**Healthcare-associated Infection (HAI) Outbreak Standardized Variables List**

*Interim Version*

In order to maximize learning from outbreaks, public health and providers should use standardized variables. Which variables should be collected will vary by setting and outbreak. However, regardless of the outbreak or information to be collected, we strongly urge the use of standardized variables. The Healthcare-associated Infection (HAI) Outbreak Standardized Variables presented here, along with the associated [REDCap database](https://cdc-my.sharepoint.com/personal/qac2_cdc_gov/Documents/REDCAP/Collaborative%20Projects/HAI%20standardized%20list/HAI%20Standardized%20Variables%20Form_v8%20tracked%20changes.docx), are resources for standardizing potential variables, which healthcare facilities and state and local public health jurisdictions can use when deciding what information is most appropriate to collect during or after a particular HAI outbreak investigation. This list contains a comprehensive set of standardized variables that may help identify exposure variables and pertinent clinical details, similar to an older [CDC HAI Outbreak Chart Abstraction Tool](https://www.cdc.gov/hai/pdfs/outbreaks/Response_Toolkit_Abstraction_Form-508.pdf), but with the inclusion of variables that capture information related to health equity. Health equity information is important to include in outbreak data collection, which when standardized can better help with the investigation when it spans different providers and jurisdictions.

Systematizing HAI outbreak data collection can help healthcare facilities, providers, and public health agencies, better characterize scope, transmission routes, and outcomes of outbreaks more quickly. Systematic HAI outbreak data collection can also allow better synchronization of data across facilities, jurisdictions, and time, particularly when a common electronic data collection and management tool, such as REDCap, is utilized by investigation partners. This can facilitate the identification of common outbreak sources, themes and trends, which can help inform broader prevention efforts.

Traditional approaches to data collection during healthcare outbreak investigation have focused on clinical and exposure data. Including the systematic collection of data related to health inequity deserves strong consideration.[[[1]](#footnote-1)] Doing so can help identify health inequities related to outbreaks among patients and facilities as well and inform future prevention measures. However, a number of the health equity-related variables listed below may be difficult to obtain or may not necessarily help halt an active outbreak Therefore, health equity-related variables (e.g., facility or patient address, zip code, or county) can be obtained retrospectively after the outbreak has resolved and the active phase of the investigation has ended, but doing so in a standardized manner will facilitate the evaluation. This may help reduce data collection burden, while initial focus can be targeted to the collection of data that can inform the cession of the current outbreak.

This list is organized in a tabular format, divided into sections to collect variables related to outbreaks at both the facility and individual patient levels. *Fields highlighted in gray may be of particular importance for health equity analyses*. Please review the implementation notes section for recommendations on how to approach data collection and for footnotes to references that were used to inform the creation of the variable list.

