SURVEILLANCE IN INFECTION CONTROL: AN PRIME IMPORTANT ASPECT OF INFECTION CONTROL

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ABSTRACT

Health surveillance is the process of continually obtaining pertinent data, collecting and assessing it, and promptly informing the people who need to know—especially those who can take appropriate action—with the results. The effectiveness of disease control programmes depends on the availability of systems for efficient surveillance and response. Increasing the capacity of disease surveillance aids countries in making plans for the best possible population health, determining priorities for disease prevention, raising beneficiary awareness, concentrating successful evidence-based interventions, monitoring trends to show impact, and identifying issues that require attention. Surveillance should be seen by the healthcare industry as a common service that makes use of similar structures, practises, and resources. However, as different illnesses could require different types of monitoring, opportunities for cooperation should be utilised while carrying out necessary duties. Surveillance is a fundamental tool in infection control that provides the necessary data for understanding, preventing, and responding to infectious diseases. It is an ongoing and dynamic process that is crucial in both healthcare settings and broader public health efforts to protect populations from the spread of infections. .

Keywords: Surveillance, Infection, Healthcare, Indicator

INTRODUCTION

One indicator of the standard of care and safety in an institution is the nosocomial infection rate in cases. Monitoring this rate through a surveillance procedure is a crucial way to track issues and trends and gauge how well infection control efforts are working. The frequency of nosocomial infections can be reduced effectively by surveillance alone.The process of continuously gathering relevant data, organising it, evaluating it, and quickly notifying those who need to know—especially those who can take appropriate action—of the findings is known as health surveillance. Systems for effective surveillance and response are essential to the success of disease control initiatives. Increasing the capacity of disease surveillance helps nations plan for optimal population health, identify priorities for disease prevention, sensitise beneficiaries, concentrate evidence-based interventions that are effective, track trends to demonstrate impact, and identify problems that need to be addressed.

Healthcare should view surveillance as a shared service that uses comparable structures, procedures, and resources. However, given that various illnesses may need different kinds of monitoring, possibilities for collaboration should be taken advantage of when performing essential tasks (detection, confirmation). Surveillance is indeed a crucial aspect of infection control in various healthcare and public health settings. It involves the systematic collection, analysis, interpretation, and dissemination of data related to infectious diseases. This data-driven approach helps in preventing and managing infections in a more effective manner.

DEFINITION OF SURVEILLANCE

The systematic gathering, examination, interpretation, and distribution of information on the state of hospital acquired infections within a specific patient group is known as surveillance.

COMPONENTS OF SURVEILLANCE

Early Detection: Surveillance systems enable the early detection of infectious disease outbreaks. Timely identification of cases or clusters of infections can lead to prompt response and containment measures, preventing the spread of the disease.

Monitoring Trends: Surveillance allows healthcare professionals to monitor trends and patterns of infections over time. This information is essential for understanding the epidemiology of diseases and adapting control measures accordingly.

Resource Allocation: Surveillance data helps in allocating resources efficiently. When health

authorities know where and when infectious diseases are likely to occur, they can allocate resources, such as vaccines, medications, and personnel, to the areas most in need.

Risk Assessment: Surveillance helps assess the risk of specific infections, making it possible to prioritize preventive measures. This is particularly important in situations where resources are limited.

Evaluation of Control Measures: The data collected through surveillance can be used to evaluate the effectiveness of infection control measures. If a certain intervention isn't working as expected, adjustments can be made based on the surveillance findings.

Public Health Policy Development: Surveillance data informs the development of public health policies and guidelines. It guides decision-making processes by providing evidence on the prevalence and impact of infectious diseases.

Research and Innovation: Researchers use surveillance data to study the dynamics of infections, identify emerging threats, and develop new strategies for infection control.

International Collaboration: Surveillance is critical for global health security. It allows countries to share information about infectious disease threats, collaborate on response efforts, and prevent the international spread of diseases.

Education and Public Awareness: Surveillance data can be used to educate healthcare professionals, policymakers, and the general public about the importance of infection control and prevention.

Legal and Ethical Considerations: Surveillance also plays a role in legal and ethical considerations, as it helps guide decisions related to quarantine, isolation, and contact tracing during infectious disease outbreaks.

