflow of patients in the emergency department. When the number of examined patients is high, it is necessary to examine a new patient in the consultation room immediately after the previous patient has moved. Cleaning and surface disinfection should not be skipped for facilitating quick patient consultation. Cleaning and surface disinfection are essential to prevent secondary transmission to patients and health-care professionals. It is necessary to establish a system to quickly clean and disinfect the empty consultation room. Even if the patient has multidrug-resistant bacteria, the results, such as those of culture test, are often found after the patient leaves the emergency department and is admitted to another ward. In such a case, it is necessary to establish an in-hospital information transmission system that can ensure that the information reaches the emergency department and that appropriate disinfection can be carried out. In addition, it is necessary to prepare multiple types of disinfectants for patients with multidrug-resistant bacteria, clearly indicate proper use, and use them appropriately according to the instruction manual.[7] For example, in environments with patients who have shed bacteria, such as methicillin-resistant

Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), and *Clostridioides* (*Clostridium*) *difficile*, it is recommended that quaternary ammonium salts or alcohol were used to disinfect the surfaces that the patient with the infection could have possibly touched.[51] In addition, as the virus can survive for a relatively long time in the environment, it is important to disinfect the environment immediately after the consultation of patients with viral infections.[52,53] For environments contaminated with viruses, alcohol or sodium hypochlorite is used. Care must be taken because non-enveloped viruses are resistant to alcohol. Viruses with strong alcohol resistance include norovirus, hepatitis A virus, rotavirus, poliovirus, coxsackievirus, and echovirus.[54,55] Sodium hypochlorite is used for disinfection of environment contaminated with these viruses. However, sodium hypochlorite has a corrosive effect on metals and drifting effect on textiles. Moreover, contact with wood reduces its efficacy. Alcohol is used for such an object. When using alcohol, the object to be disinfected is wiped twice to enhance the effect.[56] Generally, the higher the concentration of the disinfectant, the higher the bactericidal effect; however, it is necessary to consider the effect on the disinfectant. Disinfectants could have reduced concentrations in a variety of situations, as described below; thus, care must be taken when using and managing them. Concentrations of low-level disinfectants (e.g., chlorhexidine gluconate), povidone-iodine, and sodium hypochlorite decrease due to organic contaminants. Some low-level disinfectants are adsorbed by fibers, such as cotton swabs and mops, and this adsorption can decrease the disinfectant concentration. The concentration of sodium hypochlorite decreases over time, and that of alcohol preparations decreases due to volatilization.

Once a year or quarterly, it should be confirmed that the above mentioned procedure is carried out.[7] In the event of an outbreak of multidrug-resistant bacteria, check the above information temporarily.

Item 31. Reusable devices (e.g., ultrasound, point-of-care items such as blood glucose measurements, endoscopes, etc.) are properly cleaned, disinfected, and sterilized before using in the next patient.

Category

Quarterly (always).

Item 32. When cleaning, disinfecting, and sterilizing the reusable equipment, appropriate PPE is used.

Category

Quarterly (always) and temporary.

Item 33. The procedure of reuse (cleaning, disinfection, or sterilization) is taught using a hands-on approach.

Category

Once a year and specific.

Commentary

It is necessary to know whether medical devices and equipment in the emergency department are single use or reusable. There are many devices in the emergency department, including point-of-care products such as blood glucose measurement, gastrointestinal endoscopes, bronchoscopes, surgical instruments for incision sutures, and needles. All reusable medical devices must be properly cleaned and maintained according to the instructions of preventing horizontal transmission among patients.[7] In this regard, the Spaulding classification is helpful (Table 2).[57] The Spaulding classification categorizes reusable devices, regarding how much sterilization or disinfection is required, based on the risk of horizontal transmission. If dirt remains on the equipment, the effects of disinfection and sterilization will be insufficient. Therefore, cleaning is necessary before disinfection and sterilization.[7]

There are three types of puncture devices for collecting small amounts of blood, such as those used for measuring blood glucose: (i) the entire instrument is a disposable product, which is for single use only, (ii) the puncture needle and peripheral part are disposable products, which can be used by several individuals to replace the needle and its surroundings, (iii) the puncture needle is replaced, but the area around the puncture needle is not disposable. Therefore, if the blood was contaminated by the previous blood sampling, the replaced puncture needle could be contaminated. Unlike (ii), it cannot be used by several individuals. Regarding the cleaning and disinfection of gastrointestinal endoscopes, the "Multi-society Practice Guide for Infection Control of Gastrointestinal Endoscopes, Revised Edition" has been published and should be consulted.[58]

To use reusable medical devices aseptically and appropriately, the device instructions should be readily accessible.[7] When cleaning, disinfecting, or sterilizing reusable equipment, PPE is used to prevent transmission to health-care workers and patients through health-care workers. The use of PPE could be categorized as a standard precautionary measure. Provide hands-on training on the proper method of cleaning, disinfecting, and sterilizing each reusable device and using appropriate PPE. The training is provided once a year, when new equipment is introduced, or when the method is changed.[7] It is important to educate the entire

Table 2. Spaulding classification

Classification	Uses	Example	Degree of disinfection and sterilization
Critical items	Inserted into sterile tissues or blood vessels	Surgical instruments	Sterilization
Semicritical items	In contact with mucous membranes or non-healthy skin	Upper or lower gastrointestinal endoscope	High-level disinfection
Non-critical items	In contact with normal skin Does not come in contact with the mucous membrane	Cuff and stethoscope for blood pressure measurement	Low- to medium-level disinfection

department, not just those who mainly clean, disinfect, and sterilize equipment.

Outside the hospital

Transport by ambulance

Item 34. Based on information from staff undertaking prehospital rescue operations, staff in the emergency department can either instruct or undertake appropriate precautionary measures against staff carrying out prehospital rescue operations.

Category

Specific and temporary.

Commentary

Standard precautionary measures are fundamental when dealing with all suspected infections.[9] Furthermore, if any infection-related events occur, it is important to communicate and share information with the medical institution that will house patients and health centers that have jurisdiction. Conceptually, there are roughly two types of infectious diseases: those that are seasonally prevalent in the community and those that can enter from overseas.