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| --- | --- | --- | --- |
| **Outbreak-level Information** | | | |
| **Field name** | **Field Type** | **Choices** | **Implementation Notes** |
| Date of entry into REDCap | Text |  | Can modify variable to be free text field or use action tag to automate date (if using REDCap) |
| Name of person entering report | Text |  |  |
| Reported to | Dropdown | State│ Local │ Territorial│ Tribal │ CDC  If selected🡪 include date of report |  |
| Pathogen(s) identified | Dropdown | Placed holder for extensive list of pathogens  If other option is selected🡪specify pathogen type |  |
| Type of positive test(s) | Checkbox | PCR│ Culture│ Antigen│ Titer│ Microscopy│ Other-specify  *Check all that apply* | For outbreaks involving more than one pathogen, repeat this question for each pathogen. |
| Total number of positive tests | Text |  | Indicate the number of positive tests for all test types reported.  For outbreaks involving more than one pathogen, repeat this question for each pathogen. |
| Positive test notes | Text |  | Include additional information if applicable (e.g., the exact number of tests per test type). |
| Confirmed case definition | Text |  |  |
| Number of confirmed cases | Text |  |  |
| Probable case definition | Text |  |  |
| Number of probable cases | Text |  |  |
| Suspect case definition | Text |  |  |
| Number of suspect cases | Text |  |  |
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| **Facility-level Information** | | | |
| The following variables capture data at the facility level and are specific for use by **public health**, such as local and state public health departments, to compare characteristics across facilities within their jurisdiction**.** | | | |
| **For each Facility** |  |  | If outbreak involves multiple facilities, elements will be repeatable in REDCap. |
| **Field name** | **Field Type** | **Choices** | **Implementation Notes** |
| Method of report | Dropdown | Surveillance report│clinical consultation │ direct facility inquiry to state HD│ Other-specify  If surveillance report is selected🡪 (indicate type of report)   * electronic lab reporting * electronic case reporting |  |
| Source of report | Dropdown | CDC Lab│ Facility│ Local HD│ Local Lab State HD │ State Lab│ Other |  |
| Number of facilities involved | Text |  |  |
| Facility healthcare setting | Dropdown | Acute care hospital │ Ambulatory surgical center│ Dental │ Dialysis center│ Inpatient rehabilitation facility│ Home health │ Long term acute care hospital│ Assisted living residence│ Outpatient clinic │ Nursing home/Skilled nursing facility│ Urgent care│ Other🡪specify) | If a single LTCF provides multiple levels of care (e.g. assisted living and skilled nursing), regard these as separate facilities and complete the information for the part of the facility where the outbreak is occurring. |
| **Patient-level Information** | | | |
| The following variables capture data at the patient level that can be collected during an outbreak. | | | |
| **Field name** | **Field Type** | **Choices** | **Implementation Notes** |
| Date of entry into REDCap | Text |  | Can modify variable to be free text field or use action tag to automate date (if using REDCap) |
| Name of person entering report | Text |  |  |
| Email of person entering report | Text |  |  |
| Date of report | Text |  | Date of pdf export/ abstraction/patient interview |
| Patient identifier | Text |  | If needed, TBD by investigators |
| DOB | Text |  | Patient date of birth (MM/DD/YYYY) |
| Age | Text | Enter age in years or months (if age is less than 0). | Age at the time of illness |
| Case status | Radio | Confirmed│ Probable│ Suspect/possible│ Contact│Other 🡪 specify (*free text*) |  |
| Role | Radio | Patient│ Resident[[2]](#footnote-2)│ Staff│ Visitor│ Other🡪specify *(free text)* |  |
| Date of illness onset (MM/DD/YYYY) | Text |  |  |
| Outpatient medical care related to this illness/diagnosis | Yes/No | Yes │ No  If yes🡪 (*free text*)   * name of outpatient medical care facility * MRN * address of outpatient medical care facility * outpatient visit date(s) | Include all relevant outpatient visits during the potential exposure period. This field may be repeated. |
| Inpatient medical care related to this illness/diagnosis | Yes/No  Free text | Yes │ No  If yes🡪 (*free text*)   * Name of inpatient medical care facility * MRN * address or inpatient medical care facility * ED date of arrival * admitted to hospital🡪yes or no   If admitted to hospital🡪 (*free text*)   * List all room numbers with units and the dates that the patient occupied each room during the exposure period of interest. | Include all inpatient visits during the potential exposure period. |
| Outcome/Current disposition | Radio | Alive│ Deceased│ Unknown  If not deceased 🡪   * Hospitalized, home, other care facility (specify), unknown * Never symptomatic, recovering, recovered, unknown   If deceased🡪   * Date of death (*free text*) * Cause of death (*free text*) * Was autopsy performed🡪Yes or no   If autopsy was performed🡪(*free text*)   * Autopsy date * Autopsy findings |  |
| Comorbidities/Past Medical History/Social | Checkbox | Place holder for common/relevant comorbidities/substance abuse, other🡪specify *(free text)* |  |
| Exposures (tailored to specific disease in question) | Checkbox  Text | Indwelling devices│ Injections│ Locations│ Medical products│ Medications│ Procedures│ Surgeries│ Transplanted Organs, Tissue Cells, or Blood products│ Water  *Check all that apply*  Exposure notes text field also included to enter specific details about exposures relevant to investigation | Facilities can tailor based on infection/organism |
