Assignment: With reference to infection prevention and control theory critically discuss the challenges of managing one of the following in the workplace or the community:

Hepatitis B infection

Principles of Infection Prevention and Control

Hepatitis B is a viral liver infection that maintains a high level of contagiousness and presents a serious public health-related burden worldwide since it involves blood and other bodily fluids in its modes of transmission (World Health Organization, 2024). Given that Hong Kong is one of the most densely populated centers, putting a high demand on its healthcare system, management for Hepatitis B should include vaccination, infection control protocols, and public health education. Healthcare workers, in particular, stand at high risk of exposure, hence the emphasis on IPC measures to contain the spread (Araújo et al., 2023). The hepatitis B virus (HBV) presents health risks associated with acute and chronic infections; the latter can culminate in severe liver diseases such as cirrhosis and liver cancer (Matthews *et al.*, [redacted] (HBV), its chain of infection, infection prevention and control measures, organizational challenges in Hong Kong, risk management and surveillance practices, and conclude with recommendations for improving infection control, highlighting key strategies and public health initiatives.

Nature of Hepatitis B Virus and Its Transmission

HBV is a DNA virus that mainly targets the liver and is responsible for a broad spectrum of health outcomes ranging from acute infection to chronic liver disease, including cirrhosis and liver cancer (Matthews *et al.*, 2022). Hepatitis B has been a significant public health concern in Hong Kong due to its prevalence (Viral Hepatitis Control Office, 2024). The unique population density in the region adds to the challenges of its healthcare system in managing this virus. Statsitics show that as of 2022. 5% of the Hong Kong population had the infection (Viral Hepatitis Control Office, 2024). HBV infection is contagious, and the disease can be transmitted through direct contact with infected blood and bodily fluids (The Centre for Health Protection, 2019).

This can occur through exposure to breaks in the skin or mucous membranes, sexual contact, blood transfusions, or vertical transmission (Haber and Schillie, 2021). Vertical transmission is the transmission of the virus from the mother to embryo (Maclachlan and Dubovi, 2017). Historically, vertical transmission has been one of the main modes of spread in Hong Kong. Local studies showed that mother-to-child transmission of HBV [redacted] Kong College of Obstetricians and Gynaecologists, 2024).

HBV remains a significant risk to healthcare workers, who are often exposed to blood or blood-contaminated fluids in health facilities, especially hospitals (Araújo et al., 2023). In Hong Kong, many people have access to public healthcare services, and this can lead to overcrowding, significantly heightening the chances of such exposure (Schoeb, 2016). Among the more highly susceptible groups of healthcare workers are [redacted] 2023). Research shows that proper use of PPE and the adoption of safe handling practices of sharps significantly reduce the risks of infection transmission (The Centre for Health Protection, 2019).

High-risk behaviors like the use of injectable drugs, where needle sharing can result in direct bloodborne transmission, have also perpetuated HBV transmission. As cultural stigma appears to be part of life in Hong Kong for those suffering from Hepatitis B, some people avoid diagnosis or treatment because they do not want to be discriminated against, especially in their employment and social relations (Jin, Brener and Treloar, 2022). In turn, this prevents them from seeking medical consultation and [redacted] *et al.*, 2018). The chronic nature of Hepatitis B infection creates further problems in

attempting to contain the infection. Some infected persons do not exhibit symptoms for many weeks while remaining infectious to others (World Health Organization, 2024). In [redacted] diagnosis and vaccination (Mokaya *et al.*, 2018).