The former corresponds to respiratory syncytial (RS) virus infection that precedes the influenza epidemic in children from summer to autumn,[59] infectious gastroenteritis (especially norovirus) from autumn to winter, and influenza from winter to spring. In the case of infectious gastroenteritis and influenza, transmission-based precautions in addition to standard precautions are carried out,[9] and it is ensured that the information is transmitted to the destination (category: specific).

The latter is in preparation for emerging or re-emerging infectious diseases, such as MERS, that are rare or not encountered in Japan[60]; however, these outbreaks are still persistent in the Middle East. These occur when contacting a victim who has traveled or lived abroad. Public information is disclosed on the website of the Quarantine Station of the Ministry of Health, Labour, and Welfare. If information on the victim's travel to or residence in an infected area is obtained at the time of medical history recording, it is necessary to determine what transmission-based precautions should be followed in addition to the standard precautions. The medical institution scheduled to receive the patient or the health center in charge is contacted, and instructions, such as the destination and infection control measures at the time of transport, are obtained. Localized tick-related infections, such as SFTS, which are prevalent in western Japan, might be suspected based on medical history and physical findings. The information is transmitted to the destination medical institution in advance.[61]

Item 35. For each relevant infectious disease, instructions are prepared for infection control measures to be provided to staff undertaking prehospital rescue operations.

Category

Specific.

Commentary

Responding to an infectious disease begins with an assumption about the nature of the infectious disease. An effective means of controlling infection appropriately for the relevant infection is to block the transmission route.[9] These are called transmission-based precautions. However, transmission-based precautions are measures that can be applied if the infectious disease is identified in the patient. The personnel carrying out prehospital rescue operations must contact the affected patient in a situation where it is unknown if the victim has an infectious disease. Therefore, realistically,

countermeasures are started from standard precautions. Standard precautions involve basic infection control measures in which all wet body fluids, such as the saliva, nasal discharge, sputum, urine, stool, ascites, and pleural effusion, except for the victim's sweat, are treated as infectious. Transmission-based precautions are added to standard precautions.[9] While applying standard precautions, when dealing with diarrhea/vomiting, rash, fever, cough, and drainage, the implementation of empirical transmission-based precautions is required. Specifically, if respiratory disease is expected, droplet and airborne infection precautions are added, and for gastrointestinal diseases, contact and droplet infection prevention measures are added while treating the patient. Simultaneously, a protocol for specific precautionary measures will be prepared quarterly, as instructions, for appropriate infection control for staff undertaking prehospital rescue activities. For example, influenza is assumed to be the infectious disease in winter and infectious gastroenteritis primarily involving norovirus infection the infectious disease from autumn to winter. The "Rescue team infection prevention manual (version 1.0)" is based on the manual from a previous study.[62]

Item 36. If a staff member carrying out prehospital rescue operations receives information about a confirmed or strongly suspected case of TB, measles, chickenpox, etc., the staff member carrying out prehospital rescue operations is instructed to take appropriate infection prevention measures.

Category

Quarterly (always).

Commentary

If a prehospital rescue worker receives information that TB, measles, chickenpox, etc. is confirmed or strongly suspected, measures should be taken to prevent airborne infection. It is essential to collect the following information before contacting the victims when dispatching to TB-affected areas: (i) complaint of prolonged cough for more than 2 weeks, (ii) contact with *Mycobacterium tuberculosis* smear-positive patients within 1 year, (iii) cough and fever that are difficult to cure and occurring during treatment of other diseases, (iv) unknown fever with poor response to chemotherapy.[63] In the abovementioned case, measures in accordance with "transportation of tuberculosis victims"[64] against infection are taken during transport, specifically: (i) the victim should wear a surgical mask (a face mask may be used when administering oxygen), (ii) the ventilation fan is turned on or the window is opened to improve ventilation in the ambulance, (iii) personnel performing prehospital rescue operations should wear N95 masks (involved passengers should also wear them), (iv) equipment and materials are cleaned and disinfected in an appropriate manner, (v) the environment for responding to contaminated patients and surfaces of large equipment in an ambulance are to be wiped off of large contaminants, such as blood, and then cleaned and disinfected using an appropriate disinfectant. Personnel undertaking prehospital rescue operations in contact with a patient with suspected measles or chickenpox should prioritize immunized, antibody-positive individuals or those who have received two vaccinations. Measles and varicella are contained in moist body fluids, such as nasal secretions and saliva of infected patients, and are often transmitted by inhaling droplets. It is important to wear emergency masks in emergency services as a measure against infection. Unlike TB, it is essential that individuals with immunity to measles and varicella respond. Staff performing prehospital rescue operations should check for antibody titers for measles, varicella, rubella, mumps, hepatitis B, etc., and receive vaccination as necessary.

Item 37. Based on the diagnosis, staff undertaking prehospital rescue operations are advised on occupational infection control, surface disinfection, and environmental recovery.

Category

Temporary.

Commentary

As paramedics expand the range of treatments, such as drug administration and infusion prior to cardiac arrest, occupational infection control, surface disinfection, and environmental recovery for staff undertaking prehospital rescue operations are important issues.[64] Occupational infection control is a measure against needlestick injury and exposure of blood and body fluids to damaged skin and mucous membranes (especially eyes). Countermeasures are divided into: (i) preventive measures, (ii) actions to be taken, (iii) measures to be taken after occurrence (Table 3). This response requires cooperation with medical institutions. Regarding surface disinfection and sterilization of equipment, instruments, or environment for emerging infectious diseases, and environmental recovery, it is necessary to respond based on the "Act on the Prevention of Infectious Diseases and Medical Care for Patients with Infectious Diseases (the Infectious Diseases Control Law)."[11] As a general rule, surface disinfection and sterilization of equipment, instruments, and environments contaminated with infectious disease pathogens