| Signs and symptoms | Checkbox | Abdominal pain│ Abscess│ Altered mental status│ Bloating│ Cellulitis│ Chills │ Constipation│ Diarrhea│ Dyspnea (i.e., difficulty breathing) │ Dysuria│ Furuncle (i.e., skin boil) │ Hematochezia (i.e., red blood in stool) │ Hemoptysis (i.e., coughing up blood) │ Loss of appetite│ Melena (i.e., black, tarry stool) │ Nausea/vomiting│ New increased sputum│ New onset cough│ Rales/crackles│ Rash│ Rhinorrhea (i.e., runny nose) │ Sore throat│ Suprapubic tenderness│ Urinary urgency│ Weight loss│ Wheezing│ Worsening gas exchange (e.g., increase O2, PEEP, TV) │ Wound  *Check all that apply* | Facilities can tailor based on infection/organism |
| Infection type(s) | Checkbox | Abscess│ Blood │ Respiratory │ Surgical/wound│ Urinary tract│ Joint Other🡪specify *(free text)*  *Check all that apply* |  |
| Site of infection | Text |  | If applicable, specify the site of infection (e.g., for joint infection, specify if shoulder, knee, elbow, etc.) |
| Diagnostic test(s) performed | Checkbox | PCR │ Serology│ Antigen test│ Culture│ *Check all that apply*  For tests performed enter🡪   * Test result * Date collected * Specimen source🡪 (*checkbox options )* * Blood│ Cerebrospinal fluid│ Joint/synovial fluid│ Urine│ Wound│ Sputum│ Skin abscess│ Stool│ Other🡪specify *[free text]*) * Reason for specimen collection *[free text]* | This field may be repeated for each pathogen identified.  If applicable, specify the body site from which the specimen was obtained (e.g., for synovial fluid, specify if obtained from knee, shoulder, etc.) |
| Procedures, non-surgical | Yes/No | Yes │ No  If yes🡪 (*free text*)  Specify procedure/date/location | Procedures that are non-surgical include procedures such as joint injections, simple biopsies, point of care testing, infusions etc. Include any procedures occurring *during the exposure period of interest*. |
| Surgical procedures | Yes/No | Yes │ No  If yes🡪 (*free text*)  Specify procedure/date/ location | Include any surgeries occurring during the exposure period of interest. |
| Treatment | Yes/No | Yes │ No  If yes🡪(*checkbox options*)  *Check all that apply*   * Antimicrobials * Antifungals * Antivirals * If yes to any of the above, specify the medication/dose/route if needed * Surgery * Other, specify *(free text)* |  |
| **END OF SECTION** | | | |
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| **HEALTH EQUITY RELATED DATA COLLECTION** | | | |
| **Facility-level Information** | | | |
| The following variables capture data at the facility level and are specific for use by **public health**, such as local and state public health departments, to compare characteristics across facilities within their jurisdiction. **A number of these variables can be determined retrospectively, if needed, by using the facility address (e.g., jurisdiction, county, etc.) or Medicare Provider Number.** | | | |
| Date of entry into REDCap | Text |  | Can modify variable to be free text field or use action tag to automate date (if using REDCap) |
| Name of person entering report | Text |  |  |
| Facility Name | Text |  |  |
| Facility bed count (if applicable) | Text |  |  |
| Telephone number | Text |  | (XXX-XXX-XXXX) |
| **Facility Address** | Text |  | Report street name, city, state/territory, zip code, county |
| IRS tax exemption status | Radio | For-profit │Non-profit status│Unknown |  |
| The variables below **can be determined after the resolution of the outbreak** using the facility’s county and state address information. | | | |
| *Urbanicity* | Radio | Urban Area │ Urban Cluster│ Rural | Using facility address information, this variable can be determined using census data\* |
| *Federally Qualified Health Center (FQHC)* | Radio | Yes│ No │ Unknown | Using facility address information, this variable can be determined using Health Center Find tool Ϯ |
| *Medically Underserved Area (MUA)* | Radio | Yes │ No│ Unknown | Using facility address information, this variable can be determined using MUA Find tool § |
| *Health Professional*  *Shortage Area (HPSA)* | Radio | Yes │ No│ Unknown | Using facility address information, this variable can be determined using HPSA Find tool¶ |
| The variables below related to patient pay **can be determined after the resolution of the outbreak** and may be obtained directly from healthcare facilities. Patient pay categories are not mutually exclusive. | | | |
| **Patient Pay Information Breakdown (past calendar year)** |  |  |  |
| Medicare/Medicaid Provider Number (MPN) | Text |  | If applicable to healthcare facility, this variable can be used to link CMS data to determine patient pay information. |
| Percentage of patients on Medicare | Text |  |  |
| Percentage of patients on Medicaid | Text |  |  |
| Percentage of patients using cash pay | Text |  |  |
| Percentage of patients using private insurance | Text |  |  |
| Percentage of patients using Tricare/VA/military insurance | Text |  |  |
| Percentage of patients using IHS/Tribal Health Services | Text |  |  |
| **Patient-level Information** | | | |
| The following variables capture health equity related data at the patient-level that **can be obtained retrospectively and may be more challenging to collect even after the resolution of an outbreak**. If attempting to collect this health equity information, **data may be collected from a number of different sources** (e.g., electronic medical records, patient interviews or surveys, etc.). Therefore, the format of the questions should be tailored to the method of data collection selected. Additional explanations and recommendations are included in the implementation notes column. | | | |
