Guidelines for Poliomyelitis Epidemic Management

Centers for Disease Control, Department of Health, Executive Yuan

July 2006
I. Foreword

In human history, poliomyelitis has caused tremendous trauma to numerous individuals and families and brought about immense loss of human lives as well as material resources. In an effort to minimize the damage caused by poliomyelitis and free humanity from the threat of the disease, the World Health Organization (WHO) launched the Global Polio Eradication Initiative in 1988. Since its inception, the program has achieved outstanding results with the efforts and cooperation of so many countries. In 2001, global poliomyelitis cases had fallen to under 500, bringing the world close to the eradication objective.

Though the threat posed by poliomyelitis to human beings has been significantly reduced, for countries that have eradicated polio, the disease still poses a huge challenge to public health when wild poliovirus is detected in patients. If poliomyelitis occurs in countries where polio vaccination rates are low, it becomes a even greater threat. Consequently, as long as poliovirus still spreads in certain countries, the risk of polio being imported from other countries can not be completely eliminated and the challenge and threat will continue to exist. Between 2002 and 2005, twenty-one countries which had eradicated polio were reinfected with wild poliovirus (WPV) originating from six countries, including Afghanistan, Egypt, India, Niger, Nigeria and Pakistan. The wild poliovirus then spread in the twenty-one countries and caused serious epidemic. Though the epidemic was brought under control after resorting to emergency vaccination programs, the progress towards achieving the eradication objective was hindered and the WHO’s schedule to eradicate polio was delayed for a couple of years. In addition, vaccine-derived poliovirus (VDPV) poses a great threat to countries with low vaccination rates.
Poliomyelitis has been eradicated in Taiwan since 2000. Nevertheless, frequent travel by Taiwanese businessmen to and of foreigners from regions where poliomyelitis is still common due to trade and personal reasons has furthered the transmission of poliovirus. As a result, it is rather difficult to prevent poliovirus from transmitting from other countries into our territory before the global eradication objective is reached. Therefore, even though it is unlikely that a polio epidemic might break out in Taiwan, we still need to be well-prepared at peacetime so that when an epidemic occurs, we may immediately detect it and effectively prevent its spread. Consequently, the guidelines are based on past prevention and control experience and related guidelines in Taiwan and from other countries in an effort to better prepare ourselves in peacetime and strengthen our response capacities. Emergency response strategies and measures have been developed to cover surveillance, epidemiological investigation, vaccination and health education. The purpose is to properly respond to crisis and so that Taiwan’s eradication result can be maintained.
II. Risk Assessment

1. WPV still exists in the world

Taiwan has not seen confirmed poliomyelitis cases caused by WPV infection since 1983. Though poliomyelitis eradication was declared in the Western Pacific area where Taiwan is located in 2000, WPV circulating in countries still affected by polio poses a great threat to countries that have eradicated polio. With frequent international travel, it is difficult to keep off WPV.

2. Risks of Poliomyelitis Outbreak in Taiwan

(1) Possible sources of infection:

A. WPV:

At present, the biggest crisis to the global polio eradication campaign is the possibility of WPV spreading from regions where polio is still common to other areas. If the vaccination rate of poliomyelitis in a certain country is low or the country has poor health conditions, an outbreak is possible. With intensive interaction and exchanges among countries, it is likely for poliomyelitis to spread from other countries to Taiwan.

B. VDPV:

Oral Poliomyelitis Vaccine (OPV) is a live attenuated poliovirus vaccine. After taking it orally, the whole body will be infected and circulating antibodies as well as immune responses in the intestines will be stimulated. The advantage is that the vaccine strain can develop in the intestines of vaccinated individuals and will be discharged along with their excrements. This process puts the vaccine-strain virus in absolute advantage over the wild strain virus in the environment and enables the vaccine strains to infect other
people who have not been immunized in a natural way. As a result, the immunity of the whole group will be improved. Vaccine-strain virus will not cause clinical symptoms in infected individuals; nevertheless, people whose immune system is not functioning properly (especially those with B-cell malfunction) may excrete virus for a long time after receiving OPV and it might last as long as ten years. In the meantime, the virus may mutate into iVDPV (Immuno-deficient excretors of vaccine-derived poliovirus) and become the source of an epidemic.