Table 3. Occupational infection control

Measures to prevent needlestick injury
Use a venous indwelling needle with a safety device.
Place the dedicated container where it can be reached after securing the venous route.
The punctured indwelling needle is to be thrown into the special container by the staff responsible for prehospital rescue activities after the puncture.
Do not hand over the indwelling needle or temporarily place it on the stretcher or floor.
Do not recap.
Prevent exposure to the eyes with goggles and face shield and to the mouth and nose with a surgical mask.
Action when it occurs
Rinse with running water. Do not smoke.
Wash thoroughly with soap and a large amount of running water.
Gargle when blood or body fluid enters the mouth.
If blood or body fluid enters the eyes, wash them with running water.
If blood or body fluid touches the wound, rinse it with running water.
Response after occurrence
Collect information on hepatitis B/C and HIV infections of victims.
Examine the exposed staff undertaking prehospital rescue activities for hepatitis B/C, HIV infection, liver function, etc.
Based on the previous two steps, determine the necessity of emergency treatment, such as inoculation of anti-hepatitis B human immunoglobulin to the staff undertaking prehospital rescue activities, whether regular observation is sufficient, and the examination schedule thereafter.

should be carried out appropriately and promptly to prevent the spread of contamination.

1. Disposable products are used as much as possible for gloves, caps, infection-prevention clothing, and emergency equipment to be used directly for the victims of staff performing prehospital rescue operations.
2. After use, they are sealed in a dedicated infectious waste container or double sealed in a plastic bag, and then the outer bag surface is wiped off and disinfected and it is taken out of the site where it is in contact with the patient. Then it is incinerated.
3. In accordance with the Spaulding classification (Table 2), contaminated reusable equipment should be immersed in a disinfectant suitable for the intended use of the equipment after manual cleaning (Table 4).
4. After necessary processing, such as sterilization, it can be reused. After cleaning, it is soaked in disinfectant. As linen is not immersed, it is limited to partial contamination (blood).
5. Large contaminants, such as blood, adhering to the surface are removed.

Subsequently, the environment for responding to the contaminated victims and the surfaces of large equipment in the ambulance should be cleaned and disinfected using an appropriate disinfectant. As much as possible, reducing the amount of contaminating microorganisms before wiping will increase its effectiveness. Unlike sterilization, disinfection has a limited range of target microorganisms. Microorganisms that exceed the antimicrobial spectrum are always present, and some microorganisms survive and grow in disinfectant solutions. Therefore, it is necessary to select an appropriate disinfectant in consideration of the target microorganism. It is advisable to refer to the disinfection manual of the medical institution in selecting a disinfectant.

Item 38. Based on the diagnosis, advice on occupational infection control, surface disinfection, and environmental recovery is provided to staff undertaking prehospital rescue operations.

Category

Specific.

Commentary

Personal protective equipment, such as gloves, caps, and infection-control clothing, for staff undertaking prehospital rescue operations and rescue equipment used directly for the victims should be disposable as much as possible. For this reason, occupational infection control measures for staff carrying out prehospital rescue activities must be prepared in advance. It is checked in advance whether the dedicated

Table 4. Definition of sterilization, disinfection, or cleaning and target equipment

Classification	Definition	Equipment
Sterilization	Used for items usually inserted into the sterile tissue or blood vessels	Intravenous indwelling needle Tracheal tube
Disinfection	Used for items that come in contact with intact mucous membranes and skin with wounds	Supraglottic airway device Combitube Laryngeal tube Laryngeal mask Laryngoscope blade McGill forceps Oral airway Nasal airway Suction catheter
Cleaning	Used for items that come in contact with undamaged skin	Stethoscope Sphygmomanometer cuff Oxygen mask Thermometer Bag valve mask Cervical spine collar Splint Tarpaulin stretcher Bag board

Reproduced from Yasuda (2014): Emergency field activities series 2.[64]

infectious waste container is full, and if so, the contents are discarded and the surface is thoroughly disinfected. The expiration date is checked, and the disinfectants are replenished, such as alcohol for disinfection, and linens are checked for contamination with blood or body fluids. When contacting, handling, and transporting a suspected infected person specified in the Infectious Diseases Control Law, preparations for surface disinfection and environmental recovery measures supplement the methods specified for each category.[64]

Glutaral is not normally used for disinfection by immersion to prevent formaldehyde gas exposure. As a general rule, surface disinfection and sterilization of equipment, instruments, and environments contaminated with infectious disease pathogens should be undertaken appropriately and promptly to prevent the spread of pathogens. Additionally, as the Infectious Diseases Control Law is revised from time to time, it is necessary to update information as needed.[65] Emerging infectious diseases will be handled based on the Infectious Diseases Control Law. With regard to MERS, the number of victims who may have been exposed to camels while traveling or living in the Middle East is still constant, and bird flu is sporadic mainly in Asia. Information should be updated and collected in advance.[60,66] The Infectious Diseases Control Law is fundamental for emerging infectious diseases. Moreover, there is a need to strengthen measures against the pandemic influenza and new infectious diseases that can spread quickly and nationwide, and local governments are taking the initiative in improving operations and systems. Medical institutions across the country are required to create and maintain a medical version of the BCP, assuming an increase in medical demand and absence of staff.[47]

Item 39. If TB, measles, chickenpox, etc., are confirmed or strongly suspected, based on the diagnosis, staff carrying out prehospital rescue operations are advised on measures to prevent occupational infection, appropriate cleaning, surface cleaning, and disinfection, and environmental recovery.

Category

Quarterly (always).

Commentary

Airborne infection precaution is required for TB and measles, so the equipment used for the victim and environment of the victim should be disinfected after transport. After transport, it is important to take measures against TB

in urban areas, and it is essential to collect information after emergency transport. If there is a staff member who undertakes a prehospital rescue operation without an N95 mask and heavily contacts the patient, the procedure will be stricter because "contact screening" is indicated. In May 2000, the new *Mycobacterium tuberculosis* test guidelines changed the description of TB bacillus evacuation in the Gaffky scale to a simple notation of 1+ to 3+.[67] It is important to check the health status of all members on a quarterly basis and members who have cough for more than 2 weeks. In addition, TB is a potentially progressive disease, even asymptomatic. Therefore, at least once a year, all staff undertaking prehospital rescue operations should be checked for health by chest X-ray.[62]

Transport between hospitals

Item 40. If necessary, appropriate advice is given to the transfer requester regarding infection control, taking into account the patient's personal information.