| Date of entry into REDCap | Text |  | Can modify variable to be free text field or use action tag to automate date (if using REDCap) |
| Name of person entering report | Text |  |  |
| Email of person entering report | Text |  |  |
| Date of report | Text |  | Date of pdf export/ abstraction/patient interview |
| Patient identifier | Text |  | If needed, TBD by investigators |
| Patient name | Text |  | First, Middle, Last names |
| Gender | Checkbox | Male│ Female│ Transgender│ Something else  *Check all that apply.* | Gender as patient describes themselves\*\* |
| Sexual orientation | Radio | Lesbian or Gay │ Straight, that is not lesbian or gay │ Bisexual│ Something else│ I don’t know the answer | Sexual orientation as patient describes themselves ϮϮ |
| Race | Checkbox | White│ Black or African American│ American Indian or Alaska Native │ Asian │ Native Hawaiian or Other Pacific Islander│ Other (specify) Unknown │ Refused  *Check all that apply* | Minimum recommended racial categories§§ |
| Ethnicity | Checkbox | Yes, of Hispanic, Latino/a, or Spanish origin (not specified) │ No, not of Hispanic, Latino/a, or Spanish origin │ Yes, Mexican, Mexican Am., Chicano │ Yes, Puerto Rican │ Yes, Cuban  Yes, another Hispanic, Latino/a, or Spanish origin (specify).  *Check all that apply* | Recommended ethnicity categories ¶¶ |
| State or Federally recognized tribal enrollment | Text |  | Enrolled or principal tribes of patient\*\*\*  Examples include the following but not limited to:  Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, Nome Eskimo Community, etc.  For coding resources, see census code lists ϮϮϮ |
| Insurance | Checkbox | Medicare│ Medicaid │ Private │ TRICARE/VA/Military │ Alaska Native/Indian Health Service/Tribal Health Services │ Other 🡪specify *(free text)*│ Unknown│ Refused  *Check all that apply* | Primary source of health care coverage§§§ |
| Industry | Text |  | Type of industry patient works in for job¶¶¶  For coding resources see census code lists\*\*\*\* |
| Occupation | Text |  | Occupation that best describes patent’s work  For coding resources, see census code lists ϮϮϮϮ |
| Household income last year, before taxes: | Radio | <$20,000│ $20,000 to $34,999 │ $35,000 to $49,999│ $50,000 to $74,999│ $75,000 to $99,999│ $100,000 to $149,000│ $150,000 to $199,999│ $200,000 or more│ Unknown│ Refused | Household income before taxes¶¶¶ |
| Household size | Text | 0 to 5│ 6 to 12│ 12 to 17 │ 18 or older | Indicate total number of dependents in each age category living in household¶¶¶ |
| Marital status | Radio | Married or living with partner│ Widowed│ Divorced│ Separated  Never married│ Unknown│ Refused | Patient marital status¶¶¶ |
| Education status | Radio | Never attended school or only attended kindergarten│ Grades 1 through 8  (Elementary) │ Grades 9 through 11 (Some high school) │ Grade 12 or GED (High  school graduate) │ College 1 year to 3 years (Some College or  Technical school) │College 4 years or more (College graduate) │Unknown│ Refused | Highest grade or year of school completed§§§  Alternative source for more specific education status categories see census questions§§§§ |
| Disability status | Yes/No | 1. Are you deaf, or do you have serious difficulty hearing?  2. Are you blind, or do you have serious difficulty seeing, even when wearing glasses?  3. Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions? (5 years old or older)  4. Do you have serious difficulty walking or climbing stairs? (5 years old or older)  5. Do you have difficulty dressing or bathing? (5 years old or older)  6. Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor’s office or shopping? (15 years old or older)" | Patient Disability status§§§ |
| Origin | Radio | US born│ Foreign born│ Unknown│ Refused  If foreign born🡪(*free text*)  Name country of birth | Indicate if the patient was born in the United States, territories (American Samoa, Guam, Northern Mariana Islands, Puerto Rico, U.S Virgin Islands) or a freely associated state (Republic of the Marshall Islands, Palau, Federated States of Micronesia) ¶¶ |
| Primary language | Radio | English│ Spanish│ Other, please specify  │ Unknown│ Refused | Primary language spoken at home¶¶¶¶ |
| Primary residence | Radio | Home│ Multifamily housing (e.g., apartments, condominiums, townhouses, duplexes, quadruplexes) │ Long term acute care hospital (LTACH)│ Nursing home│ Rehabilitation Facility│ None/unhoused│ Jail│ Prison│ Other- specify│ Unknown│ Refused  \* [If asymptomatic, enter housing when case status was assigned] | Primary residence at the time of illness/hospitalization |
| Address of primary residence | Radio  Text | Facility │ Home address  If facility is selected🡪 *(free text)*  facility telephone number and facility name\*  If home is selected🡪*(free text)*  address information will be collected (e.g., street name, city, state, zip code) | Address of primary residence at the time of illness/hospitalization. If resident address is the same as facility address (e.g., outbreak in a nursing home), question will be skipped. |
| County of primary residence | Text |  | County of primary residence at the time of illness/hospitalization |
| Urbanicity of primary residence | Radio | Urban Area │ Urban Cluster│ Rural | Using facility address information, this variable can be determined after resolution of outbreak using census data\* |
| Patient telephone number (###-###-####) | Text | If None🡪  What is guardian name? (first, middle, last)  What is guardian telephone number? |  |

