

National Healthcare Safety Network (NHSN) Overview

The NHSN is a secure, Internet-based surveillance system that expands and integrates patient and healthcare personnel safety surveillance systems managed by the Division of Healthcare Quality Promotion (DHQP) at the Centers for Disease Control and Prevention. Facilities that participate in certain reporting programs operated by the Centers for Medicare and Medicaid Services (CMS) can do so through use of NHSN. Furthermore, some U.S. states use NHSN as a means for healthcare facilities to submit data on healthcare-associated infections (HAIs) and other healthcare measures mandated through their specific state legislation.

NHSN enables healthcare facilities to collect and use data about HAIs, adherence to clinical practices known to prevent HAIs, the incidence or prevalence of multidrug-resistant organisms within their organizations, trends and coverage of healthcare personnel safety and vaccination, and adverse events related to the transfusion of blood and blood products.

The NHSN includes seven components: Patient Safety, Long-term Care Facility, Outpatient Dialysis, Healthcare Personnel Safety, Biovigilance, Outpatient Procedure, and Neonatal (Figure 1).

Figure 1: NHSN Components



The **Patient Safety Component** includes five modules that focus on events associated with medical devices, surgical procedures, antimicrobial agents used during healthcare, and multidrug resistant organisms.

- Device-associated Module:
 - Bloodstream Infection (CLABSI – Central line-associated bloodstream infection)
 - Central line insertion practices (CLIP) adherence
 - Urinary Tract Infection (CAUTI – Catheter-associated urinary tract infection)
 - Pediatric Ventilator-associated events (PedVAE) (NICU and pediatric locations only)
 - Ventilator-associated events (VAE) (adult locations only)
 - Pneumonia (VAP – Ventilator-associated pneumonia) - in pediatric locations (in-plan* or off-plan*), or NICU and adult locations (off-plan* only)
- Procedure-associated Module:
 - Surgical Site Infection (SSI)
- Antimicrobial Use and Resistance Module (AUR)
- Multidrug-Resistant Organism and *Clostridium difficile* Infection (MDRO/CDI) Module

***Note:** “In-plan” surveillance means that the facility has committed to following the NHSN surveillance protocol, in its entirety, for that particular event, as shown in the facility’s NHSN monthly reporting plan. “Off-plan” surveillance is surveillance that is done because a facility has decided to track a particular event for internal use. Data that are entered into NHSN “off-plan” are not included in NHSN annual reports or other NHSN publications. A facility makes no commitment to follow the NHSN protocol for “off-plan” events. Further, “off-plan” data cannot be uploaded into NHSN via Clinical Document Architecture (CDA) and must be manually entered. Instructions and standardized surveillance methods and definitions for each module of the Patient Safety Component are provided in this manual and on the NHSN website (www.cdc.gov/nhsn). Modules may be used singly or simultaneously.

The NHSN **Long-term Care Facility Component** provides long-term care facilities (LTCFs) with standardized surveillance methods and definitions for four modules: (1) Multidrug resistant organism (MDRO) and *Clostridioides difficile* Infection (CDI) laboratory-identified (LabID) Events; (2) Urinary Tract Infections (UTI); (3) Prevention Process Measures; and 4) COVID-19. The component is ideal for use by nursing homes, skilled nursing facilities, chronic care facilities, assisted living and residential care facilities, intermediate care facilities for individuals with intellectual disabilities, psychiatric residential treatment facilities, and State Veteran’s Homes. LTCF surveillance protocols, training materials, data collection forms, instructions, and other supporting materials are provided on the Long-term Care Facility Component website: <https://www.cdc.gov/nhsn/ltc/index.html>.

Outpatient hemodialysis centers have several surveillance options tailored to their patients and setting in the **Dialysis Component**. The component consists of 4 modules: 1) Dialysis Event; (2) Prevention Process Measures; (3) Dialysis Patient Influenza Vaccination; and 4) COVID-19. Facilities that treat hemodialysis outpatients should refer to the Dialysis Component instructions and standardized surveillance methods and definitions at www.cdc.gov/nhsn/dialysis/index.html.