Category

Temporary.

Commentary

If necessary, especially for emerging infectious diseases, appropriate advice on infection control is given to the previous physician, taking personal information into consideration, especially for those with strong infectiousness or high pathogenicity. In Japan, local tick-related infections, such as SFTS, are prevalent mainly in western Japan,[61] and MERS, which is an infectious disease from abroad[60] and highly pathogenic avian influenza (H5N1 and H7N9) are emerging or re-emerging infectious diseases that are rare or not encountered in Japan. The latest information on these is publicly disclosed on the website of the Quarantine Information Office, Ministry of Health, Labour and Welfare (FORTH).[68] In response to the threat of domestic invasion of emerging infectious diseases, which has become a problem overseas in recent years, efforts have been made to strengthen measures against pandemic influenza and new infectious diseases that could spread rapidly and nationwide. These countermeasures have been established and developed under the initiative of local governments.[69] At the time of the invasion of emerging infectious diseases and response to a pandemic where this measure is applied, infection control measures are taken under the direction of local governments or health centers. From the viewpoint of prevention of secondary infection, it is necessary to obtain information on the final diagnosis of infectious diseases of transported patients appropriately from the government.

Item 41. According to the information from the physician who requested the patient's medical treatment, instructions are given on the appropriate transport timing and method.

Category

Temporary.

Item 42. When transporting patients from a hospital to an outside facility, the requester provides appropriate information on infection control to the receiving facilities and transport vehicles and provides guidance.

Category

Specific and temporary.

Commentary

When handling patients with suspected infections or transporting them between hospitals, appropriate information from the requester will be given to the transfer destination, and the appropriate transport timing and method, taking into account personal information: (i) infectious diseases that are prevalent in the public seasonally, (ii) infectious diseases from abroad that could invade Japan. Examples of (i) are RS virus infection from summer to autumn, infectious gastroenteritis (especially norovirus infection) from autumn to winter, and influenza from winter to spring. Examples of (ii) are regional tick-related infections, such as SFTS that are prevalent mainly in western Japan,[61] MERS[60] that could enter from overseas, and emerging infectious diseases that require special measures, including highly pathogenic avian influenza (H5N1 and H7N9). In the event of a domestic invasion or pandemic response, the instructions of local governments and health centers are followed. The availability of transfers and methods of transport are basically determined by discussions between medical institutions. If you suspect an emerging infectious disease for which the pathogenic microorganism cannot be identified, especially a pandemic influenza or new infectious disease that has arisen overseas, the local government or health center is contacted in accordance with the Infectious Diseases Control Law[70] and further instructions are obtained. When sending patients from their own hospital, it is important to provide information on infection control to the receiving hospital and transport vehicles. This is because vehicles and isolators specified by the government could be required.

Monitoring

Equipment, environment, etc.

Item 43. A special examination room is set up, and there is a system to periodically check the negative pressure (differential pressure) and filter management in the negative pressure room.

Category

Once a year.

Commentary

Emergency departments receive patients with infectious disease before they are diagnosed. A private room (medical space for isolation) is preferred for patients with suspected microbial infections that can cause airborne, droplet, or contact infections (e.g., diarrhea, respiratory symptoms with fever, rash with fever).[7,71] Negative pressure isolation rooms are needed to prevent secondary infections in health-care workers and patients by airborne microorganisms.[72,73] Microbes that cause airborne infections include TB, varicella-zoster, measles, and smallpox viruses. Regarding viral hemorrhagic fever (Ebola hemorrhagic fever, Marburg disease, Lassa fever, Crimean Congo hemorrhagic fever), there are no reports of airborne infections in medical institutions. However, in the CDC guidelines, it is recommended to manage airborne infections in a negative-pressure private room with an anterior room for caution.[72] This is to minimize exposure to these risk factors, as blood, vomit, liquid stools, and respiratory secretions in end-stage patients, which might aerosolize and mediate infection.[74] We will examine how many negative-pressure private rooms are needed in the emergency department based on the actual conditions of patients and local community.[72] If the emergency department does not currently have a negative-pressure private room, a negative-pressure private room should be considered for renovation or relocation. Regardless of viral hemorrhagic fever, it is desirable to have an anterior room for negative-pressure private rooms to prevent airborne infection.[72] If there is no anteroom, installing an air purifier with a HEPA filter inside the negative-pressure private room can reduce particles in the air. However, as the effect is limited, it is difficult to replace the air purifier with a HEPA filter to create a negative-pressure private room. It is ensured that the negative pressure differential in the negative-pressure room is appropriate and that the filters are used and managed properly at least once a year. Recommendations, such as differential pressure, are presented in the CDC guidelines.[72]

Infection risk management for facility structure and hardware

Toilet facilities

Item 44. There are multiple toilet facilities in the emergency department.
Item 45. There are toilet facilities in or close to a private room (medical space for isolation).
Item 46. Hand washing facilities are provided in the toilet space.
Item 47. The floor of the toilet space is easy to clean.

Category

Once a year.

Commentary

In a hospital, toilets are easily contaminated by pathogens; hence, managing these contaminations is important. It is necessary to frequently clean and disinfect the surface of toilet bowls, articles around the toilet bowls, floors, walls, etc., to keep them clean.[9,75] Toilets should be separated for staff and patients. Especially in the emergency department, it is necessary to pay attention to the epidemic period of infectious gastroenteritis, such as norovirus infection. Patients suspected or diagnosed with intestinal microbial infections should use toilets separate from those used by other patients to prevent transmission to others.[9] To realize such a situation, it is desirable to install multiple patient toilets in the emergency department. If the toilet bowl or its surroundings are contaminated by stools, temporarily stop using the entire toilet until cleaning and disinfection are completed. It is more desirable that only one patient can use it by providing a private room with toilet.[9] If a private room is unavailable, one mobile toilet is used for each patient. Furthermore, it is important to thoroughly clean and disinfect not only the toilet bowls but also the surrounding items, floors, walls, etc., where feces can adhere.[9,76,77] In such infections, an appropriate drug is used depending on the microorganisms that are prevalent. An automatic faucet is desirable for the washbasin in the toilet. It is desirable that the floor of the toilet is easy to clean. If the toilet bowl is a wall drain type, it is easy to clean the floor. These should be adopted when building or reconstructing a hospital or emergency department.

