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Module name: Public Health

Module code: LCHS4003

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Infectious Disease Outbreak: Polio

Introduction

The case study is related to vaccine-derived poliovirus 2 (VDPV2) which is a strain of weakened poliovirus. It has changed behaviors like a wild virus. This polio virus was found in the sewage sample in the feces of a person in North-East London and can spread to others who come in contact with the coughs, sneezes, or feces of an infected person (UK Health Security Agency, 2022). This case study assignment discusses the strategies and approaches to measure, monitor, and control the infectious disease outbreak as well as policies and strategies by the UK government.

Approaches and Strategies to measure, monitor, and control infectious disease outbreak of poliovirus type 2

Measurement- Infectious disease outbreaks are detected or measured by using public health surveillance methods. Surveillance is the approach used to collect, analyse, interpret, and disseminate data about incidents of infectious diseases and measure the success of infection prevention/ control programs (Choi et al., 2021). The outbreak of infectious disease is measured using strategies such as the detection of signs and symptoms. The poliovirus is detected in the specimen from faeces, throat, and cerebrospinal fluid using polymerase chain reaction. Patient screening is used as a measurement strategy by clinicians to diagnose poliovirus signs from lab tests. The severity of poliovirus is measured based on signs and symptoms (Dr. Mandal, 2020). Acute paralysis/ myelitis related to poliovirus is measured from rapid onsets of physical weaknesses including muscle weakening or swallowing (UK Health Security Agency, 2022).

Monitoring- Contact tracing strategy is used to monitor the spread of infectious diseases that involves identifying and notifying the person/s exposed to someone/ others with infectious diseases (Craig et al., 2021). The surveillance approach also serves as an epidemiological tool for monitoring the burden of an infectious disease. Communicable disease surveillance involves a multi-component system that is used to monitor data related to disease information (Murray and Cohen, 2017).

Another monitoring strategy is to monitor whether the people are vaccinated for infectious disease or not (WHO, 2022). The isolation strategy is used to isolate the person infected with an infectious disease from others to prevent the spread of disease outbreaks (Voo et al., 2020).

Control- Vaccination is the main preventive approach used to prevent and control the outbreak of infectious diseases. The polio eradication program is used as a preventive approach that relies on strategies, such as high immunization coverage, surveillance for polio signs and symptoms, and rapid response for the detection of the poliovirus. The vaccine is provided to lessen the danger of contracting and spread of infectious diseases like polio. The WHO's strategy, GPEG (Global Polio Eradication Initiative) provides guidelines for 100% immunization against infectious diseases (e.g. polio, hepatitis, Covid-19, and others), active surveillance, containment, and hand washing (The WHO, 2022). Handwashing is an effective approach to control disease outbreaks by washing hands regularly to remove germs or microorganisms (e.g. viruses) from hands and prevent the spread of

disease to others. Wearing PPE is another approach that involves using PPE, such as hand gloves, masks, and other PPE to prevent disease outbreaks. Disinfection is another approach used to disinfect hands, and contact surfaces using disinfectants, such as sanitizer to kill germs or viruses (Mohapatra, 2017). The control strategies for preventing and controlling infectious disease outbreaks include immunizing against communicable/ infectious diseases, washing and drying hands regularly, staying at home if sick or susceptible to infectious disease, covering sneezes, cough, and mouth droplets, ventilating homes, and cleaning contact surfaces (SFCDCP).

Policy, Strategies, and Actions by UK Government and health agencies

The UK government promotes public health and prevent disease outbreak of polio through **immunization policy**. This includes **Inactivated polio vaccine (IPV) booster program** through which IPV vaccines are offered routinely to babies throughout 8, 12, and 16 weeks of their age. Further doses of polio vaccines are provided to children at age of 3 years and 4 months as a part of preschool booster dose (DTaP/IPV) and adolescents at 14 years as a part of teenage polio booster (Td/IPV). The vaccination policy covers 3-dose in one-year-old babies as the primary schedule and uptake of a preschool booster dose in 5-years old children. But, this falls below 95% coverage of the WHO target (UK Health Security Agency (2022)).

The **PHE Infectious Disease Strategy** demonstrates its mission to detect, prevent, control, prepare and respond to reduce the effect of infectious diseases on the general public. This strategy provides a five-years long strategic framework (2020-25) to prevent and control the outbreak of infectious diseases, such as Polio. This strategy has six core functions including prevention and protection of susceptible people from acquiring infectious diseases, detection and control of incidents and outbreaks of infectious diseases, preparation and response to infectious disease threats, advice and collaboration with health protection and promotion partners, build and apply evidence through research, translation, evaluation, and innovation and generate and share evidence and advice. The enablers of the strategy include building and retaining the skilled workforce, building and improving knowledge, working together, achieving sustainable finances and income, strengthening the incidence response system, surveillance system, and laboratory infrastructure, and creating and using knowledge and evidence (Public Health England, 2020).

Ten strategic priorities include the following:-

Optimizing vaccination and reduction of vaccine-preventable diseases

Be a global leader in tackling antimicrobial resistance

Capitalizing on technologies to increase data availability and surveillance capabilities

Strengthen response to major incidents of infectious diseases

Build evidence for addressing infectious diseases associated with health inequalities

Embed WGS (whole genome sequencing) in PHE labs and use related information

Integrate and strengthen the Health Protection system in England

Strengthen Global health activities for protecting public health against infectious disease outbreak

Deliver infectious disease strategy to define and incorporate value

(Public Health England, 2020)

Regulation 2(1)(b) concerning Health Protection Regulations 2010 demonstrates the responsibility of public health practitioners for reporting any suspected infection that may harm public health (UK Health Security Agency, 2022). The UK government aided the public health agency, Health Security Agency (UKHSA) which announced an incidence response system and incident management team for detection and response to incidences of VDPV2. The ongoing investigations and responses by UKHSA are related to assessing the risks of VDPV2, strengthening poliovirus surveillance and routine immunization, and enhancing communication and collaboration between health professionals, community workers, and caregivers (WHO, 2022).

The UKHSA has taken actions to deal with the challenge of disease outbreak of VDPV2, such as reporting the case/ incidence to the local Health Protection Team over phone calls, informing local virology/ microbiology, collect samples and send to the Virus Reference Department of the UKHSA for isolation and diagnosis, testing of 48-hours stools, nasopharyngeal aspirate (NSA) or throat swab, cerebrospinal fluid, completion of surveillance survey/questionnaire, and testing stool samples. The primary caregivers in the PHC and school immunization providers are needed to check the immunization/ vaccination status of newly registered children/adults and

opportunistically check whether patients are up-to-date with vaccines and catch-up vaccination to those who are not vaccinated (UK Health Security Agency, 2022).

The first action in dealing with the virus

The first action for addressing the VDPV2 outbreak might be 100% vaccination to prevent and control an outbreak of this poliovirus disease. The UK government might take action for surveying people to check their vaccination status. The UKHSA needs to monitor the immunization program to ensure 100% of people living in the UK are vaccinated to prevent disease outbreaks of VDPV2.

The actions might also be taken for monitoring through contact tracing to ask questions with the person infected with VDPV2 with whom the person was contacted. Thereafter, the actions, such as detection of any polio-related symptoms or signs among the contacted persons and collection of samples of their stools, throat swabs, or NSA might be taken. The person will be checked for vaccination status. The action, such as isolating the person might help to prevent the VDPV2 outbreak.

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