Footnotes

\*[Urban and Rural (census.gov)](https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html) (Accessed September 2, 2022).

†  [Find a Health Center (hrsa.gov)](https://findahealthcenter.hrsa.gov/) (Accessed August 31, 2022).

§ [MUA Find (hrsa.gov)](https://data.hrsa.gov/tools/shortage-area/mua-find) (Accessed August 31, 2022).

¶[HPSA Find (hrsa.gov)](https://data.hrsa.gov/tools/shortage-area/hpsa-find) (Accessed September 2, 2022).

\*\* National Academies of Sciences, Engineering, and Medicine. 2022. Measuring Sex, Gender Identity, and Sexual Orientation. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26424>. (Accessed August 31, 2022.)

ϮϮ [NHIS - Sexual Orientation Information Questionnaire (cdc.gov)](https://www.cdc.gov/nchs/nhis/sexual_orientation/questionnaire.htm) (Accessed August 31, 2022).

§§ [2020 Census Frequently Asked Questions About Race and Ethnicity](https://www.census.gov/programs-surveys/decennial-census/decade/2020/planning-management/release/faqs-race-ethnicity.html#:~:text=An%20individual%27s%20responses%20to%20the,response%20to%20the%20race%20question.) (Accessed August 31, 2022).

¶¶[Collection of Data on Race, Ethnicity, Language, and Nativity by US Public Health Surveillance and Monitoring Systems: Gaps and Opportunities - PMC (nih.gov)](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5805104/) (Accessed August 31, 2022).

\*\*\*United Sates Census Bureau. 2021. Understanding and Using American Community Survey Data: What users of data for American Indians and Alaska Natives need to know. U.S. Government Publishing Office, Washington D.C. 2021. (Accessed August 31, 2022.)

ϮϮϮ [Code Lists, Definitions, and Accuracy (census.gov)](https://www.census.gov/programs-surveys/acs/technical-documentation/code-lists.html) (Accessed August 31, 2022).

§§§ [2020 BRFSS Questionnaire (cdc.gov)](https://www.cdc.gov/brfss/questionnaires/pdf-ques/2020-BRFSS-Questionnaire-508.pdf) (Accessed August 31, 2022).

¶¶¶[NIOSH Worker Well-Being Questionnaire (WellBQ) (cdc.gov)](https://www.cdc.gov/niosh/docs/2021-110/pdf/2021-110revised052021.pdf?id=10.26616/NIOSHPUB2021110revised52021) (Accessed August 31, 2022).

\*\*\*\*U.S. Census Bureau [2012]. Census 2012 detailed industry code list. https://www.census.gov/topics/employment/ industry-occupation/guidance/code-lists.html. (Accessed August 31, 2022).

ϮϮϮϮ U.S. Census Bureau [2010]. 2010 Census occupation codes with crosswalk. Download from the list at https://www.census.gov/topics/ employment/ industry-occupation/guidance/ code-lists.html. (Accessed August 31, 2022).

§§§§ <https://www.census.gov/acs/www/about/why-we-ask-each-question/education/> (Accessed August 31, 2022).

¶¶¶¶ <https://www.ahrq.gov/sites/default/files/publications/files/iomracereport.pdf> (Accessed August 31, 2022).

Feedback on the HAI Standardized Outbreak Variable List is welcome and can be directed via email to [info@corha.org](mailto:info@corha.org). You can also provide feedback online by completing a form that will be shared with a CORHA staff member. Access the form by clicking [here](https://www.corha.org/contact-us/).

1. Schrodt, C.A., et al. (2023). Health equity: The missing data elements in healthcare outbreak response. *Infection Control & Hospital Epidemiology*, XX: X-X, *https:doi.org/xxxxxxxxx* [↑](#footnote-ref-1)
2. Resident refers to someone residing in a nursing home. [↑](#footnote-ref-2)