Waiting area

Item 48. Waiting and examination rooms are divided during epidemics or when necessary.

Category

Quarterly (always) and temporary.

Commentary

Prolonged stay of patients who require transmission-based precautions poses a risk of transmission to other patients and accompanying family members through the waiting and examination rooms. Therefore, when patients (including patients suspected of infection) who need transmission-based precautions visit the hospital, waiting and examination rooms are separated, and contact with other patients and accompanying families is avoided as much as possible.[51]

During an epidemic, such as influenza, posters will be displayed to detect symptomatic persons at an early stage, and a triage system will be established to confirm symptomatic persons at the reception. It is desirable for symptomatic persons to have a separate waiting room, but if this is not possible, measures, such as sitting at a minimum distance of 1 m, are taken.[78] Moreover, the chairs in the waiting room should be placed facing each other to prevent exposure of droplets between patients. Although it might be difficult in terms of equipment, such as the size of the waiting room, consideration must be given to prevent outbreaks in emergency departments as much as possible.

Item 49. Surgical masks, hand sanitizers, and tissue papers are always available at the reception. These wastes are collected so that they can be immediately and properly disposed of in a foot-operated trash can.

Category

Quarterly (always).

Commentary

Many patients who come to the emergency department have infectious diseases. Many patients are untested at the time of visit, and it is important to properly implement standard precautions for all patients. Hand hygiene is the basis of infection control, and it is necessary to prepare the environment so that it can be carried out immediately when necessary.[51] The reception desk is the place where visiting patients must stop by. It is necessary to install hand sanitizers so that everyone, including patients, can easily carry out hand hygiene when needed.

Even if there are respiratory symptoms, such as fever and cough, many patients visit the hospital without wearing a surgical mask, which is necessary to prevent the spread of microorganisms. Patients with respiratory symptoms should wear a surgical mask at the reception.[51] Patients might also cough and expel sputum while in the waiting room. To handle such patients, it is necessary to keep tissue paper at the reception desk and install a trash can so that it can be discarded immediately after use. If the lid of the trash can is opened by hand, infection could spread by touching it with contaminated hands, so a foot-operated trash can should be installed.[7] Hand hygiene should always be undertaken after the tissue is discarded. If your fingers are contaminated, wash your hands quickly with soap and running water. If there is no visible contamination, hand hygiene with sanitizer is carried out. When performing hand hygiene with soap and running water, it is also necessary to avoid touching the common areas so as not to spread the infection while moving to the hand washing facility.

Item 50. Outside the building, there are facilities, such as intercom and telephone, that staff in the hospital can respond to.

Category

Once a year.

Commentary

If a patient suspected of having an emerging or re-emerging infectious disease, such as the pandemic influenza, directly enters the examination room, other patients and health-care workers are exposed, and the risk of spreading the infection increases. To reduce the exposure of other patients and health-care workers as much as possible, it is necessary to examine the patient as far as possible from the usual examination area.[51]

Therefore, if an infectious disease, such as pandemic influenza, develops overseas, and its pathogenicity is likely to be strong, it is necessary to prepare an acceptance system for medical treatment of patients suspected of having it. When receiving a patient, it is necessary to secure a conducting wire that does not intersect with other patients and use appropriate protective equipment, such as gowns, gloves, N95 masks, and goggles.[51]

For that purpose, it is desirable to have equipment, such as an intercom or telephone, that allows the patient to contact the staff directly from outside the building to inform them of their visit and symptoms. It is also important to publicize that you have such equipment and systems.

Item 51. There is equipment in the patient waiting room for hand hygiene.

Category

Quarterly (always).

Commentary

Many patients with infectious diseases also visit the emergency department. Depending on the patient's symptoms, the emergency department environment could be contaminated with blood, body fluids, and excrement. Fingers of patients with infectious diseases and attending families are likely to be contaminated. Hand hygiene is the basis of infection control, and it is hoped that not only medical personnel but also patients will comply with hand hygiene. To improve compliance with hand hygiene, it is important to create an environment in which hand hygiene can be implemented.

It is easy to install a hand sanitizer in the reception desk or waiting room. If it is contaminated with organic substances, such as blood and body fluids, it is necessary to perform hand hygiene with soap and running water, and a hand-washing sink is required. Although it might be difficult to install a hand-washing sink immediately, it is recommended to install a hand-washing facility in the patient waiting room when it is possible to review the facilities, such as new construction or renovation. It is also important to manage and clean the hand-washing sink.

Item 52. Chairs are made of wet cleanable material.

Category

Specific.

Commentary

There are no reports showing spread of infection through the hospital chair. However, the basic procedure of environmental cleaning in hospitals are wet cleaning, and it is necessary to use materials that can be wet cleaned daily with environmental cleaning agents. Especially in emergency departments, there is a high risk of environmental pollution, such as blood and vomit, so chairs in the waiting room should be made of materials that are easy to clean.

In addition, when contaminated with organic substances, disinfectants, such as sodium hypochlorite and alcohol, may be used, so it is desirable to use materials that can withstand these disinfectants.

Item 53. There is a toilet near the waiting room, and the patient's flow line is clear.

Category

Specific.

Commentary

Patients with symptoms of infectious diseases, such as diarrhea and vomiting, often visit the emergency department. Therefore, there is a high possibility that the patient will suddenly go to the toilet, and it is desirable to have a toilet near the waiting or consultation room. In addition, if the attendant has a family infection, sudden symptoms could occur in the attendant. In that sense, it is desirable to have a toilet near the waiting room.

The location of the toilet is posted so that it can be recognized immediately. For patients with symptoms, such as diarrhea and vomiting, the location of the toilet at the time of reception and the location of the waiting area for medical examination near the toilet should be considered.

Patients and families suspected of having infectious diseases could pollute the environment or cause environmental pollution after use. Depending on the scale of the facility, it is desirable to have multiple and separate toilets for use with other patients and attendants. At the time of construction or large-scale renovation, it is desirable to consider the number of toilet rooms installed.

