

Annex 5

Technical Protocol for Site-specific Disinfection

I. The principle of disinfection

1) Determination of scope and object

According to the results of epidemiological investigation, one should determine the scope, object and time limit of on-site disinfection. Places where patients and asymptomatic infected persons have stayed, such as homes, medical institutions, isolation wards, transfer vehicles, etc. should be disinfected at any time, and receive terminal disinfection after discharge or death of patients, and after asymptomatic infections' nucleic acid test results turn negative.

2) Method selection

Medical institutions should try to choose disposable diagnostic supplies. For non-disposable diagnostic supplies, pressure steam sterilization is preferred; non-heat-resistant items can be disinfected or sterilized with chemical disinfectants or low-temperature sterilization equipment.

The surface of surrounding objects can be disinfected through wiping, spraying or soaking with chlorinated disinfectants, chlorine dioxide, or other disinfectants.

It is recommended to choose an effective disinfectant such as Povidone-iodine and hydrogen peroxide, or other quick-drying hand disinfectant for hand and skin disinfection.

For indoor air disinfection, one can choose spray disinfection with disinfectants such as peracetic acid, chlorine dioxide, and hydrogen peroxide.

All disinfection products used should comply with the management requirements of national health departments.

II. Disinfection measures

1) Disinfection at any time

Disinfection at any time refers to the timely disinfection of items and places contaminated by patients and asymptomatic infected persons. Places where patients have stayed, such as homes, isolation wards of medical institutions, medical observation sites, and transfer vehicles etc, as well as the contaminated items and pollutants from patients should be disinfected at any time. For disinfection methods, please refer to the section on terminal disinfection. When there are people in the room, it is recommended not to choose spray disinfection. Ventilate indoor air (including natural ventilation and mechanical ventilation) in places where patients are isolated to maintain indoor air circulation. Ventilate 2~3 times a day for 30 minutes each time.

If conditions allow, patients should be placed in negative pressure isolation wards in the healthcare facility; suspected cases should be isolated in single rooms; confirmed cases can be placed in the same

room. Non-negative pressure isolation wards should be well ventilated and can be ventilated either through natural ventilation and mechanical ventilation, or through air disinfection with circulating air sterilizers. Ultraviolet rays can be used to sterilize the air under unmanned conditions. When sterilized with ultraviolet rays, the exposure time can be appropriately extended to more than 1 hour. Medical staff and companions should wash and disinfect their hands after diagnosis, treatment or nursing.

2) Terminal disinfection

Terminal disinfection refers to the thorough disinfection after the source of infection has left relevant sites, and it should be ensured that the places and the items going through terminal disinfection should no longer have pathogens. Terminal disinfection targets include patients and asymptomatic infected persons' pollutants (blood, secretions, vomitus, feces, etc.) and their potentially contaminated items and places. It is not necessary to sterilize the outdoor environment (including the air) on a large scale. Terminal disinfection is not needed for places where asymptomatic infected persons have temporarily stayed and without obvious pollutants.

a. Patient's home

After the patient is hospitalized or dies, or asymptomatic infected persons' nucleic acid test results turn negative, terminal disinfection should be performed, targeting: the floor, walls, surface of tables, chairs and other furniture, door handles, patients' tableware and drinkware, clothes, bedding and other daily necessities, toys, and bathrooms (including toilets) etc.

b. Transportation vehicles

Terminal disinfection should be performed when patients and asymptomatic infected persons take off from transportation vehicles, including: surface of cabins, seats, sleepers, tableware and drinkware, textiles such as bedding, excreta, vomitus, items and places contaminated by excreta and vomitus, toilets within trains and aircraft etc.

c. Medical institutions

Terminal disinfection should be performed for the following situations: at the end of each working day at fever outpatient clinic and infectious disease outpatient clinic of medical institutions; isolation wards; after discharge or death of patients; and after the nucleic acid testing results of asymptomatic infected persons turn negative. Terminal disinfection should cover: the floor, walls, surface of tables, chairs, bedside tables, bedsteads etc., patients' clothes and bedding, other daily necessities and medical supplies, indoor air etc.

d. Terminal disinfection procedures

The terminal disinfection procedure is performed in accordance with Appendix A of the *General Principles of Disinfection of Epidemic Focus (GB19193-2015)*. On-site disinfection personnel should take personal protection when preparing and using chemical disinfectants.

