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Glossary of terms for information technology and pearls of wisdom for implementation and use

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Key Words:
Data terminology
Information technology
Data management

Algorithm: Step-by-step procedure for solving a problem or reaching a conclusion, especially by a computer. A set of rules or criteria by which an outcome is determined. The definitions of health care–associated infections can be structured into algorithms based on criteria for meeting the definition. If a patient meets the first criterion (eg, positive culture >2 days after admission), we move on to see if they meet the next set of criteria (eg, symptoms), and the next (eg, device in place), and so on. Computer software programs rely on algorithms, or sets of rules, to make decisions on what to display, how to label the information, and whether the case meets criteria for infection. In the future, infection surveillance will be largely done by computer algorithms. Once accurate clinical information (eg, vital signs, presence of invasive devices, patient problem lists) is available electronically, it will be more efficient to use computer algorithms to perform surveillance for health care–associated infections.

Clinical decision support: Patient-specific information that is intelligently filtered or presented at appropriate times to enhance health and health care. These tools include alerts and reminders to clinicians or patients and access to clinical guidelines, condition-specific order sets, and data summaries within the health care workflow.

Clinical document architecture (CDA): A base standard that provides a common architecture, coding, semantic framework, and language for the creation of electronic clinical documents. The National Healthcare Safety Network accepts CDA file imports that have been created by electronic surveillance systems. CDA file formatting allows IPs to import the infection data for a given time period into the National Healthcare Safety Network all at once rather than having to enter each infection separately.

Configure: To set up for operation especially in a particular way. One example is setting up files so that they can be imported into the National Healthcare Safety Network. IPs also may be involved in setting up the electronic medical record to contain needed data in the correct formats for use by other systems, including the National Healthcare Safety Network.

Cookie: A packet of data passed from one computer application to another, which is stored and can be retrieved at a later date. Cookies often store your personal information and preferences so that you can sign on to a system and your prior preferences are remembered by the system.

Data integration: Combining data residing in different sources to provide a unified view. For example, admission date, vital signs (temperature), laboratory tests (white blood cells in urine), and microbiology (urine culture) to assess for symptomatic urinary tract infection.

Data mining/text mining: Using computer programs to assess a set of data for associations that are not obvious in clinical practice or everyday life. Also referred to as knowledge discovery in data.

Data warehouse: A relational database (subsequently defined) designed for query and analysis rather than for transaction processing. It usually contains historical data derived from transaction data, but it can include data from other sources. It separates the analysis workload from the transaction workload and enables an organization to consolidate data from several sources. In simple terms, the data warehouse is a separate place from the electronic medical record (where transactions, or data entry, are performed) that receives the data from all of the records and stores in a way that can be queried and analyzed. In general, the electronic medical record is good at storing chronologic data by individual patient, and clinicians can get the history of that patient from the electronic medical record. The data warehouse focuses on storing data so it can be queried across populations. The data warehouse may be limited to a single department or may include all data from the institution.
Institution-wide data warehouses are called enterprise data warehouses.

**Electronic health record (EHR), electronic medical record (EMR), and lifetime clinical record (LCR):** Similar terms for documentation of patient health data in an electronic record. The EMR usually refers specifically to a hospital record, whereas the EHR and LCR refer to the patient’s integrated record across the continuum of care, and in the case of the LCR, covering the person’s whole lifespan.

**Field:** Individual location within a database or record for a specific piece of data (eg, name, medical record number). The IP must help guide decisions on what information is essential in the electronic medical record or surveillance software system and in which fields these are located (eg, where is nursing documenting the presence of invasive devices, where are the multiple-drug resistant organism flags placed in the electronic medical record). Ideally, each data element will have a discrete field (eg, name and date of birth not placed in the same data field); therefore, IPs can sort or limit reports based on any data element.

**Firewall:** A software- or hardware-based network security system that controls the incoming and outgoing network traffic based on an applied rule set. A firewall establishes a barrier between a trusted, secure internal network and another network (eg, the Internet) that is not assumed to be secure and trusted.

**Free text:** Information that is entered in narrative form, without constraint. Progress notes and radiology reports are good examples of free text. It is more difficult to analyze free text (must use natural language processing or text mining to do so) than it is to analyze structured data, in which the user selects an option from a limited range of categories.

**Health Insurance Portability and Accountability Act (HIPAA):** Title I of HIPAA protects health insurance coverage for workers and their families when they change or lose their jobs. Title II of HIPAA, known as the administrative simplification provisions, requires the establishment of national standards for electronic health care transactions and national identifiers for providers, health insurance plans, and employers. For IPs and clinicians, the privacy aspects of the HIPAA are a critical consideration for any data system. If your facility gets the opportunity for IPs to be alerted to critical information (eg, being alerted to patients with organisms that require them to be placed on isolation precautions), a decision about whether this information may be transmitted by e-mail or text pager must be made.

**Health Level 7 (HL7):** A set of international standards for the transfer of clinical and administrative data between hospital information systems.

