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Basic Elements of an Infection Control Program

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Preface

The Centers for Disease Control estimates that about 5 percent of all patients who enter hospitals contract at least one infection during their stay. Hospital-based infections result in increased patient suffering and sometimes death; longer hospital stays; and increased health care costs. Effective infection control programs can reduce the number of nosocomial infections, and researchers have estimated that such programs can more than pay for themselves by reducing patients' lengths of stay and the related costs of treating infections.

We have prepared this listing of elements that experts consider necessary for effective hospital-based infection control programs in order to share it with infection control practitioners and program directors and other interested parties. We developed the listing to assess the content of infection control programs in the Departments of Veterans Affairs (VA) and Defense hospitals and to compare such programs with those in nonfederal hospitals. We found that federal and nonfederal hospitals were similar in their use of the elements and many hospitals use a significant number of them. For example, our survey of 443 nonfederal hospitals showed that 42 of the 56 elements were being used by over 70 percent of the hospitals when such use was appropriate.[1]

The 56 elements reflect current thinking on basic infection control program activities. We developed these elements by first consulting with officials of the organizations and the individual that follow:

- American Hospital Association.
- Association for Practitioners in Infection Control.
- Centers for Disease Control (CDC).

[1]For more details on our comparison of VA and nonfederal hospitals' infection control programs see our report, Infection Control: VA Programs Are Comparable to Nonfederal Programs but Can Be Enhanced (GAO/HRD-90-27). Our report on the comparison of Department of Defense and nonfederal hospitals will be published later this year.

- Joint Commission on Accreditation of Healthcare Organizations.
- The Society of Hospital Epidemiologists of America.
- Robert W. Haley, M.D., who directed CDC's Study on the Efficacy of Nosocomial Infection Control (SENIC).[2]

We discussed the activities these officials thought were necessary for an effective infection control program and worked with CDC officials to compile a comprehensive list of elements. The list was sent to the above organizations (except CDC) as well as the following organizations:

- American Public Health Association.
- The Association of Operating Room Nurses, Inc.
- Association of State and Territorial Health Officials.
- Surgical Infection Society.

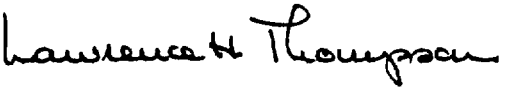
We asked each to indicate which elements could be considered minimum requirements for an effective infection control program. From their responses, we developed a list of the elements that six or more agreed were minimum requirements and, subsequently, discussed these with CDC infection control experts. Using existing Joint Commission standards, published studies demonstrating the effectiveness of an element, and CDC's judgment as to whether the element would be widely supported by infection control experts, we arrived at a final list of 56 elements. These elements focus on the surveillance activities of an infection control program.

We believe that these elements should be useful to both practitioners and hospitals in starting or evaluating infection control programs. However, the elements indicate only whether an infection control program involves certain activities and should not be used by themselves to assess the program's effectiveness. Other important determinants of a

[2]In this study, CDC evaluated the impact of surveillance and control activities on nosocomial infections in a sample of hospitals.

program's effectiveness include hospital and program priorities, availability of data to identify problems, and, most significantly, how well infection control activities are carried out by hospital staff.

The field of infection control is a dynamic one. Better ways to ascertain the risk of nosocomial infections and reduce infection rates continue to be found. Our hope is that these basic elements will be expanded and modified to reflect further developments in infection control program knowledge and practices.



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Basic Elements of an Infection Control Program

Applicability of the Elements

The basic elements cited in this pamphlet are applicable only to acute-care hospitals having 50 or more beds. Infection control programs for hospitals with less than 50 beds should entail many of the same types of activities but could be less structured than programs for larger facilities. Also, infection control programs in extended care facilities may be somewhat different because the infection risks, availability of diagnostic tests, and organizational structure may not be the same as in acute-care hospitals.

Use of the Basic Elements

The basic elements are divided into five groups: general program elements, bloodstream infections, pneumonia, surgical wound infections, and urinary tract infections. The general group includes 14 elements that apply to all hospitals and address program structure, applicable surveillance activities, and control activities. The remaining four groups of elements are organized by the four major sites of infection and address surveillance activities (identification, analysis, and reporting) specific to each site.