Medical area

Item 54. The special examination room has an anterior room equipped with PPE.

Category

Once a year.

Commentary

When functioning as a negative-pressure room for airborne precautions, the purpose of using the special examination room is twofold. The first is to generate a differential pressure and appropriately control the indoor airflow. The second, in addition to the standard precautions, is to confirm that patients are physically isolated in terms of contact precautions, compliance with infection control measures is maintained, and the risk of indirect contact infections is reduced. Except for airborne precautions, the following is recommended when dedicated isolation rooms cannot be used: secure space to ensure that the patient is physically isolated (>1 m and install privacy curtain between beds to minimize heavy contact.[9,72,73]

Item 55. Sliding doors are installed in the examination and anterior rooms.

Category

Temporary.

Commentary

If it is difficult to install a new front room, it is recommended to use a sliding door. A sliding door is recommended because the pressure difference inside and outside the door is maintained when opening the door, and the airflow from outside to inside is easily maintained.[79,80] According to the previous implementation guidelines in Japan,[81] a sliding door is especially required for the entrance and exit of the negative-pressure examination room to minimize the effect on air circulation as much as possible. If there is a provision to improve a facility by installing sliding doors, this should be done. Therefore, it is a confirmation item (temporary) when designating an isolation room or at the time of construction.

Item 56. The samples that must be submitted to the administrative body and the infection control method at the time of collection are well known.

Category

Temporary.

Commentary

National laws and enforcement regulations stipulate management regulations, such as compliance matters. The main content relates to hardware management and legal exchange. At the time of sample collection, it is necessary to take transmission-based precautions according to the assumed disease and microorganisms. There should be a written statement regarding collection environment management (isolation room or negative-pressure room), correct attachment or detachment of PPE, storage of sample collection, and environmental management of collection environment (ventilation and environmental disinfection or cleaning). Furthermore, they should be well known.

Newly adopted medical devices and materials

Item 57. When new medical devices and materials are introduced, infection control specialists are confirmed, and appropriate advice is given to the site.

Category

Specific.

Commentary

The education and training of employees is essential in ensuring the understanding and practice of standard and transmission-based precautions. In addition, education or training and advice on the principles and practice of preventive measures related to the transmission of infectious microorganisms should be provided at the start of work or when using the device for the first time. For the purpose of preventing exposure to blood and body fluids and indirect contact infection through contamination of fingers and environment, it is necessary to have effective information provision, education, training, and advice opportunities through specialists in infection control and respond to them.[9] When revising the procedures for changing or introducing medical devices and materials, it is necessary to provide education or training and advice based on the latest information. To disseminate infection control measures and improve their learning effect, the timing and educational form (information transmission, exercises, simulations, time) for employees' occupations, users, and managers is considered. In addition, education or training and advice suitable for each individual should be provided. This is different from the regular education and training, so it should be undertaken when the situation arises.

Monitoring and response to multidrug-resistant bacteria

Item 58. If multidrug-resistant bacteria are detected, information can be shared within the hospital, such as notification in a medical record.

Category

Once a year.

Commentary

Patients with a history of hospitalization or admission to an elderly facility often visit the emergency department. In such patients, it is necessary to assume the possibility of having multidrug-resistant bacteria. It is often necessary to wait for a long time in an emergency department before hospitalization. Affected by small space and busy medical personnel, multidrug-resistant bacteria are easily transmitted between patients, and environmental pollution is likely to occur. In

the case of patients for whom it has been previously known that multidrug-resistant bacteria (MRSA, VRE, multidrug-resistant *Pseudomonas aeruginosa*, multidrug-resistant *Acinetobacter*, etc.) that require contact precautions have been detected, information should be clearly provided. These should be on the cover of the medical record (top page in the electronic medical record) so that they can be quickly recognized by the medical staff who will treat the patient for the first time in the emergency department.[5] If there are outbreaks of multidrug-resistant bacteria in multiple wards in the hospital, there is a risk that the emergency department will be a place to spread the infection. For this reason, it is desirable to share information on the detection status of multidrug-resistant bacteria in the hospital with emergency departments[82].

Measures against emerging and re-emerging infectious diseases

Item 59. Initial response procedures for patients with emerging and re-emerging infectious disease are prepared.

Category

Temporary.

Commentary

In Japan, where emerging or re-emerging infectious diseases, such as the pandemic influenza, require a physician's notification under the Infectious Diseases Control Law, it is assumed that patients with confirmed symptoms will be admitted to hospitals designated for infectious diseases. It is also necessary to assume that a suspected patient will be referred to an emergency department of a general medical institution before undergoing an administrative test (pathogen test at a local health institution) through a public health center. Diseases that are prevalent primarily in foreign countries are assumed. Hence, the Ministry of Health, Labour and Welfare often publishes the case definition based on the history of stay in the endemic area and incubation period. Based on this case definition, it is desirable to use an algorithm to summarize the initial response procedure (including waiting room, examination room, securing of flow lines) in an easy-to-understand manner when a suspected patient visits the hospital.[6,83] It is also recommended to collect contact information of related organizations, such as the nearest public health center. It is also advisable to consult with public health centers and designated medical institutions for infectious diseases to envision procedures for administrative inspections and transfers.

Collaboration with the government

Item 60. The reporting procedures and contact information for infectious diseases designated by the Infectious Diseases Control Law are well known.

Category

Once a year.

Commentary

Infectious diseases that require notification by a physician under the Infectious Diseases Control Law are classified into new infectious diseases, category 1 to 5 infectious diseases, pandemic, and re-emerging influenza (infectious diseases designated for 2 years in addition to these). New infectious diseases, category 1 to 3 infectious diseases, and some category 4 and 5 infectious diseases (measles, rubella, meningococcal infection) require notification to the nearest public health center immediately after diagnosis. Notification of infectious diseases should be organized in an easy-to-understand manner. Simultaneously, it is desirable to have a system that allows 24-h contact with public health centers (prefectural health departments) for emergency departments who often treat patients at night or on holidays. When a patient is hospitalized, it is recommended to establish a system that allows them to discuss infection countermeasures and contact in-hospital infection control specialists when necessary.[6] In addition, when a pandemic influenza develops, the presence or absence of the notification changes depending on the epidemic situation, so it is necessary to refer to the notification from the government at any time to inform the hospital.