PURPOSE OF SURVEILLANCE

The decrease of nosocomial infections and associated expenditures is the ultimate goal. A surveillance program's specific goals are as follows:

- To improve clinical staff and other hospital employees' knowledge and abilities regarding nosocomial infections and antibiotic resistance, so that they understand the need for preventive action;

- To look into the trends, incidence, and distribution of nosocomial infections, as well as prevalence and, when possible, risk-adjusted incidence for intra- and inter-hospital comparisons;

- To determine whether new or intensified infection prevention programmes are necessary, and assess the effectiveness of preventive measures

- To determine potential areas for patient care improvement and to conduct more epidemiological research using risk factor analysis.

TECHNIQUES OF SURVEILLANCE

The surveillance system has to fulfil the following requirements.

Clarity, to save expenses and burden and encourage unit involvement through prompt feedback; Mouldability, to allow modifications as necessary Pratability (e.g., measured by the volume of participation and the calibre of the data) Selectivity, necessitating exact definitions and skilled investigators; • Stability (use standardised definitions, methodology); Responsiveness, even though a case-finding method with low sensitivity is frequently valid in following trends, provided that sensitivity stays constant over time and cases identified are representative;

APPLICATION OF SURVEILLANCE IN A HEALTHCARE SETTING

Keeping an organised and consistent monitoring system is a crucial hospital duty. All partners, such as clinical unit and laboratory personnel, infection control practitioner (ICP)/nurse, director, administration, must have established time periods of monitoring and clearly stated objectives (for units, services, patients, and specialised care areas). The conversation should first identify the information gaps, and as a result, the potential for the chosen interventions should continue to apply corrective measures (i.e., influencing what or who is affected by the data).

The following details should be covered in this discussion:

• The patients and units that will be under observation (defined population)

 • The types of infections and relevant data that will be gathered for each case (with clear definitions)

• Monitoring frequency and duration;

• Data gathering techniques;

• Data analysis, feedback, and distribution techniques;

• Anonymity and confidentiality.

APPROACHES OF SURVEILLANCE

Merely counting infected people, or "counters," yields scant and challenging-to-understand data. To properly understand the issue from a population perspective, assess its significance, understand variability, and allow for comparisons, more data is required. Data on patients who are infected as well as those who are not are needed for risk correlation analysis. Then, the transmission rate—also referred to as the risk adjustment rate—can be computed. The majority of "passive monitoring" reports from sources outside than the infection control team (lab monitoring, deletion from medical records upon discharge, or infection notifications from physicians or nursing personnel) are callous.

• Cross-sectional/cross-sectional Prevalence Survey Patients hospitalised at a specific period are classified as having overall infections either throughout the hospital or in specific wards (prevalence). Each resistant institution is usually visited in a single day by a team of experienced researchers who go over clinical staff interviews, medical and nursing records, and risk factor data collection. Prevalence might be used as a gauge of success. The length of the patient stay (the infected patient remains longer and overestimates the patient's risk of infection) and the duration of the infection have an impact on prevalence.

• Long-term, continuous incidence survey Monitoring every patient in the population described for a certain amount of time is necessary for proactive infection identification (incidence monitoring). Patients get follow-up care during their stay and occasionally beyond (e.g., post-discharge wound infection monitoring). Compared to the prevalence survey, this monitoring is more expensive, time-consuming, and labor-intensive. As a result, it is typically ongoing (in a medical supply unit, for example) or temporary (in surgery, for example) for certain illnesses and high-risk units that are unique to a given region. just last a few months).

TARGETED MONITORING TRENDS OF SURVEILLANCE

Location-based monitoring: Regularly keeping an eye on avoidable infections that significantly affect mortality, morbidity, and expenses (extended hospital stays, medical expenses, etc.) is the top priority. The following are common priority areas: -Pneumonia due to ventilation (high mortality)-Infection from a wound (original days and expenses)-Primary intravascular bloodstream infection (high mortality)- Multiresistant bacteria, such as Staphylococcus aureus that is resistant to methicillin.Extended Spectrum Beta-Lactamase produced by Klebsiella. The majority of this monitoring takes place in a lab. Regular updates on the dissemination of isolated microorganisms and the antibiotic susceptibility profile of common pathogens are also furnished

by the laboratory to the unit. Unit-oriented monitoring: High-risk units including burn, oncology/hematology, medical supply, surgical, and newborn units might be the focus of attention. Priority monitoring: Keep an eye on a few issues that have an impact on the process (e.g., UTIs in patients in long-term care institutions who use urethral catheters). Although the majority of the hospital needs to be monitored, high-risk regions still require some surveillance. The most effective way to achieve this is through rotation (lab-based or repeatable prevalence studies).

