



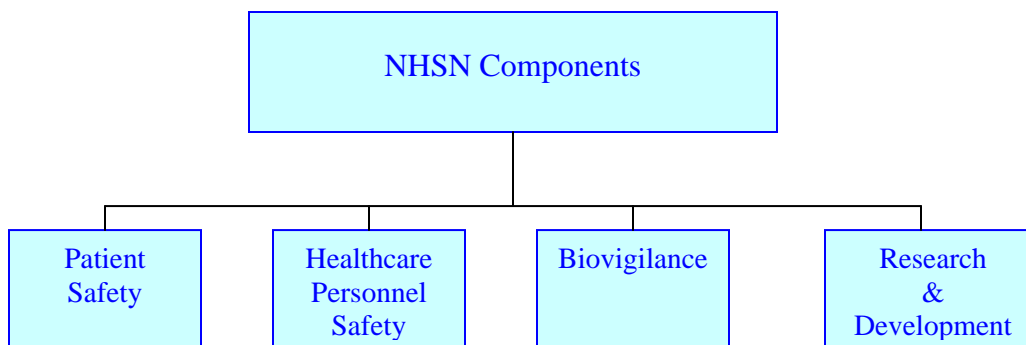
National Healthcare Safety Network (NHSN) Overview

The NHSN is a secure, internet-based surveillance system that integrates former CDC surveillance systems, including the National Nosocomial Infections Surveillance System (NNIS), National Surveillance System for Healthcare Workers (NaSH), and the Dialysis Surveillance Network (DSN).

NHSN enables healthcare facilities to collect and use data about healthcare-associated infections, adherence to clinical practices known to prevent healthcare-associated infections, the incidence or prevalence of multidrug-resistant organisms within their organizations, and other adverse events. Some U.S. states utilize NHSN as a means for healthcare facilities to submit data on healthcare-associated infections (HAIs) mandated through their specific state legislation.

The NHSN has three components, each concerned with various aspects of control and prevention of HAIs. Those four components are Patient Safety, Healthcare Personnel Safety, Biovigilance, and Research and Development as illustrated below in Figure 1.

Figure 1. Components of the NHSN system.



The Biovigilance Module is currently in pilot testing at 9 facilities and will be available to interested facilities pending post-pilot amendments.

Research and Development is concerned with enabling infection control software systems, private or public, to communicate with the NHSN thereby reducing manual data entry.. This component involves internal activities at CDC in partnership with software and data messaging specialists, and NHSN users are not involved with this component of the system.

NHSN users do however, access and participate in the Patient Safety and Healthcare Personnel Safety Components of NHSN. Within the Patient Safety Component, like-types of surveillance are grouped into modules, each concerned with healthcare



procedures, devices, or medications associated with HAIs. Specific types of surveillance within the Patient Safety Component are outlined below:

- Device-associated Module:
 - CLABSI - Central line-associated bloodstream infection
 - CLIP - Central line insertion practices adherence
 - VAP - Ventilator-associated pneumonia
 - CAUTI - Catheter-associated urinary tract infection
 - DE - Dialysis Event
- Procedure-associated Module:
 - SSI - Surgical site infection
 - PPP - Post-procedure pneumonia
- Medication-associated Module:
 - AUR - Antimicrobial use and resistance options
- Multidrug-Resistant Organisms/*Clostridium difficile*-associated Disease (MDRO/CDAD) Module
- High Risk Inpatient Influenza Vaccination Module

Instructions and standardized surveillance methods and definitions for each module are provided in individual protocols available on the NHSN website. Modules may be used singly or simultaneously and each module has its own minimum time-period for required participation (see individual modules). Regardless of the combination of modules a facility chooses to participate in, a total of 6 months of data must be reported annually to NHSN for continued participation.

There are two modules within the Healthcare Personnel Safety component of NHSN: Blood/Body Fluid Exposure Module and Healthcare Worker Influenza Vaccination Module.

Surveillance Techniques:

Some of the options in the following modules require active, patient-based, prospective surveillance of events and their corresponding denominator data by a trained Infection Preventionist (IP). This means that the IP shall seek out infections during a patient's stay by screening a variety of data sources, such as laboratory, pharmacy, admission/discharge/transfer, radiology/imaging, and pathology databases, and patient charts, including history and physical exam notes, nurses/physicians notes, temperature charts, etc. Others may be trained to screen data sources for these infections, but the IP must make the final determination. Laboratory-based surveillance should not be used alone, unless all possible criteria for identifying an infection are solely determined by laboratory evidence (e.g., LabID event detection in the MDRO & CDAD Module). Retrospective chart reviews should be used only when patients are discharged before all information can be gathered. NHSN forms should be used to collect all required data, using the NHSN definitions of each data field. To minimize the IP's data collection



burden, others may be trained to collect the denominator data and process of care data (e.g., central line insertion and high risk inpatient influenza vaccination information).