The elements allow for both total and targeted surveillance. A program performing total surveillance monitors all four major sites of infection in every hospital patient on either a periodic or continuous basis. A program that targets surveillance identifies the areas of highest infection risk or concern and focuses its attention on such areas; for example, patients in the intensive care unit or all bloodstream infections. The specific elements applicable to an infection control program depend on whether the program uses total or targeted surveillance:

Total surveillance—all five groups of elements would be used, however, a few individual elements within the groups may not be applicable (see the basic elements).

Targeted surveillance—the general elements would be used, and, depending on which site(s) of infections are being targeted in the high risk groups, other appropriate groups of elements would be used (i.e., bloodstream, pneumonia, surgical wound, or urinary tract).

Although the basic elements place emphasis on surveillance activities, an infection control program cannot be effective without control activities. We included in our list only the broad categories of control functions because control activities, unlike surveillance activities, are performed not only by the infection control staff but by other hospital personnel. CDC has published detailed recommendations on procedures to be followed by providers to prevent infections. Further, control activities that (1) are carried out by the program and (2) are beneficial to all hospitals are difficult to specify because the appropriate control activities depend heavily on the surveillance findings and the circumstances within the individual hospital. For example, if a program finds it has a high rate of bloodstream infections related to intravenous catheters, the appropriate control activity could be to revise the hospital policy on changing intravenous catheters or provide in-service training for residents or nurses responsible for inserting or changing the catheters.

The list of elements that follows is not all inclusive; the elements listed form a basic rather than an optimal program. Therefore, the elements should be used in conjunction with other standards, such as the Joint Commission's accreditation standards and CDC's guidelines.

General Elements
(These apply to all hospitals)

Structure
G1. The hospital has at least a part-time infection control practitioner.
G2. The hospital has a physician who supervises or consults in the infection control program and has taken at least one training course in hospital infection control.
G3. The hospital has a multidisciplinary infection control committee.
G4. Permanent membership on the committee includes representation from the following: •hospital administration, •microbiology laboratory (if one exists), •medical staff, and •nursing service.
G5. The committee meets at least every 2 months.
Surveillance Activities
G6. The infection control program performs surveillance for at least one of the four major infection sites (bloodstream, pneumonia, surgical wound, and urinary tract).
G7. The hospital's infection control program has written standardized criteria (definitions) for nosocomial infections at specific sites.
G8. The infection control program has a system to detect and control outbreaks of infections.
Control Activities
G9. The hospital's infection control program assists in developing and revising hospital departments' policies and procedures as they relate to infection control issues.
G10. The hospital's infection control program assists in developing a system for reporting infections or infection exposures of employees.

(continued)

Structure
G11. The hospital's infection control program assists in identifying and developing infection control topics for orientation classes.
G12. The hospital's infection control program assists in identifying and developing infection control topics for in-service training.
G13. The hospital's infection control program monitors or assists in monitoring the hospital staff's compliance with specific patient care practices, such as aseptic techniques during intravenous catheter insertion and maintenance of insertion sites.
G14. Infection control practitioners and registered nurses on hospitals units have written authority to implement isolation procedures in an emergency without a physician's order.

Bloodstream Infections

Identification	Applicability to surveillance type: Total	Target
B1. A hospital's infection control program uses at least one of the following case-finding approaches to identify bloodstream infections either in all patients or in a subset of patients: • Review results of blood cultures in all patients in target population. • Review all patients' charts in target population. • Review all patients' fever charts in target population.	X	X
B2. During the surveillance period, a hospital's infection control program performs an acceptable case-finding approach (previous criterion) on an average of every 3 days.[a]	X	X
B3. In their case-confirmation effort, infection control staff perform at least one of the following activities if they do not review all patients' charts in target population as a case-finding activity: • Review results of blood cultures in patients in target population, identified through case finding (if they do not review results of blood cultures in all patients in target population as a case-finding activity). • Review patients' charts in target population identified through case finding.	X	X
Analysis[b]		
B4. The infection control program has developed initial baseline rates for nosocomial bloodstream infections within the hospital.	X	X
B5. Infection control staff analyze nosocomial bloodstream infection data by pathogen.	X	X
B6. Infection control staff analyze data on nosocomial bloodstream infections by whether or not patient had peripheral and/or central intravenous (IV) cannulation.		X
B7. Infection control staff analyze nosocomial bloodstream infection data by ward.	X	X

(continued)

Reporting	Applicability to surveillance type: Total	Target
B8. Infection control staff report summarized/ analyzed data on nosocomial bloodstream infections to the infection control committee.	X	X
B9. Infection control staff report summarized/ analyzed data on nosocomial bloodstream infections to the supervisor of the IV therapy team, if one exists.		X
B10. Infection control staff report summarized/ analyzed data to the ward supervisors or head nurses.	X	X

[a]Important infection control problems may require case finding more frequently than every 3 days.