Moreover, if the vaccination rate of OPV is low, the vaccine strain will spread among those who have not been inoculated for a long time and become cVDPV (Circulating Vaccine-Derived Poliovirus), causing illness to the human nervous system and potentially leading to an epidemic.

VDPV might come from people who have been immunized in Taiwan or other countries where OPV is still used. Taiwan had conducted the “OPV Surveillance on Patients of Congenital Immunodeficiency” project between 2003 and 2004. The purpose was to understand the possibility of immunodeficient patients carrying the poliovirus vaccine strain in Taiwan, and the research result came out negative. However, cVDPV epidemics still broke out recently in Egypt, the Dominican Republic, Haiti, the Philippines, Madagascar, Cambodia, China and India.

(2) Estimation of the Impact on Taiwan

Poliomyelitis is a vaccine-preventable infectious disease. Taiwan’s government first introduced the inactivated poliomyelitis
vaccine (IPV) to its people in 1958. Later, Sabin vaccine was also introduced to Taiwan in 1963. A national vaccination program was launched soon afterwards. Since 1965, children younger than one year old must receive two doses of OPV. In 1983, the total number of doses was increased to five: a baby will receive the first dose at two months of age, the second dose at four months of age, and the third dose at six months of age. Normally, the body will create enough protection after three doses. But to be on the safe side, two additional doses will be given after one year and when the child is six years old respectively in order to maintain immunity. The OPV3 vaccination rate for children born in the past decade has reached over 94% (between 94.86% and 97.04%). Even though the vaccination rate for each generation does not reach 100% and theoretically the number of infectable hosts may increase with time, the vaccine-strain virus has gained absolute predominance in the environment since Taiwan has made OPV one of the routine vaccinations and the vaccination rate is rather high. Therefore, when imported WPV or VDPV is found in Taiwan, the epidemic development will be confined. A large-scale outbreak such as the one recently occurred in India is highly unlikely.

III. Preparedness and Response

1. Peacetime

(1) Applicable Conditions

A. No WPV or imported poliomyelitis cases.

B. When laboratories detect that VDPV in the feces of acute flaccid paralysis (AFP) cases or their contacts and that they
are the sporadic cases of the disease.

(2) Estimating Crisis Targets

A complete clinical and epidemiological investigation and two examinations of fecal specimens must be carried out for hot cases of AFP. The definition of hot cases of AFP is as follows:

(A) People aged under five years and are not immunized;

or (B) Hobos or travelers with no fixed abodes;

or (C) Those who have had contact with people from poliomyelitis-affected areas and have shown typical symptoms of poliomyelitis (such as slight fever and asymmetric paralysis).

(3) Goals of Crisis Management

A. To maintain the achievement of poliomyelitis eradication.

B. To prevent VDPV from spreading.

(4) Implementation Strategies

A. When there is no WPV, VDPV or imported poliomyelitis cases:

Taiwan has conducted the medium-term “Poliomyelitis, Neonatal Tetanus, Congenital Rubella Syndrome and Measles Eradication Project” since 1991. At present, the medium-term project has entered the fifth year of its third stage. In order to maintain the result of poliomyelitis eradication and eliminate measles and other diseases, the fourth stage (2007-2011) of the medium-term project was planned and submitted to the DOH for approval in early 2006.