There are two modules in the **Healthcare Personnel Safety (HPS) Component** of NHSN: The Healthcare Personnel Exposure Module and the Healthcare Personnel Vaccination Module. The Healthcare

Personnel Exposure Module includes Blood/Body Fluid Exposure Only; Blood/Body Fluid Exposure with Exposure Management; and Influenza Exposure Management. This module is no longer available for enrollment and should only be used by facilities that have already been reporting Blood/Body Fluid Exposure and Exposure Management data to the system. The Healthcare Personnel Vaccination Module includes Influenza Vaccination Summary and COVID-19 Vaccination Summary. Data collected in this surveillance system can assist healthcare facilities, health systems, and public health agencies to monitor and report trends in blood/body fluid exposures, to characterize antiviral medication use for exposures to influenza, and to monitor influenza and COVID-19 vaccination coverage among healthcare personnel. These modules may be used separately or simultaneously. Instructions and standardized surveillance methods and definitions for the Healthcare Personnel Vaccination Summary is provided in the NHSN Manual: HPS Component Protocol <https://www.cdc.gov/nhsn/pdfs/hps-manual/vaccination/hps-flu-vaccine-protocol.pdf>. Information on reporting COVID-19 Vaccination Summary data for healthcare personnel can be found here: <https://www.cdc.gov/nhsn/hps/weekly-covid-vac/index.html>.

The **NHSN Biovigilance Component**, Hemovigilance Module facilitates national surveillance of transfusion-related recipient adverse events. The Hemovigilance Module is designed for transfusion service staff to collect data on annual facility and transfusion service characteristics, individual reports on adverse transfusion reactions, errors or accidents associated with adverse reactions, and monthly counts of transfused or discarded components. The Hemovigilance Module surveillance protocol, training materials, data collection forms, instructions, and other supporting materials are provided on the Hemovigilance Module website: www.cdc.gov/nhsn/acute-care-hospital/bio-hemo/index.html.

The **Outpatient Procedure Component (OPC)** includes two modules that focus on adverse events associated with surgical procedures performed in Ambulatory Surgery Centers (ASCs). The two modules include Same Day Outcome Measures and Surgical Site Infections.

- Same Day Outcome Measures (OPC-SDOM) are a grouping of outpatient care quality indicators that represent a broad range of risks encountered by patients accessing care in various outpatient settings. The four individual outcome measures are:
 - Patient Burn
 - Patient Fall
 - Wrong Site, Wrong Side, Wrong Patient, Wrong Procedure, Wrong Implant
 - All-Cause Hospital Transfer/Admission
- Surgical Site Infection (OPC-SSI) - SSI surveillance for outpatient operative procedures using the Outpatient Procedure Component (OPC).

The OPC surveillance protocols, training materials, data collection forms, instructions, and other supporting materials are provided on the Outpatient Procedure Component website: <https://www.cdc.gov/nhsn/ambulatory-surgery/index.html>.

The **Neonatal Component** includes one module, Late-Onset Sepsis/ Meningitis (LOS/MEN). This module will track late-onset sepsis and meningitis events in very low birthweight neonates housed in Level II/III, Level III, and Level IV nursery locations. The following events will be tracked in the LOS/MEN module:

- **Late-Onset Sepsis Event:** In an eligible infant, a recognized pathogen or common commensal identified from one or more blood specimens by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment. Under this major type of infection, there are two specific types of infection (see below).
 - NLCBI 1
 - NLCBI 2
- **Meningitis Event:** In an eligible infant, a recognized pathogen or common commensal identified from a CSF specimen by a culture or non-culture based microbiologic testing method which is performed for purposes of clinical diagnosis or treatment. Under this major type of infection, there are two specific types of infection (see below).
 - NLCM 1
 - NLCM 2

The LOS/MEN surveillance protocols, training materials, data collection forms, instructions, and other supporting materials are provided on the Neonatal Component website:

<https://www.cdc.gov/nhsn/neonatal/index.html>

Surveillance Techniques

Surveillance for healthcare acquired conditions/infections require a combination of active, concurrent, prospective or retrospective approaches and surveillance techniques and resources. Trained Infection Preventionists and designees shall seek out infections/conditions by screening a variety of data sources, such as laboratory, pharmacy, admission/discharge/transfer, radiology/imaging, and pathology databases, as well as patient charts, including history and physical exam notes, nurses' / physicians' notes, temperature charts, etc. Others may be trained to screen data sources for these events, 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 (for example, LabID event detection in the MDRO/CDI 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; additionally, electronic capture of data is an option for reporting as an aide to optimizing available resources.