Procedure Associated Module:

Surgical site infection (SSI) and post-procedure pneumonia (PPP) monitoring is offered through protocols in this module. Both protocols require active, patient-based, prospective surveillance of infections and their corresponding denominator data by a trained IP. A variety of data sources, such as laboratory, pharmacy, admission/discharge/transfer information, radiology/imaging, and pathology databases, and patient charts, including history and physical notes, nurses/physicians notes, temperature charts, etc may be used. Others may be trained to screen data sources for these infections, but the IP must make the final determination as to whether the required criteria are met.

PPP events are monitored only for patients undergoing inpatient operative procedures and only during the patient's stay (i.e., post-discharge surveillance methods are not used for PPP). However both post-discharge and ante-discharge surveillance methods should be used to detect SSIs following in- and outpatient operative procedures. These methods include 1) direct examination of patients' wounds during follow-up visits to either surgery clinics or physicians' offices, 2) review of medical records or surgery clinic patient records, 3) surgeon surveys by mail or telephone, and 4) patient surveys by mail or telephone (though patients may have a difficult time assessing their infections). Any combination of these methods is acceptable for use; however, CDC criteria for SSI must be used. To minimize IPs' workload of collecting denominator data, operating room data may be downloaded (see file specifications at: <http://www.cdc.gov/nhsn/pdf/ImportingProcedureData1.3.5.8.pdf>).

See the SSI and PPP protocols for detailed instructions on NHSN related surveillance.

Device-Associated Module:

Medical instrumentation increases the risk of development of an HAI and most patients admitted for health care are exposed to some kind of medical device in the course of their treatment. Such devices include, but are not limited to, venous and urinary catheters, and ventilators. NHSN enables facilities to monitor infectious complications associated with the use of these devices and also to monitor processes related to their use which might increase infection risk. Specifically, surveillance of Central Line-associated Bloodstream Infection (CLABSI), Catheter-associated UTI (CAUTI), Dialysis Event (DE) and/or Ventilator-associated Pneumonia (VAP) is possible using the NHSN. In addition, Central Line Insertion Practices (CLIP) can be monitored to inform facilities of the appropriateness of their processes and how they may relate to HAI development.



Device-associated denominator data should be collected at the same time each day. When denominator data are available from electronic databases (e.g., ventilator days from respiratory therapy), these sources may be used as long as the counts are not substantially different ($\pm 5\%$) from manually collected counts.

See the respective device-associated protocols for detailed instructions on NHSN related surveillance.

Medication-Associated Module:

Multidrug-resistant organisms (MDROs) have made news headlines in the recent past. The use of antimicrobial agents has a direct effect on antimicrobial resistance patterns of pathogens. The observed increase in multidrug resistance is in part due to inappropriate prescription of, as well as incomplete completion of, courses of antibiotics.

The Medication-Associated Module allows facilities to collect information on the amount of antimicrobials that are utilized for patient care within their systems, as well as to collect data on the prevalence of drug-resistant organisms in their inpatient and outpatient programs. Microbiology and pharmacy methods of data collection are available options for this module.

See the Antimicrobial Use and Resistance (AUR) protocol for detailed instructions on NHSN related surveillance.

Multidrug-resistant Organism & *Clostridium difficile*-Associated Disease (MDRO/CDAD) Module:

The NHSN MDRO/CDAD Module offers a means for facilities to meet criteria and metrics that are outlined in several organizational guidelines to control and measure the spread of MDROs and CDAD within their healthcare system. The module has both required and optional surveillance activities that can be tailored to the needs of the facility. Infection surveillance and monitoring of proxy infection measures are choices available to facilities choosing to participate in this program within NHSN.

In addition, process measures related to adherence to contact precautions when caring for patients infected or colonized with an MDRO or *C. difficile*, and/or active surveillance testing for such organisms or, outcome measurements of incidence and prevalence of positive cultures of these organisms in patients can be undertaken.

See the MDRO/CDAD protocol for detailed instructions on NHSN related surveillance.



High Risk Inpatient Influenza Vaccination (HRIIV) Module:

Influenza continues to be associated with increased morbidity and mortality in certain patient populations including the very young, elderly, immunocompromised, and pregnant women. Hospitalization has been identified as a potential opportunity to provide influenza immunization to at-risk individuals.

The NHSN HRIIV module offers a means for facilities to track high-risk patient presentations to the healthcare system as well as data on the success of capitalizing on influenza vaccination opportunities. Various measurement options are available related to patient susceptibility and adherence to vaccination recommendations.

See the HRIIV Protocol for detailed instructions on NHSN related surveillance.