**Hypertext markup language (HTML) and extensible markup language (XML):** The languages most commonly used for Web page development.

**Interface:** An area or system through which one machine is connected to another machine. Interfaces must be made between systems for you to access various data and information. For example, the laboratory system data are interfaced to the electronic medical record. Data travels from the laboratory system across the interface to the main electronic record.

**User interface:** A system that controls the way information is shown to the user and how the user interacts with the system. The user interface is just another way to say the screens that you see and use in a system.

**Interoperability:** The extent to which systems and devices can exchange data and interpret that shared data. For 2 systems to be interoperable, they must be able to exchange data and subsequently present that data such that it can be understood by a user.

**Logical Observation Identifiers Names and Codes (LOINC):** A universal code system for tests, measurements, and observations of laboratory and other clinical data. A system that allows a universal mapping of individual facilities’ test and result codes so that the data can be shared across institutions.

**Natural language processing (NLP):** Ability of computers to understand human language, as opposed to computer language or numerical information. This is usually accomplished by parsing sentences or phrases into smaller units of words and searching for words or patterns of words. An example relevant to IPs is using NLP to search for words and phrases indicative of tuberculosis in pathology or radiology reports.

**Observation X (OBX) segment:** A piece of the data message that transmits a single observation or encapsulated data. If you are having trouble with data getting across an interface into your system, the IT professional may ask you to look at the messages with them and focus on the OBX segment to assure that the right piece of information is available in the system.

**Relational database:** A database in which data are stored in tables and the relationships among the various data elements is also stored in tables. Microsoft Access (Microsoft, Redmond, WA) is a common relational database.

**Server:** A computer that provides data to other computers. It may serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet. Many types of servers exist, including Web servers, mail servers, and file servers. Each type of server runs software specific to its particular purpose.

**Structured data:** Data that requires the user to select from prespecified categories or limits the user’s ability to put data in a narrative free text format. Structured data are easier to analyze (compared with free text) and have the advantage of guiding the user to complete all required elements rather than assuming that they will remember all the requirements in a narrative note.

**Subject matter expert (SME):** A person who has expertise in a particular subject area. IPs are experts in surveillance and the needed data components to carry out surveillance with the aid of computers and algorithms. It is critical to be involved with the planning phase of IT projects; therefore, the developers understand the data and formats that will be needed for use by the IP in surveillance and other activities.

**Surveillance software:** Computer programs used by facilities to identify infections based on admission, procedure, culture, and clinical data. These are usually offered by third party vendors not associated with facility’s electronic medical record and require interfacing to the facility’s source systems (eg, laboratory; admission, discharge, or transfer; pharmacy; operating room records).

**Systematized Nomenclature of Medicine–Clinical Terms (Snomed/Snomed CT):** A systematic, computer-processable collection of medical terms, in human and veterinary medicine, to provide codes, terms, synonyms, and definitions, which cover anatomy, diseases, findings, procedures, microorganisms, substances, and so forth. It allows a consistent way to index, store, retrieve, and aggregate medical data across specialties and sites of care.

**Validation:** Testing any new system or upgrade against data that are known to be correct. Validation is crucial to implementing any new system and maintaining systems after upgrades or changes to any of the data sources that feed into a system. For example, invasive device days can be counted manually for a day or week and compared with the information on invasive devices in the electronic system.

Learning the terms used by IT is important, but the most important thing IPs can do is envision their ideal electronic system. Think about the details that will be needed:

- Is the patient’s age or date of birth preferable?
- Should cases that were reviewed, but did not meet infection criteria, be documented?
- What is the most effective and efficient way to document the review of cases if that is desired?
• Can the system present patient data so that all the information needed for surveillance definitions is in a single view?
• Can the electronic system help streamline communicable disease reporting and exposure investigations?
• Will IPs communicate with the clinical care team in the electronic medical record? Where will those notes be?
• Who else will be impacted by the new system? Will the laboratory staff, nursing staff, physicians, and other workers need to provide input on what they hope to gain or how they can improve their workflow by having IPs in the system?
• Can letters to patients be generated by the system?

It will take some time up front to think through the various possibilities. Run through processes in the stage system or mocked up on paper to see what the best work flow will be for the IP team and the best ways for IPs to communicate with the clinicians and others within their work flows. If there is a process that is not smooth currently, consider the preferred process and build that.

Starting on an IT venture requires IPs to pass through a learning curve, and IT professionals will need to learn about IP needs. Write down your expectations and understanding of the project succinctly, and share this with your development team. Repeat when any changes are made. This can help serve as a reference, can keep the team focused, and can assure that everyone understands the project and next steps. There will be glitches and bumps in the road. The system will require maintenance and rechecking when anything changes. There are frustrations, but there are rewards as well. Use of electronic surveillance, when configured correctly, allows IPs to perform more surveillance in less time and spend more time on intervention. Give it a year, and you will wonder how you ever worked with phone calls from the laboratory and paper reports!

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