TYPES OF MONITORING -SURVEILLANCE

- Active Monitoring . To prospectively identify individuals who may have had hospital acquired infections, defined definitions, predetermined criteria, and established methods are used. Hospital staff and budgetary resources may be needed to perform active surveillance, which is typically used to find drug-resistant bacteria like MRSA.

- Passive Surveillance: Under this technique, health officials obtain information from clinics, hospitals, and other establishments. With this method, sickness data is inexpensively gathered from all prospective reporting healthcare professionals.

- Process and Outcome Surveillance: Process surveillance is the systematic gathering of information on the infection control procedures that are actually applied inside the establishment. Process surveillance is often carried out by data analysis, performance evaluations given to staff members who handled the care or are in charge of it, and real practise observation.

- The assessment of health care-associated infections (HAI) and its effects, including but not limited to death, additional length of stay, related cost, and bacterial resistance, is known as outcome surveillance.

- Patient- or clinical-based surveillance It's common to refer to clinical or patient-based surveillance interchangeably. The ability of clinical surveillance to identify warning indicators of disease epidemics that call for prompt intervention at the local, national, or worldwide level is one of its most criticised functions. Health care professionals are at the forefront of surveillance systems because they evaluate patients and make diagnoses of illnesses based on signs and symptoms, either with or without the use of laboratory-based tests, fast test kits, or other diagnostic tools.

- Laboratory-based surveillance - This is a novel method that reports instances to health officials and conducts inclusive diagnostic testing.

- Priority-directed surveillance, often referred to as surveillance by aim, entails both corrective and preventative actions to halt nosocomial infections.
- Comprehensive surveillance: This tries to define the general guidelines that employees should follow while conducting surveillance across general guidelines.

SUMMARY

Healthcare institutions worldwide are always looking for new and improved methods to prevent illnesses from spreading and to enhance their infection prevention and control procedures. Although it lessens the likelihood of making the incorrect judgements, effective surveillance does not always guarantee that the right ones are made.

REFRENCES

1. Thacker SB, Berkelman RL. Public health surveillance in the United States. *Epidemiol Rev*. 1988;10(1):164–190.

2. Smith PF, Hadler JL, Stanbury M, Rolfs RT, Hopkins RS; CSTE Surveillance Strategy Group. Blueprint version 2.0: updating public health surveillance for the 21st century. *J Public Health Manag Pract*. 2013;19(3):231–239.

3. Council of State and Territorial Epidemiologists. Common data structure for National Notifiable

Diseases. http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/2015PS/2015PSFinal/15-EB-01a.pdf. Accessed July 20, 2016.

4. Richards CL, Iademarco MF, Anderson TC. A new strategy for public health surveillance at CDC: improving national surveillance activities and outcomes. *Public Health Rep*. 2014;129(6):472–475.

5. National Center for Health Statistics. National Vital Statistics System: mortality data. https://www.cdc.gov/nchs/nvss/deaths.htm. Accessed January 9, 2017.

6. National Center for Health Statistics. From once a year to on demand, DVS rewrites the rules of mortality surveillance. https://blogs.cdc.gov/inside-nchs/2015/04/02/from-once-a-year-to-on-demand-dvs-rewrites-the-rules-of-mortality-surveillance. Accessed March 3, 2017.

7. Centers for Disease Control and Prevention. Notice to readers: update to reporting of pneumonia and influenza mortality. *MMWR Morb Mortal Wkly Rep*. 2016;65(39):1088.

8. Vesper HW, Kuiper HC, Mirel LB, Johnson CL, Pirkle JL. Levels of plasma trans-fatty acids in non-Hispanic white adults in the United States in 2000 and 2009. *JAMA*. 2012;307(6):562–563.