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LIST OF ABBREVIATIONS

AIDS: acquired immune deficiency syndrome

BCG: bacille Calmette–Guérin

BCP: business continuity plan

CDC: Centers for Disease Control and Prevention

CLABSI: central line-associated bloodstream infection

CRBSI: catheter-related bloodstream infection

FORTH: FOR Traveler's Health

HB: hepatitis B

HBIG: hepatitis B immunoglobulin

HBs: hepatitis B virus surface

HBV: hepatitis B virus

HCV-RNA: hepatitis C virus-RNA

HEPA: high-efficiency particulate air

HIV: human immunodeficiency virus

ICT: infection control team

IGRA: interferon-gamma release assay

MERS: Middle East respiratory syndrome

MRSA: methicillin-resistant Staphylococcus aureus

MSBP: maximal sterile barrier precautions

PPE: personal protective equipment

RSV: respiratory syncytial virus

SARS: severe acute respiratory syndrome

SFTS: severe fever with thrombocytopenia syndrome

VRE: vancomycin-resistant enterococci

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APPENDIX 1

LIST OF CHECKLIST ITEMS

Management system
Organization
Item 1. The hospital's infection control committee includes a chief of emergency outpatient care.
Item 2. The Emergency Headquarters, which is set up in the event of an emerging or re-emerging infectious disease, such as pandemic influenza, includes a person in charge of the emergency department.
Item 3. A system is available to provide 24-h consultation to infection control specialists when needed.
Item 4. An infection control manual specifically for emergency departments has been prepared, or the infection control manual includes items related to emergency departments and is regularly reviewed and revised.
Education, medical examination, and vaccination systems
Management and education on infection control
Item 5. In addition to full-time staff, training on infection control is provided to all staff involved in the emergency department.
Item 6. Training to properly attach and detach the N95 mask and regular fit tests are carried out.
Item 7. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, information on case definitions, infection control methods, etc., will be promptly disseminated.
Screening for tuberculosis (TB)
Item 8. Regular medical examinations for TB are provided at the time of employment and at least annually.
Vaccination
Item 9. Influenza vaccination is recommended and managed.
Item 10. Measles, varicella, rubella, mumps, and hepatitis B virus immunity (vaccination frequency, antibody titer) have been confirmed and managed.
Item 11. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, there is a system that allows temporary vaccination in cooperation with the government.
Response to suspected infection
In the hospital
Early recognition and initial response
Item 12. In the event of a prior telephone call from the patient or at the patient reception desk, the information obtained by the first staff contacting the patient to recognize the infectious disease are created in a checklist format and updated as appropriate.
Item 13. In the case of telephone contact, there are explanatory systems and easy-to-read signs that guide a patient with suspected infectious disease to the appropriate entrance.
Item 14. When treating patients, the emergency department staff, including emergency receptionists, should wear surgical masks in principle.
Item 15. Inquiry forms or questionnaires (including the destination and length of stay and risk of exposure to infectious diseases) are used for the emergency outpatient staff, including receptionists, to conduct triage in

Japanese and foreign languages (English, it is desirable to include the language used in the disease endemic area).

Item 16. An infection screening system has been prepared in advance.

Item 17. In the event of an emerging or re-emerging infectious disease, such as pandemic influenza, infection screening systems based on case definitions including suspected cases will be strengthened.

Item 18. The flow of patients and health-care professionals to special or specific rooms equipped with negative pressure, high-efficiency particulate air (HEPA) filters, etc., is well known and implemented.

Item 19. The basic flow line, isolation method, and response for each major symptom (fever/rash, gastrointestinal symptoms, respiratory symptoms) are documented in a manual. The flow of patients with suspected infections and that of other patients and staff are well established.

Specific measures to prevent infection

Item 20. Personal protective equipment required for standard precautions is available in sufficient quantities in various sizes and ready for use when needed.

Item 21. In response to symptoms, such as trauma and vomiting, emergency departments are prepared so that items necessary for infection control can be used immediately.

Item 22. Even when inserting peripheral venous catheters, clean operations are carried out according to the hospital manual.

Item 23. Even when infection is not suspected, standard precautions (gloves, eye guards, surgical masks, etc.) are used in carrying out tracheal intubation.

Item 24. Urinary catheters are not routinely inserted in patients who have been admitted.

Item 25. Urinary catheter insertion is carried out aseptically.

Item 26. When there is a risk of exposure to blood and body fluids, eye guards and surgical masks are used for medical examinations, thoracic drainage, and lumbar puncture.

Item 27. Careful consideration should be given to central venous catheter insertion. If inserted, the central line-associated bloodstream infection (CLABSI) prevention bundle must be followed.

Item 28. When inserting a central venous catheter, the maintenance of cleanliness is monitored by a health-care professional who has not carried out the insertion procedure. If there is a violation, the procedure is discontinued.

Item 29. Procedures are in place for responding to suspected infections.

Improvement of environment

Item 30. Procedures for cleaning the examination room after use, improving the environment for frequent contact surfaces and contaminated sites (wet process), and providing appropriate drugs and concentrations for alcohol-resistant microorganisms are well known.

Item 31. Reusable devices (e.g., ultrasound, point-of-care items such as blood glucose measurements, endoscopes, etc.) are properly cleaned, disinfected, and sterilized before using in the next patient.

Item 32. When cleaning, disinfecting, and sterilizing the reusable equipment, appropriate PPE is used.

Item 33. The procedure of reuse (cleaning, disinfection, or sterilization) is taught using a hands-on approach.

Outside the hospital

Transport by ambulance

Item 34. Based on information from staff undertaking prehospital rescue operations, staff in the emergency department can either instruct or undertake appropriate precautionary measures against staff carrying out prehospital rescue operations.

Item 35. For each relevant infectious disease, instructions for infection control measures to be provided to staff undertaking prehospital rescue operations are prepared.