In the third and fourth stages, clear and definite execution goals have been outlined to maintain the result of polio eradication in peacetime, including surveillance, vaccination rate, preservation and control of WPV, cVDPV and other related specimens as well as education and training. The CDC
and its branches will supervise local health bureaus to implement each task based on the goals set in the medium-term project, and the following rewards have been set up accordingly in an effort to boost the morale of grassroots epidemic prevention staff and motivate clinics and hospitals to report cases:

( A ) Grassroots Epidemic Prevention Staff

**Rewards:** The CDC will publicly commend staff who meet one of the following requirements in the year-end review meeting or ask local governments to give administrative rewards to the staff.

a. The number of confirmed AFP cases under 15 years old reaches the expected reporting number for that county or city in any given year, and investigation and specimen collection are carried out in accordance with related schedules set up in the “Eradication Program of Polio, Measles, Rubella and Neonatal Tetanus.”

b. Branches of the CDC randomly visit (or call by phone) clinics and hospitals in regions under their jurisdiction and are participants in the zero case reporting program, and the actual number of clinics and hospitals have been visited or contacted reaches over 90%.

c. The OPV3 completion rate is over 97%, and over 90% of the townships and villages have completed OPV3 in the given administrative district.

**Improvement:** The CDC will ask local governments to do self-evaluation and submit concrete
improvement plans if one of the following conditions applies:

a. County and city health bureaus fail to finish investigation on 95% of reported AFP cases in their jurisdictions within time limit or fail to collect specimens from 90% of cases within time limit.

b. Branches of the CDC fail to visit (or call) 80% of clinics and hospitals participating in the zero case reporting program in areas under their control.

c. The number of confirmed AFP cases under 15 years of age does not meet the expected number of cases that should be reported that year.

d. Counties and cities with OPV3 completion rates lower than 93%.

( B ) Clinics and Hospitals

In accordance with the Article 5 of the Rewards Regulations for Infectious Disease Prevention and Control, if a medical worker reported an AFP case that was subsequently confirmed by the CDC, he or she would be rewarded NT$1,000. If a medical worker failed to report in accordance with Article 37 of the Communicable Disease Control Act, he or she could be fined between NT$90,000 and NT$450,000.

Consequently, county and city health bureaus shall make known of the rewards through various channels such as doctors’ associations, medical education and training seminars, etc. and encourage clinics and hospitals (especially those participating in the zero case
reporting program) under their jurisdiction to report cases.

B. When the laboratory finds VDPV from feces of AFP cases or their contacts and they are sporadic cases of
   (A) Look for other suspected cases and conduct large-scale epidemiological investigation and specimen collection on cases’ neighbors and schoolmates.
   (B) Know well the vaccination rate of OPV in the county or city where the cases live. Make sure the vaccination rate is over 95% and demand those who haven’t received vaccination or are not sure if they have been vaccinated to receive vaccination immediately.
   (C) Track viral excretions of cases until they have two consecutive negative test results:
      a. Collect their feces once every month within the first six months of the onset of disease.
      b. Six months after the onset of disease, collect specimens once every two months.

2. Special Circumstances
   (1) Applicable Conditions
      A. WPV epidemic:
         (A) When laboratories find WPV in feces of AFP cases and through epidemiological investigation process, the case is found out to have traveled to areas where polio is still common.
         (B) AFP case is detected with WPV and through epidemiological investigation process, the case is determined to have been infected in Taiwan.
         (C) WPV is found in feces of a case and such case has no
nervous symptoms or has recently visited polio-affected areas.

B. cVDPV epidemic:

More than one polio-like AFP case occurs out in a short period of time; or even though it is a single polio-like case, the case is not immunodeficient or imported.

(2) Estimating Crisis Targets

For high-risk AFP cases (hot cases) or environments where WPV has been detected, a complete clinical and epidemiological investigation and immediate collection of two fecal specimens from AFP cases for examination are necessary. The definition of hot cases of AFP is as follows:

A. Those who are under five years old and are not immunized;
or B. transient population or travelers;
or C. Those who have had contact with people from areas where polio is common and have shown typical poliomyelitis symptoms (such as slight fever and asymmetric paralysis).