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9. Terry AL, Cogswell ME, Wang CY, et al. Feasibility of collecting 24-h urine to monitor sodium intake in the National Health and Nutrition Examination Survey. *Am J Clin Nutr*. 2016;104(2):480–488.

10. Pinner RW, Lynfield R, Hadler JL, et al. Cultivation of an adaptive domestic network for surveillance and evaluation of emerging infections. *Emerg Infect Dis*. 2015;21(9):1499–1505.

11. Gwinn M, MacCannell DR, Khabbaz RF. Integrating advanced molecular technologies into public health. *J Clin Microbiol*. 2017;55(3):703–714.

12. Peters PJ, Pontones P, Hoover KW, et al. HIV infection linked to injection use of oxymorphone in Indiana, 2014-2015. *N Engl J Med*. 2016;375(3):229–23913.

13. Crosby AE, Mercy JA, Houry D. The National Violent Death Reporting System: past, present, and future. *Am J Prev Med* 2016;51(5)(suppl 3):S169–S172.

14. US Department of Health and Human Services. Million Hearts. http://millionhearts.hhs.gov. Accessed March 3, 2017.

15. Heisey-Grove D, Wall HK, Helwig A, Wright JS. Using electronic clinical quality measure reporting

16. Centers for Disease Control and Prevention. Healthcare-associated infection (HAI) progress report. https://www.cdc.gov/hai/surveillance/progress-report. Accessed March 3, 2017.

17. Centers for Disease Control and Prevention. Data. https://data.cdc.gov. Accessed March 3, 2017.

18. Centers for Disease Control and Prevention. Injury prevention and control: data and statistics WISQARS. https://www.cdc.gov/injury/wisqars/index.html. Accessed March 3, 2017.

19. Centers for Disease Control and Prevention. Sortable risk factors and health indicators. https://sortablestats.cdc.gov. Accessed March 3, 2017.

20. Centers for Disease Control and Prevention. NCHS data visualization pilot. https://blogs.cdc.gov/nchs-data-visualization. Accessed March 3, 2017.

21. Centers for Disease Control and Prevention. National environmental public health tracking network. https://ephtracking.cdc.gov/showHome.action. Accessed March 3, 2017.

22. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. https://www.cdc.gov/brfss. Accessed March 3, 2017.

23. Khalil GM, Gotway Crawford CA. A bibliometric analysis of U.S.-based research on the Behavioral Risk Factor Surveillance System. *Am J Prev Med*. 2015;48(1):50–57.

24. Centers for Disease Control and Prevention. Adolescent and school health: Youth Risk Behavior Surveillance System

(YRBSS). http://www.cdc.gov/healthyyouth/data/yrbs/index.htm. Accessed March 3, 2017.

25. Kann L, McManus T, Harris WA, et al. Youth risk behavior surveillance—United States, 2015. *MMWR Morb Mortal Wkly Rep*. 2016;65(6):1–174.

26. Centers for Disease Control and Prevention. *Prevention Status Reports: National Summary*. Atlanta, GA: US Department of Health and Human Services; 2016.

27. Centers for Disease Control and Prevention. *Morbidity and Mortality Weekly Report (MMWR)*. https://www.cdc.gov/mmwr/index.html. Accessed March 3, 2017.

28. Centers for Disease Control and Prevention. Vital signs. https://www.cdc.gov/vitalsigns/index.html. Accessed March 3, 2017.

29. Centers for Disease Control and Prevention. CDC public health grand rounds. https://www.cdc.gov/cdcgrandrounds/index.htm. Accessed March 3, 2017.

30. Council of State and Territorial Epidemiologists. Review of and recommendations for the National Notifiable Disease Surveillance System: a state and local health department perspective. http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/pdfs/nndss_report.pdf. Published April 2013. Accessed July 20, 2016. 2015;21(suppl 6):S5–S6.

43. Sepúlveda MJ. Public health informatics and the public health workforce in an era of change. *Am J Prev Med*. 2014;47(5)(suppl 3):S386–S387.

44. US Department of Health and Human Services. HHS Idea Lab: Entrepreneurs-in-Residence Program. https://www.hhs.gov/idealab/eir-program. Accessed March 3, 2017.

45. Mac Kenzie WR, Davidson AJ, Wiesenthal A, et al. The promise of electronic case reporting. *Public Health Rep*. 2016;131(6):742–746. [