III. Disinfection methods of common polluted objects

1) Indoor air

For the terminal disinfection of indoor air in venues such as households and isolation wards of medical

institutions, one can refer to the “*Management Specifications of Air Cleaning Technique in Hospitals*” (WS/T 368-2012). Peracetic acid, chlorine dioxide, hydrogen peroxide and other disinfectants can be selected and sprayed in ultra low volume for disinfection when no one stays indoors.

2) Contaminants (patients' blood, secretions and vomitus)

A small amount of pollutants can be carefully removed by using disposable absorbent materials (such as gauze, wipes, etc.) dipped with 5,000mg/L-10,000mg/L chlorine-containing disinfectant (or disinfecting wet wipes/dry wipes that can achieve high-level disinfection).

A large amount of pollutants should be completely covered with disinfectant powder or bleach powder containing water-absorbing ingredients, or fully covered with disposable water-absorbing materials before a sufficient amount of 5,000mg/L -10000mg/L chlorine-containing disinfectant (or sterilized dry towels that can achieve high-level disinfection) is poured on the water-absorbing materials for 30 minutes of disinfection, followed by careful removal of the pollutant. One should avoid contact with pollutants during the removal. The cleaned-up pollutants should be centrally disposed of as medical waste.

Patients' secretions, vomitus should be collected in a specialized container and should be soaked for two hours with 20,000 mg/L chlorine-containing disinfectant, according to the ratio of 1:2 for contaminants to disinfectant.

After removal of the pollutants, the surface of the polluted environmental objects should be disinfected. The container containing the pollutants can be soaked with a disinfectant solution containing 5,000mg/L effective chlorine for 30 minutes, and then be cleaned.

3) Faeces and sewage

When there is an independent septic tank, it should be disinfected before entering the municipal drainage pipe network, and chlorine-containing disinfectant should be added regularly, and chlorine-containing disinfectant should be added into the tank (for the first time, effective chlorine reaches 40mg/L or above), and the total residual chlorine should reach 10mg/L after 1.5 hours of disinfection. The disinfected sewage should meet the discharge standard of water pollutants from medical institutions (GB18466-2005).

In the absence of a separate septic tank, special containers are used to collect faeces, disinfect them and dispose of them. Use chlorine-containing disinfectant with effective chlorine of 20000mg/L and soak for 2 hours according to the feces to medicine ratio of 1:2; If there is a large amount of diluted excrement, the bleaching powder with 70%-80% effective chlorine should be applied to dry it, and the mixture should be thoroughly mixed according to the excrement to medicine ratio of 20:1, and then disinfect it for 2 hours.

4) Floor and wall

When there are visible pollutants, the pollutants should be completely removed before disinfection. When there are no visible pollutants, one can use 1,000mg/L chlorine containing disinfectant or 500mg/L

chlorine dioxide to wipe or spray for disinfection. For the floor disinfection, the floor should be sprayed with disinfectant once from outside to inside, in a volume of 100mL/m² ~ 300mL/m². Then, after the indoor disinfection, the floor should be sprayed again from inside out. The disinfection should be not less than 30 minutes.

5) Surface of the object

When there are visible pollutants on the surface of the diagnosis and treatment equipment as well as bed fences, bedside tables, furniture, door handles, and household items, the pollutants should be completely removed before disinfection. When there are no visible pollutants, 1,000mg/L chlorine-containing disinfectant or 500mg/L chlorine dioxide can be used for spraying, wiping or soaking. The surface can then be wiped clean with water after 30 minutes of disinfection.

6) Textiles such as clothes and bedding

Aerosols should be avoided during collection, and it is recommended that textiles be centrally incinerated as medical waste. When there are no visible pollutants, if the textiles need to be reused, they can be sterilized by circulating steam or boiling for 30 minutes; or 500mg/L chlorine-containing disinfectant can be used to first soak the polluted textiles for 30 minutes, before they are washed as usual; or they can be put in a washing machine directly in a water-soluble packaging bag, washed and disinfected for 30 minutes, with an effective chlorine content maintained at 500mg / L; valuable clothing can be sterilized by ethylene oxide.

7) Hand hygiene

All personnel participating in the field work should strengthen their hand hygiene measures. An effective alcohol-based hand-drying disinfectant can be selected, or directly wipe with 75% ethanol disinfection. Those who are allergic to alcohol, can choose the effective non-alcohol hand disinfectant such as quaternary ammonium disinfectant; Under special conditions, 3% hydrogen peroxide disinfectant, 0.5% iodine or 0.05% chlorine-containing disinfectant can be used to wipe or soak hands, and appropriately prolong the disinfection time. One should wash hands with liquid soap and running water before disinfection when there are visible pollutants.