[b]The proper analysis of infection data requires calculation of infection rates in specific patient risk groups, as well as frequency distributions and line listings of the infections. If infection rates are to be useful for estimating infection risks in patient groups, appropriate data should be collected; for example, if bloodstream infections caused by intravenous catheters are being analyzed, then both the number of patients with intravenous catheters and the number of those patients who develop bloodstream infections are needed.

Pneumonia

Identification	Applicability to surveillance type: Total	Target
P1. A hospital's infection control program uses at least one of the following case-finding approaches to identify pneumonia either in all patients or in a subset of patients: • Review all patients' Kardexes in target population. • Ask nurses about signs or symptoms of a respiratory infection in all patients in target population. • Review all patients' charts in target population.	X	X
P2. During the surveillance period, a hospital's infection control program performs an acceptable case-finding approach (previous criterion) on an average of every 3 days.[a]	X	X
P3. In their case-confirmation effort, infection control staff perform at least one of the following activities if they do not review all patients' charts in target population as a case-finding activity: • Review lab and X-ray results for evidence of pneumonia in patients in target population, identified through case finding (if they do not review lab and X-ray results in all patients in target population as a case-finding activity). • Review patients' charts in target population identified through case finding.	X	X
Analysis[b]		
P4. The infection control program has developed initial baseline rates for nosocomial pneumonia within the hospital.	X	X
P5. Infection control staff analyze data on nosocomial pneumonia by pathogen.	X	X
P6. Infection control staff analyze data on nosocomial pneumonia by whether or not patient was on a ventilator, if target population includes ventilator patients.		X
P7. Infection control staff analyze data on nosocomial pneumonia by ward.	X	X

	Applicability to surveillance type	
	Total	Target
P8. Infection control staff analyze data on nosocomial pneumonia by whether or not patient had surgery, if target population includes surgical patients.	X	X
Reporting		
P9. Infection control staff report summarized/ analyzed data on nosocomial pneumonia to the infection control committee.	X	X
P10. If target population includes ventilator patients, infection control staff report summarized/analyzed data on nosocomial pneumonia to the respiratory therapy department, if one exists.		X
P11. Infection control staff report summarized/ analyzed data on nosocomial pneumonia to the ward supervisors or head nurses.	X	X

[a]Important infection control problems may require case finding more frequently than every 3 days.

[b]The proper analysis of infection data requires calculation of infection rates in specific patient risk groups, as well as frequency distributions and line listings of the infections. If infection rates are to be useful for estimating infection risks in patient groups, appropriate data should be collected; for example, if bloodstream infections caused by intravenous catheters are being analyzed, then both the number of patients with intravenous catheters and the number of those patients who develop bloodstream infections are needed.

Identification	Applicability to surveillance type: Total	Target
S1. A hospital's infection control program uses at least one of the following case-finding approaches to identify surgical wound infections either in all surgical patients or in a subset of surgical patients: • Review results of gram stains and cultures of wounds in all patients in target population, and ask nurses about signs or symptoms of surgical wound infections in all patients in target population. • Review all surgical patients' Kardexes in target population. • Review all surgical patients' charts in target population.	X	X
S2. During the surveillance period, a hospital's infection control program conducts case finding using an acceptable approach (previous criterion) on an average of every 3 days.[a]	X	X
S3. In their case-confirmation effort, infection control staff perform at least one of the following activities if they do not review all surgical patients' charts in target population as a case-finding activity: • Review results of gram stains and wound cultures for patients in target population identified through case finding (if they do not review gram stains and wound cultures for all patients in target population as a case-finding activity). • Review surgical patients' charts in target population identified through case finding. • Ask nurses about signs or symptoms of surgical wound infections in patients in target population identified through case finding (if they do not ask nurses about signs or symptoms of surgical wound infections in all patients in target population as a case-finding activity).	X	X
Analysis[b]		
S4. The infection control program has developed initial baseline rates for surgical wound infections in the hospital.	X	X
S5. Infection control staff analyze surgical wound infection data by surgeon.	X	X