(3) Goals of Risk Management

A. To effectively curb the spread of WPV and cVDPV in order to prevent the deterioration of epidemic.
B. To maintain the achievement of poliomyelitis eradication.

(4) Response Strategies

To effectively respond to a possible epidemic caused by imported WPV and VDPV, the following response strategies have been devised in accordance with the National Documentation for Maintenance of Poliomyelitis Eradication in Taiwan issued in 2002 and past experience in handling VDPV cases. Execution details and division of duties are as follows:
A. Prompt Investigation:

For high-risk AFP cases or areas where WPV is detected, a complete clinical and epidemiological investigation is necessary. When AFP cases or their contacts are found to have WPV or VDPV, the epidemiological investigation system must be activated immediately to determine the source of the virus strain and whether it will spread from the clinical, epidemiological and virological perspectives. The scope of investigation is as follows:

(A) The travel and contact history of cases from thirty-five days before the onset of disease and during the onset. If the case has traveled to another country, the investigator must confirm if polio is common in that country in order to determine whether the case is infected in a polio-affected region.

(B) Look for other suspected cases in places where the case has visited and people whom the case had contact with from thirty-five days (the longest incubation period of poliomyelitis) before the onset of disease and during the onset.

(C) Vaccination history of cases and their contacts.

(D) Collect specimen from cases and their contacts. Viruses separated from specimens of cases and their contacts must be sent to laboratories for analysis. Through gene sequencing results, the virus strain can be identified to be WPV, vaccine strain (VPV) or VDPV, and the region of its origin will be determined based on investigation results.

B. Strengthening Monitoring System:
When confirmed poliomyelitis cases are found in countries where polio has been eradicated or when WPV is found to exist in the environment, it is necessary to immediately strengthen the monitoring of AFP and poliovirus. By reviewing the quality of the monitoring system, which should involve a retrospective investigation and examination, we may determine the case did not occur because there was already an undetected epidemic. Through actively looking for cases and monitoring contacts of the cases, we may effectively prevent the imported virus from taking roots and learn more about the degree of virus transmission. Disease prevention and control efforts will also be improved. The measures to be taken are as follows:

( A ) Immediately pass the information to WHO, diplomatic allies and neighboring countries.

( B ) Immediately call on experts to discuss contingency plans and the coordination of resources.

( C ) Immediately inform health departments and major hospitals in Taiwan, asking them to be on alert for more cases and remind health authorities in each level to fortify their zero case reporting system and to collect complete information on people in charge of that system in related departments and hospitals. No exception is allowed. Meanwhile, a complete epidemiological investigation on and specimen collection from cases are needed.

( D ) Evaluating mobilization level:
   a. Staff in each administrative district join in intensified efforts to conduct surveillance, visit cases in their
district and neighboring areas where AFP cases live, and find out unreported AFP cases. No suspected cases should be left out.

b. Educational and social authorities are responsible for supervising education and nursery institutions in strengthening epidemic monitoring and health education work.

(E) Collect fecal specimens from family members and school contacts of AFP cases before giving them OPV.

(F) Conduct serum differentiation on enterovirus isolates separated in the virus laboratory. If it is poliomyelitis virus, proceed to intratypic differentiation.

(G) Track viral excretions of cases until negative results are obtained in two consecutive tests:
   a. Within six months of onset of disease, collect fecal specimens once every month.
   b. Six months after the onset of disease, collect fecal specimens once every two months.

(H) Prevention and control departments at each level must report their prevention and control measures and results periodically.

C. Vaccination:

When WPV has been spread to Taiwan or when there is an outbreak of VDPV, in order to curb the dissemination of viruses, an immediate and large-scale vaccination campaign is necessary. Consequently, stockpiling enough OPV is a must.

The scale of vaccination must be expanded in order to hold back the epidemic. Otherwise, disastrous outcomes
result. The measures to be taken are as follow:

(A) Convene an emergency consultation meeting on vaccination consultancy. Discuss emergency response operations based on local situation, decide whether a large-scale vaccination is needed, plan vaccination campaign schedule and define the scope of vaccination.