Chain of Infection of Hepatitis B Virus

The chain of infection refers to the process by which an infectious agent spreads from one host to another. It consists of six key phases: infectious agent, reservoir, portal of exit, mode of transmission, portal of entry, and susceptible host. Understanding the chain is crucial in identifying points where transmission can be interrupted to prevent the spread of disease. Breaking any link in the chain—such as reducing reservoirs, blocking [redacted] can protect both patients and staff from harm (NIPCM, no date). Below is the chain of infection of HBV:

- **Infectious agent:** The Hepatitis B virus, the causative agent, is resistant and can be resilient outside the body for at least seven days. Its resilience makes it highly infectious both within and outside the hospital environment, although vaccination has somehow minimized the menace in Hong Kong.
- **Reservoir:** The reservoir for the virus is humans, particularly chronic carriers. Even in Hong Kong, where vaccination programs have been in place for twenty [redacted] programs (Viral Hepatitis Control Office *et al.*, 2021).
- **Portal of exit:** The point of exit for the virus is through infected blood and body fluids. Infected fluids include blood, semen, vaginal fluids, and sometimes saliva. Healthcare settings are a high-risk area for the virus to exit from an infected

person since the exposure to blood is frequent (Senoo-Dogbey, Ohene and Adwoa, 2024).

- **Mode of transmission**: Mode of transmission involves direct or indirect contact with infected bodily fluids. It can be acquired in healthcare through needle prick injuries and improper handling of contaminated instruments. In contrast, in the community, it is generally acquired through unprotected sex and sharing needles.
- **Portal of Entry:** Entry typically occurs via breakages in the skin or mucous membrane. Thus, needle injuries during surgical operations or even cuts in the skin provide entry points for the virus, making healthcare settings a very high-risk area for transmission (King and Strony, 2023).
- **Susceptible host**: The susceptible hosts for HBV virus encompass individuals with a greater chance of contracting the virus, especially those who are not [redacted]

  Health professionals with frequent exposure to blood and other body fluids are at risk of infection (The Centre for Health Protection, 2019).

Infection Prevention and Control (IPC) Measures

IPC for HBV is important both in healthcare and community settings. According to the Viral Hepatitis Control Office (2024), there is a significant number of chronic carriers in Hong Kong; thus controlling the virus should be prioritized from a public health perspective. Vaccination against hepatitis B is, therefore, one of the most effective measures that can be employed to prevent and minimize the occurrence of new infections (Chang and Chen, 2015). Hong Kong has widely applied a universal neonatal [redacted] government to high-risk groups, including healthcare professionals and those whose professional practice involves exposure to blood and bodily fluids. At the same time, the

overall vaccination program has been very successful; several gaps exist, most noticeably in elderly populations (Viral Hepatitis Control Office, 2024).

Personal protective equipment is essential, especially in health care settings, to prevent HBV transmission. Healthcare workers, especially those who have direct contact with blood and other bodily fluids, remain at very high risk for occupational exposure to the virus. Properly using gloves, masks, and face shields can significantly reduce the chance of transmission during procedures such as surgery or blood

[redacted]

hospitals, and the appropriate use of safety-engineered sharps, along with careful policies on its disposal, is necessary for the reduction of this risk (The Centre for Health Protection, 2019).

The other cornerstone of IPC measures is hand hygiene (Pittet, 2017). Hong Kong healthcare facilities apply WHO's "Five Moments for Hand Hygiene" to ensure most practitioners within the healthcare system keep their hands clean (Kong 2018). This is especially essential after contact with a patient and before any aseptic procedure. Research shows consistent hand hygiene to reduce the risk of transmission of HBV as it prevents indirect contamination that may happen after handling bodily

[redacted]

especially among drug users. Such campaigns help minimize transmission in high-risk populations by modifying behaviors related to the modes of transmission of HBV (Bugshan *et al.*, 2022). However, a study by Yam et al. (2017) shows that such awareness of HPV had minimal impact on vaccination rates.

Organizational Challenges in Infection Control in Hong Kong

The organizational challenges to infection control for HBV are shaped by the high population density, resource constraint, and variability in compliance that characterizes healthcare settings in Hong Kong. While guidelines are usually in place, the busy nature of the environment within a Hong Kong hospital setting, and more so in public hospitals, can cause overcrowding (Schoeb, 2016). This may cause a resource strain, limiting the availability of PPE, and significantly affecting compliance (Sandhu *et al.*, 2022).