Procedure-Associated Module

Surgical site infection (SSI) monitoring is offered through this module. SSI surveillance requires active, patient-based, prospective surveillance techniques (see Surveillance Techniques above). To minimize IPs' workload of collecting denominator data, operating room data may be downloaded (see file specifications at <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/ImportingProcedureData.pdf>)

SSI monitoring requires active, patient-based, prospective surveillance. Concurrent and post-discharge surveillance methods should be used to detect SSIs following inpatient operative procedures and post-discharge surveillance for outpatient operative procedures. These methods may include 1) direct examination of patients' wounds during hospitalization, or follow-up visits to either surgery clinics or

physicians' offices, 2) review of medical records or surgery clinic patient records, 3) visits to the ICU and wards; talk with primary care staff 4) surgeon surveys by mail or telephone, and 5) patient surveys by mail or telephone (though patients may have a difficult time assessing their infections). Any combination of these methods (or other methods identified by the facility) with the capacity to identify all SSIs is acceptable for use; however, NHSN criteria for SSI must be used. See Surgical Site Infection Event (SSI) protocol for additional examples of concurrent and post-discharge surveillance methods (www.cdc.gov/nhsn/pdfs/pscmanual/9pscasicurrent.pdf).

Device-Associated Module

Medical instrumentation increases the risk of development of an HAI and most patients admitted for health care are exposed to a medical device in the course of their treatment. Such devices include, but are not limited to, vascular and urinary catheters, and ventilators. NHSN enables facilities to monitor infectious complications associated with the use of these devices and to monitor processes related to their use which might increase infection risk. Specifically, surveillance of central line-associated bloodstream infection (CLABSI), catheter-associated urinary tract infection (CAUTI), ventilator-associated events (VAE and PedVAE), and/or ventilator-associated pneumonia (VAP) is possible using the NHSN. In addition, central line insertion practices (CLIP) can be monitored 'off plan' to inform facilities of the appropriateness of their processes and how they may relate to HAI development. See Dialysis Component for detailed instructions for Dialysis Event (DE) surveillance of hemodialysis outpatients (www.cdc.gov/nhsn/dialysis/index.html).

Device-associated denominator data should be collected at the same time each day, or by weekly sampling methods in certain locations, for CLABSI, CAUTI, VAE, PedVAE, and VAP surveillance (see the CLABSI, CAUTI, VAE, PedVAE, and PNEU protocols for guidance). When denominator data are available from electronic databases (for example, ventilator days from respiratory therapy), these sources may be used as long as the counts are not substantially different (+/- 5%) from manually-collected counts that have been validated for a minimum of three months. See the respective device-associated event protocols for detailed surveillance instructions.

Antimicrobial Use and Resistance (AUR) Module

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 only partial completion of courses of antibiotics.

The AUR Module allows facilities to collect information on the amount of antimicrobials that are used for patient care within their systems, as well as to collect data on the prevalence of drug-resistant organisms in their inpatient and outpatient areas. Electronic capture and reporting of microbiology and pharmacy data are the only available options for reporting data into this module.

See the [Antimicrobial Use and Resistance](#) protocol for detailed surveillance instructions.

Multidrug-resistant Organism and *Clostridium difficile* Infection (MDRO/CDI) Module

The NHSN MDRO/CDI 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 CDI within their healthcare system. The module has two separate and independent reporting options, Laboratory-identified (LabID) Event and Infection Surveillance that may be tailored to meet the needs of participating NHSN facilities.

In addition, the following process measures are available: (1) adherence to hand hygiene; (2) adherence to contact precautions when caring for patients infected or colonized with an MDRO or *C. difficile*; and (3) adherence to active surveillance testing (AST) of MRSA and/or VRE. Active surveillance testing outcome measures is also available in locations where AST adherence is being performed and enables facilities to use the results of AST to monitor the incidence and prevalence of positive MRSA and/or VRE cultures. See the [MDRO/CDI](#) protocol for detailed surveillance instructions.