(B) Make use of cross-departmental cooperation mechanism. Mobilize the household registration agencies, civil administration, social administration and educational departments to jointly administer vaccination.

(C) Collect demographic information and data on transient populations. Administer OPV vaccine to children under five years old who live in the same district (township, town, city, or area) as the cases do. Among them, those who have had contact with cases must go through two fecal specimen collection before receiving vaccination. Vaccination must be conducted door-to-door. Education and nursery institutions must cooperate with these operations to avoid leaving out any high-risk groups.

(D) If cases live on border of two or more districts, in addition to children living in the administrative district where cases live, children under five years of age in neighboring districts must also receive OPV immediately.

(E) Among close contacts over five years of age, those who haven't received poliomyelitis vaccination or have no immunity must receive vaccination. People with immunodeficiency may receive IPV in place of OPV.

(F) If a second wave of epidemic breaks out, the scope of
implementation is expanded to neighboring districts in addition to the administrative area where the index case lives.

(G) Coordinate doctors’ and mobilize associations, societies, and nurses’ associations and ask hospitals to assist in the expanded vaccination operations.

(H) Integrate private resources and encourage civil groups and companies to provide facilities for administrating vaccination and to sponsor manpower and material resources.

**D. Health Education:**

(A) Issue press releases and hold press conferences.

(B) Make use of diversified communication channels such as TV, newspapers, radio broadcasting, Internet, posters, banners and flyers to teach the populace about the seriousness of poliomyelitis and the importance of vaccination in an effort to urge the public to cooperate with the disease prevention and control work.

(C) Integrate civil and local resources and teach the populace about poliomyelitis prevention through community activities, community meetings, gatherings and on community radio broadcasting.

**IV. Division of Duties**

1. Missions:

   (1) Central Government:

   A. Formulate, supervise and assess disease prevention and control policies.
B. Conduct virus cultivation and gene sequence comparison to determine whether the epidemic is brought about by wild strain virus, mutated virus from vaccine strain, or vaccine strain virus.

C. Set up an emergency response team to collect information on epidemic development and make response strategies.

D. Convene vaccination consultation meetings to discuss emergency vaccination strategies, and define the subjects, scope and schedule of vaccination.

E. Plan and arrange manpower and material resources for expanded vaccination operations, make emergency procurement or arrangement, and provide consultation and instruction concerning expanded vaccination.

F. Maintain an emergency medical care network that offers smooth patient transfer, provide medical treatment facilities such as ICUs so that patients can be treated properly and immediately.

G. Make use of cross-ministerial cooperation mechanism and mobilize related systems to administer disease prevention and control work such as epidemic monitoring, health education and expanded vaccination.

H. Announce situation updates of the epidemic and give warnings to the populace and conduct health education.

(2) Local Governments:

A. Set up a Prevention and Control Task Force.

B. Make use of cross-departmental cooperation mechanism. Mobilize related systems to monitor epidemic development, conduct health education and administer expanded
vaccination.
C. Keep an eye on all AFP cases living in areas under its jurisdiction, conduct quick and complete epidemiological investigation and manage follow-up work.
D. Keep close communication with hospitals and encourage them to report suspected cases.
E. Collect latest demographic information in areas where cases live and where might have been affected, as well as information about vaccination rates so that the Central Government may assess if expanded vaccination operation is needed.
F. Coordinate medical organizations in areas under its jurisdiction and urge clinics and hospitals to support expanded vaccination operations.
G. Integrate private and local resources and make use of community activities, community meetings, gatherings and community radios to educate the populace about polio prevention.
### 2. Duties:

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<tr>
<th>Level</th>
<th>Department</th>
<th>Job Description</th>
<th>Peacetime</th>
<th>Special Circumstances</th>
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<tbody>
<tr>
<td>Central:</td>
<td>Second Division</td>
<td>1. Formulate, supervise and assess prevention and control policies.</td>
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<td>Centers</td>
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<td>2. Make use of cross-ministerial cooperation mechanism, activate related systems and promote disease prevention and control work.</td>
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<td>for Disease</td>
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<td>3. Set up a contingency response team according to the epidemic situation, obtain and analyze related information, and convene disease prevention and control meetings to devise strategies.</td>
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<td>Control,</td>
<td>Vaccine Center</td>
<td>1. Formulate, supervise and assess vaccination policies.</td>
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<td>DOH</td>
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<td>2. Procure, stockpile and manage vaccines for routine vaccination.</td>
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<td>3. Convene vaccination consultation meetings to plan the strategies and implementation of contingency vaccination operations in response to epidemic development.</td>
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<td>4. Procure, stockpile and manage vaccines needed due to expanded vaccination.</td>
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<td>5. Provide consultancy and guidance on affairs related to expanded vaccination due to epidemic development.</td>
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<td>Fifth Division</td>
<td>1. Analyze and make judgment on the domestic epidemic situation.</td>
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<td>2. Collect and make assessment on poliomyelitis epidemic information from other countries.</td>
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<td>3. Maintain the operation of poliomyelitis related monitoring systems.</td>
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<td>4. Monitor system sensitivity and assess reporting index.</td>
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<td>5. Announce epidemic situation updates domestically and internationally and give warnings to the populace.</td>
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<td>6. Include polio in the list of items to be monitored in international media and provide response if necessary.</td>
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<td>7. Inform WHO, diplomatic allies and neighboring countries about the epidemic situation in Taiwan.</td>
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<td>8. Supervise prevention efforts against nosocomial infection.</td>
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<td>9. Supervise the investigation of nosocomial infection.</td>
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<td>Center for Research and Diagnostics</td>
<td>1. Conduct related examinations such as poliomyelitis virus cultivation and identification.</td>
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<td>2. Supervise virus laboratories, grasp and report latest epidemic development.</td>
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<td>Information Management Office</td>
<td>3. Preserve and manage wild poliovirus, vaccine-derived strains and related specimens.</td>
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<td>1. Make use of media and related resources to announce policies.</td>
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<td>2. Carry out polls for the reference of policy-making.</td>
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<td>3. Manage and maintain the image of CDC.</td>
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<tr>
<th>Six Branches</th>
<th>1. Supervise county and city health bureaus to implement poliomyelitis prevention and health education.</th>
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<td>2. Supervise and assist county and city health bureaus to execute epidemic investigation, specimen collection and follow-up work on reported AFP cases and suspected clusters.</td>
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<td>3. Collect information concerning the vaccination rates in counties and cities.</td>
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<td>Level</td>
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<tr>
<td>Local: county and city governments</td>
<td>1. Make use of cross-departmental cooperation mechanism, activate related systems, monitor epidemic development, and take charge of health education, vaccination and related disease prevention and control work.</td>
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<td>2. Step up surveillance of epidemic development in areas under its control and case management.</td>
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<td>3. Supervise clinics and hospitals in areas under its control to report suspected cases.</td>
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<td>4. Improve and maintain the vaccination rate in areas under its control to over 95%.</td>
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<td>5. Supervise education and nursery institutions in conducting school surveillance.</td>
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<td>6. Ask related departments to establish a prevention and control task force when a major epidemic breaks out.</td>
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<td>7. Collect information concerning demographic characteristics and vaccination coverage in areas under its control and in areas struck by outbreaks.</td>
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<td>8. Coordinate manpower to execute expanded vaccination operations in areas under its control.</td>
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<td>9. Coordinate and manage medical resources in areas under its control.</td>
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<td>10. Strengthen health education by integrating private and local resources.</td>
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<td>11. Report the progress of epidemic management in areas under its control.</td>
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<tr>
<td>12. Supervise education and nursery institutions to cooperate with expanded vaccination operations and related health education.</td>
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