[redacted]

of those at risk (Jin, Brener and Treloar, 2022). Fear of discrimination in social and family settings discourages individuals from seeking a diagnosis or disclosing their HBV status, hindering effective management of the disease (Jin, Brener and Treloar, 2022).

Risk Management, Surveillance, and Audit in Infection Control

Risk management is the identification and mitigation of health risks among patients and staff (Alam, 2016). Proper risk management involves comprehensive strategies that include vaccination, personal protective equipment use, and standardized sharps procedures. Vaccination is the first line of defense, and all

[redacted]

Secondly, control of HBV needs to be addressed within the community as part of risk management. The Hong Kong Centre for Health Protection has launched targeted vaccination initiatives while encouraging safe behaviors such as not sharing needles or

practicing safe sex. However, high-risk groups remain to be highly vulnerable, such as users of illicit drugs (Viral Hepatitis Control Office, 2024).

Surveillance is integral to infection control and provides timely information on the incidence and trend of HBV infection (CDC, 2024). The HA (Hospital Authority) has established an appropriate system in Hong Kong for monitoring and managing cases of HBV infection in all public hospitals, such as expanding laboratory capacities (Viral Hepatitis Control Office, 2024). Data derived from the surveillance efforts are helpful in [redacted] in high-pressure situations like Hong Kong's public hospitals, with a high occupancy rate of about 90%, ensures that any lapses are realized before they can be amplified into significant outbreaks (Yip *et al.*, 2014).

The other crucial aspect of infection control involves auditing. A clinical audit evaluates healthcare practices to ensure adherence to standards and improve patient outcomes (Abu-Jeyyab *et al.*, 2024). Clinical audits are a common phenomenon in Hong Kong, where any infection control policy or practice must be honed or applied to prevent the transmission of HBV infection. Hong Kong audits have highlighted the prevention of needle-stick injury as one of the significant risk factors for HBV [redacted] special training for the staff or any needed change in the procedures. In so doing, the continuous evaluation of these factors by audits secures the infection control program to remain dynamic and responsive to the emerging challenges.

Recommendations for Improving Infection Prevention and Control Practices

Improvement in the IPC practices related to Hepatitis B in Hong Kong must be multifaceted, addressing gaps in healthcare settings and the wider community. First of all, the expansion of vaccination programs is necessary. While the neonatal vaccination program in Hong Kong has been very effective in reducing the rate of new infections, a considerable proportion remains unvaccinated in the adult population-particularly [redacted] training related to proper PPE use, safe handling of sharps, and hand hygiene as mainstays in preventing occupational exposure. Regular training sessions, with real-time feedback and monitoring, could allow health workers to observe infection control practices consistently. Increasing the level of audits and assessments of health facilities will further encourage compliance and point out areas that need improvement (Hut-Mossel *et al.*, 2021).

Public information and education should also be improved, particularly in overcoming the stigma associated with Hepatitis B. The stigma of the illness has driven many into not being diagnosed and treated for the virus. Public health campaigns must be encouraged to raise community awareness and alleviate stigma and fear from diagnosis while offering alternative and safer behaviors (Bugshan *et al.*, 2022). Lastly, [redacted] trends. This will facilitate updating IPC measures entirely on time. All these strategies put together would go a long way in solidifying the efforts of Hepatitis B transmission control in Hong Kong.

Conclusion

Hepatitis B management in Hong Kong necessitates multi-faceted and comprehensive infection prevention and control. The essence of the virus, its potential

for chronic infection, presents significant challenges not only in health but also within the community. Critical control strategies include expanding vaccination programs, especially to high-risk groups, along with improved infection control practices among healthcare workers regarding proper hand hygiene and other measures, such as safe sharps techniques. Continuous training, rigorous surveillance, and regular audits are

[redacted]

investment in the public health infrastructure and adherence to evidence-based guidelines secure the effectiveness and adaptability of the infection control measures for evolving challenges. Thus, with continued work and cooperation, Hong Kong can continue to make a significant impact in reducing the burden of Hepatitis B and ensuring the public is protected from the disease.

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