(continued)

	Applicability to surveillance type	
	Total	Target
S6. Infection control staff analyze surgical infection data by type of wound classification (e.g., clean, clean-contaminated, contaminated, and dirty).		X
S7. Infection control staff analyze surgical wound infection data by pathogen.	X	X
S8. Infection control staff analyze surgical wound infection data by ward.	X	X
Reporting		
S9. Infection control staff report summarized/ analyzed data on surgical wound infections to the infection control committee.	X	X
S10. Infection control staff report summarized/ analyzed data on surgical wound infections to the surgical complications committee, if one exists.	X	X
S11. Infection control staff report summarized/ analyzed data on surgical wound infections to the chief of the surgical service.	X	X
S12. Infection control staff report summarized/ analyzed data on surgical wound infections to the operating room supervisor.	X	X
S13. Practicing surgeons receive surgeon-specific infection rates.	X	X

[a]Important infection control problems may require case finding more frequently than every 3 days.

[b]The proper analysis of infection data requires calculation of infection rates in specific patient risk groups, as well as frequency distributions and line listings of the infections. If infection rates are to be useful for estimating infection risks in patient groups, appropriate data should be collected; for example, if bloodstream infections caused by intravenous catheters are being analyzed, then both the number of patients with intravenous catheters and the number of those patients who develop bloodstream infections are needed.

Urinary Tract Infections

Identification	Applicability to surveillance type: Total	Target
U1. A hospital's infection control program uses at least one of the following case-finding approaches to identify urinary tract infections either in all patients or in a subset of patients: • Review all patients' Kardexes in target population. • Review results of urine cultures in all patients in target population, and ask nurses about signs or symptoms of a urinary tract infection in all patients in target population. • Review all patients' charts in target population.	X	X
U2. During the surveillance period, a hospital's infection control program performs an acceptable case-finding approach (previous criterion) on an average of every 3 days.[a]	X	X
U3. In their case-confirmation effort, infection control staff perform at least one of the following activities if they do not review all patients' charts in target population as a case-finding activity: • Review results of urine cultures in patients in target population, identified through case finding (if they do not review lab results of urine cultures in all patients in target population as a case-finding activity). • Review patients' charts in target population identified through case finding.	X	X
Analysis[b]		
U4. The infection control program has developed initial baseline rates for nosocomial urinary tract infections within the hospital.	X	X
U5. Infection control staff analyze data on nosocomial urinary tract infections by pathogen.	X	X
U6. Infection control staff analyze data on nosocomial urinary tract infections by ward.	X	X
Reporting		
U7. Infection control staff report summarized/ analyzed data on nosocomial urinary tract infections to the infection control committee.	X	X

	Applicability to surveillance type	
	Total	Target
U8. Infection control staff report summarized/ analyzed data on nosocomial urinary tract infections to the ward supervisors or head nurses.	X	X

[a]Important infection control problems may require case finding more frequently than every 3 days.

[b]The proper analysis of infection data requires calculation of infection rates in specific patient risk groups, as well as frequency distributions and line listings of the infections. If infection rates are to be useful for estimating infection risks in patient groups, appropriate data should be collected; for example, if bloodstream infections caused by intravenous catheters are being analyzed, then both the number of patients with intravenous catheters and the number of those patients who develop bloodstream infections are needed.

Acknowledgements

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- American Hospital Association.
- American Public Health Association.
- The Association of Operating Room Nurses, Inc.
- Association for Practitioners in Infection Control.
- Association of State and Territorial Health Officials.
- Centers for Disease Control (CDC).
- Joint Commission on Accreditation of Healthcare Organizations.
- The Society of Hospital Epidemiologists of America.
- Surgical Infection Society.
- Robert W. Haley, M.D., who directed CDC's Study on the Efficacy of Nosocomial Infection Control (SENIC).[1]

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[1]SENIC evaluated the impact of surveillance and control activities on nosocomial infections in a sample of hospitals.

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