8) Skin and mucous membranes

When the skin is contaminated by pollutants, the pollutants should be removed immediately, and then the skin should be wiped for more than 3 minutes with a disposable absorbent material dipped with 0.5% Povidone-iodine or hydrogen peroxide, and washed with water; the mucous membrane should be washed with a large amount of physiological saline or be rinse and disinfected with 0.05% Povidone-iodine.

9) Tableware (drinkware)

After the tableware or drinkware is cleared of food residues, it should be boiled and sterilized for 30 minutes, or a chlorine-containing disinfectant with an effective chlorine of 500mg / L can be used to soak the tableware/drinkware for 30 minutes, before it is washed clean with water.

10) Transportation and transfer vehicles

The pollution situation should be evaluated first. When there are visible pollutants in trains, cars, and ships, one should first use disposable absorbent materials dipped with 5000mg/L -10000mg/L chlorine-containing disinfectant (or disinfectant wipes/dry towel able to achieve high level disinfection) to completely remove the pollutants, and then spray or wipe the area with 1000mg/L chlorine-containing disinfectant or 500mg /L chlorine dioxide, and wipe with clean water after 30 minutes of disinfection. When disinfecting aircraft cabins, disinfectant types and dosages should be selected in accordance with the relevant regulations of the Civil Aviation Administration of China. Fabrics, cushions, pillows and sheets are recommended to be collected and centrally treated as medical waste.

11) Daily waste of patients

The domestic waste of patients should be treated as medical waste.

12) Medical waste

The disposal of medical waste should follow the requirements of the *Medical Waste Management Regulations* and the *Medical Waste Management Measures of Medical Institutions*. The waste should be collected, packed and sealed through standard use of double-layered yellow medical waste collection bags and follow the normal disposal procedures for disposal.

13) Dead body disposal

After the death of the patient, one should minimize the movement and handling of the corpse and leave it to be promptly handled by trained staff under strict protection. Cotton balls or gauzes with 3,000mg/L-5,000mg/L chlorine-containing disinfectant or 0.5% peracetic acid should be used to fill the patient's mouth, nose, ears, anus, trachea opening and other open channels or wounds; the body should be wrapped with a double-layer cloth soaked with disinfectant, placed in a double-layer body bag, and sent directly by a special vehicle from the civil affairs department to the designated place for cremation as soon as possible.

14) Precautions

The on-site disinfection work should be conducted in time by relevant organizations under the guidance of the local disease prevention and control agency, or the local disease prevention and control agency should be responsible for the disinfection. The medical institution's disinfection at any time and their terminal disinfection should be arranged by the medical institution, with technical guidance from the disease control agency. Non-professionals should receive professional training from local disease prevention and control agency before starting disinfection, so that they can adopt correct disinfection methods and have thorough personal protection.

IV. Evaluation of the disinfection effect

When necessary, the disinfection effect of the object surface, air, and hands should be evaluated in a timely manner by relevant laboratory personnel eligible for such testing.

1) Object surface

The surface of the object before and after disinfection should be sampled according to GB15982-2012 “*Hygienic Standard for Disinfection in Hospitals*”, with the sampling solution after disinfection being the corresponding neutralizer.

The evaluation of disinfection effect is generally based on natural bacteria. If necessary, indicator bacteria can also be used to evaluate the disinfection effect according to the actual situation. The resistance of the indicator bacteria should be equal to or greater than the existing pathogens. When using natural bacteria as an indicator, the killing rate of natural bacteria on the disinfected object after disinfection should be $\geq 90\%$, to render the disinfection qualified; when using the indicator bacteria as an indicator, the killing rate of the indicator bacteria after disinfection should be $\geq 99.9\%$, before the disinfection can be considered as qualified.

2) Indoor air

Air before and after disinfection should be sampled according to GB5982-2012 “*Hygienic Standard for Disinfection in Hospitals*”, the sampling plate for the air after disinfection should contain the corresponding neutralizing agent. The killing rate of natural bacteria in the air after disinfection should $\geq 90\%$, so as to render the disinfection qualified.

3) Staff hands

Pre and post disinfected hands should be sampled according to the Appendix A under GB15982-2012 “*Hygienic Standard for Disinfection in Hospitals*” with the sampling solution for post disinfected hands being the corresponding neutralizer. The killing rate of natural bacteria on the hand after the disinfection should be $\geq 90\%$, to render the disinfection qualified.

4) Disinfection effect of hospital sewage

Evaluate should be made according to the relevant provisions in GB18466 “*Water Pollutant Discharge Standards for Medical Institutions*”.