Item 36. If a staff member carrying out prehospital rescue operations receives information about a confirmed or strongly suspected case of TB, measles, chickenpox, etc., the staff member carrying out prehospital rescue operations is instructed to take appropriate infection prevention measures.

Item 37. Based on the diagnosis, staff undertaking prehospital rescue operations are advised on occupational infection control, surface disinfection, and environmental recovery.

Item 38. Based on the diagnosis, advice on occupational infection control, surface disinfection, and environmental recovery is provided to staff undertaking prehospital rescue operations.

Item 39. If TB, measles, chickenpox, etc., are confirmed or strongly suspected, based on the diagnosis, staff carrying out prehospital rescue operations are advised on measures to prevent occupational infection, appropriate cleaning, surface cleaning, and disinfection, and environmental recovery.

Transport between hospitals

Item 40. If necessary, appropriate advice is given to the transfer requester regarding infection control, taking into account the patient's personal information.

Item 41. According to the information from the physician who requested the patient's medical treatment,

instructions are given on the appropriate transport timing and method.

Item 42. When transporting patients from a hospital to an outside facility, the requester provides appropriate information on infection control to the receiving facilities and transport vehicles and provides guidance.

Monitoring

Equipment, environment, etc.

Item 43. A special examination room is set up, and there is a system to periodically check the negative pressure (differential pressure) and filter management in the negative pressure room.

Infection risk management for facility structure and hardware

Toilet facilities

Item 44. There are multiple toilet facilities in the emergency department.

Item 45. There are toilet facilities in or close to a private room (medical space for isolation).

Item 46. Hand washing facilities are provided in the toilet space.

Item 47. The floor of the toilet space is easy to clean.

Waiting area

Item 48. Waiting and examination rooms are divided during epidemics or when necessary.

Item 49. Surgical masks, hand sanitizers, and tissue papers are always available at the reception. These wastes are collected so that they can be immediately and properly disposed of in a foot-operated trash can.

Item 50. Outside the building, there are facilities, such as intercom and telephone, that staff in the hospital can respond to.

Item 51. There is equipment in the patient waiting room for hand hygiene.

Item 52. Chairs are made of wet cleanable material.

Item 53. There is a toilet near the waiting room, and the patient's flow line is clear.

Medical area

Item 54. The special examination room has an anterior room equipped with PPE.

Item 55. Sliding doors are installed in the examination and anterior rooms.

Item 56. The samples that must be submitted to the administrative body and the infection control method at the time of collection are well known.

Newly adopted medical devices and materials

Item 57. When new medical devices and materials are introduced, infection control specialists are confirmed, and appropriate advice is given to the site.

Monitoring and response to multidrug-resistant bacteria

Item 58. If multidrug-resistant bacteria are detected, information can be shared within the hospital, such as notification in a medical record.

Measures against emerging and re-emerging infectious diseases

Item 59. Initial response procedures for patients with emerging and re-emerging infectious disease are prepared.

Collaboration with the government

Item 60. The reporting procedures and contact information for infectious diseases designated by the Infectious Diseases Control Law are well known.

APPENDIX 2

NAMES AND AFFILIATIONS OF ALL MEMBERS OF THE COMMITTEE FOR INFECTION CONTROL IN THE EMERGENCY DEPARTMENT AND THE JOINT WORKING GROUP

Chairman of the Committee

JUNICHI SASAKI (DEPARTMENT of Emergency and Critical Care Medicine, Keio University School of Medicine, Tokyo)

Members who created the checklist

Yasukazu Shiino (Department of Acute Medicine, Kawasaki Medical School, Kurashiki)

Yasuyuki Kato (Department of Infectious Diseases, International University of Health and Welfare, Narita)

Daisuke Kudo (Division of Emergency and Critical Care Medicine, Tohoku University Graduate School of Medicine, Sendai)

Masahisa Fujita (Infection Control Team, Nippon Medical School Hospital, Tokyo)

Isao Miyairi (Division of Infectious Diseases, National Center for Child Health and Development, Tokyo)

Toru Mochizuki (Infection Control Team/Department of Emergency and Critical Care Medicine, Nippon Medical School Musashikosugi Hospital, Kawasaki)

Hiroshi Okuda (Division of Comprehensive Medicine, Tohoku University Graduate School of Medicine, Sendai)

Tadashi Nagato (Department of Internal Medicine, Chugoku Central Hospital, Fukuyama)

Yoshiko Nabetani (Division of Nursing, Osaka University Hospital, Suita)

Members

Hiroto Ikeda (Department of Emergency Medicine, Teikyo University School of Medicine, Tokyo)

Nobuaki Shime (Department of Emergency and Critical Care Medicine, Graduate School of Biochemical and Health Sciences, Hiroshima University Hospital, Hiroshima)

Norio Sato (Department of Aeromedical Services for Emergency and Trauma Care, Ehime University Graduate School of Medicine, Matsuyama)

Shigenari Matsuyama (Department of Emergency and Critical Care Medicine, Hyogo Emergency Medical Center, Kobe)

Hiroyuki Yokota (Department of Emergency and Critical Care Medicine, Nippon Medical School, Tokyo)

Hiroki Ohge (Department of Infectious Diseases, Hiroshima University Hospital, Hiroshima)

Manabu Watanabe (Department of Surgery, Toho University Ohashi Medical Center, Tokyo)

Masanori Morita (Critical Care Medical Center, Sakai City Medical Center, Sakai)

Hiroshi Soeda (Department of Pharmacy, Tokyo Medical University Hospital, Tokyo)

Katsunori Yanagihara (Department of Laboratory Medicine, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki)

Collaborator (the Japanese Society for Tuberculosis and Nontuberculous Mycobacteriosis)

Akira Fujita (Tama-Nambu Chiiki Hospital, Tokyo Metropolitan Health and Hospitals Corporation)

Director in charge of the Committee

Takeshi Takahashi (Director, National Hospital Organization Kumamoto Medical Center, Kumamoto)

Representative director of the Japanese Association for Acute Medicine

Takeshi Shimazu (Traumatology and Acute Critical Medicine, Graduate School of Medicine Faculty of Medicine, Osaka University, Suita)