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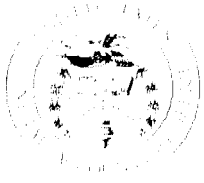
Report to the Ranking Minority Member, Committee on Veterans' Affairs, U.S. Senate

January 1990

INFECTION CONTROL

VA Programs Are Comparable to Nonfederal Programs but Can Be Enhanced



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Human Resources Division

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The Honorable Frank H. Murkowski
Ranking Minority Member
Committee on Veterans' Affairs
United States Senate

Dear Senator Murkowski:

In response to your request, this report discusses the effectiveness of the Department of Veterans Affairs', (VA's) infection control programs and how the programs compare with those in nonfederal hospitals. To assess VA's programs we developed basic elements of hospital infection control programs. Using these elements we found the content of VA medical centers' and nonfederal hospitals' programs to be similar. However, our visits to seven VA medical centers indicated that many of the VA programs were understaffed and needed more support from medical center management. Several recommendations are made to improve these conditions, all of which VA concurred with and indicated that action was being taken.

Copies of this report are being sent to the Secretary of Veterans Affairs, appropriate congressional committees, and other interested parties.

This report was prepared under the direction of David P. Baine, Director, Federal Health Care Delivery Issues, who may be reached on (202) 275-6207. Other major contributors are listed in appendix VII.

Sincerely yours,

Lawrence H. Thompson

Lawrence H. Thompson
Assistant Comptroller General

Executive Summary

Purpose

The Centers for Disease Control (CDC) estimates that some 5 percent of the patients who enter a hospital contract an infection during their stay. With over 1.3 million inpatient admissions annually, some 60,000 veterans could contract infections each year while being treated in hospitals operated by the Department of Veterans Affairs (VA). The incidence of hospital-acquired infections can be reduced, however, if hospitals operate effective programs to control infections.

The Ranking Minority Member of the Senate Veterans' Affairs Committee asked GAO to review and evaluate infection control programs at VA medical centers. Specifically, he requested that GAO determine

- whether infection control data are used to help prevent future infections,
- whether VA medical centers have adequately staffed and organized their infection control programs, and
- how VA's infection control programs compare with those of nonfederal hospitals.

Background

VA operates 159 medical centers throughout the United States. VA requires each center to have an infection control program to identify infections and help prevent future ones.

GAO needed criteria outlining the basic elements of an effective infection control program in order to assess the programs VA operates at its medical centers. It found that the program guidance issued to the medical centers by VA's central office was too broad to serve this purpose. It also found, however, that no other U.S. health care organization had up-to-date and specific guidance. In order to undertake this review, therefore, GAO worked with representatives of nine organizations and one other individual with expertise in infection control to develop a list of 56 basic elements of an effective program. The nine organizations included the Centers for Disease Control (CDC), the Joint Commission on Accreditation of Healthcare Organizations, the Association for Practitioners in Infection Control and the Society of Hospital Epidemiologists of America. (See app I.)

These elements, referred to in this report as GAO's elements, are applicable to infection control programs in any acute-care hospital with more than 50 beds. (See app II.)

GAO used these elements to examine the content of VA's infection control programs. It collected information through visits to seven medical centers and a questionnaire sent to all VA medical centers and a sample of 567 nonfederal hospitals. GAO used the questionnaire responses to compare VA infection control programs with those in nonfederal hospitals.

Results in Brief

Both VA and nonfederal infection control programs are using most of GAO's basic elements. Forty-four of the elements are widely used by VA infection control programs and 42 of the same elements are widely used by nonfederal programs. In the VA medical centers GAO visited, the use of the elements was due to the individual initiative of the infection control practitioners. Most of GAO's elements either are not included in VA guidance or are stated in such a general manner that VA's guidance is of little use to VA practitioners. Because they had only limited guidance and direction from VA's central office, VA practitioners sought current infection control information and implemented many activities that went beyond their guidance and met the basic elements.

Several infection control elements that GAO identified, however, should be used by more practitioners in both the public and private sector. These elements are generally more labor intensive than those that are receiving widespread acceptance.

In addition, to be most effective, VA programs need management attention. VA infection control programs are generally understaffed, not coordinated at the central office, and not adequately monitored by the regional offices. At the central office, six different units issue infection control guidance. There is no central focal point. At the seven medical centers GAO visited, regional office oversight of infection control programs was limited.

Principal Findings

VA Infection Control Guidance Needs to Be Updated

VA's overall guidance on infection control programs was issued in 1978 and 1979, and has not been updated since. Of the 56 elements GAO believes should be basic to any program, VA's guidance specifies clearly only 16. Seventeen of the elements are not mentioned in VA's guidance and the other 23 are discussed in such vague terms that their inclusion is of little use to practitioners. At five of the seven centers GAO reviewed,

the infection control practitioners took the initiative to take training, contact others, or read literature concerning infection control programs. As a result, they used activities in their programs that went beyond VA guidance and adhered to most of GAO's basic elements. (See pp. 18-19.)

Twelve of the elements identified by GAO are not being used as frequently by the medical centers as the other 44. These elements either are not included in VA's guidance or are stated so vaguely that the guidance is of little use to practitioners. They include: assuring that physician advisors have taken a course in hospital infection control programs, increasing the frequency of activities to identify certain infections, routinely reporting surgical wound infection rates to practicing surgeons, and reporting ward-specific infection data to ward supervisors. (See pp. 19 to 26.)

VA Infection Control Programs Comparable With Those in Nonfederal Hospitals

In terms of the extent to which each are using the GAO elements, VA's infection control programs are comparable with those of nonfederal hospitals. VA practitioners generally use 44 of the elements, while nonfederal practitioners use 42. With the exception of one area, the specific elements used are the same and the utilization rates are similar. The specific elements that are being used less in VA are also being used less in nonfederal hospitals and, again, the utilization rates are similar.

Management Issues Must Be Resolved

VA's guidance requires one full-time infection control practitioner for every 200 to 250 occupied beds. Based on this requirement, GAO's questionnaire results indicated that 55 percent of VA's infection control programs were understaffed in 1987. At three of the seven medical centers GAO reviewed, lack of resources led to the practitioners' not accomplishing necessary infection control activities. (See pp. 28 to 30.)

GAO found that regional office monitoring was inadequate at four of the seven medical centers it visited. The VA regional office inspection team did not identify existing deficiencies, each of which was significant enough to hamper the effectiveness of the centers' infection control programs. This occurred because the regional inspection teams (1) did not always include someone knowledgeable about infection control programs and (2) were given guidance that was not sufficient to assess the programs. (See pp. 31-32.)

VA does not have a specific headquarters unit to direct its infection control programs. As a result, at least six different offices are issuing guidance on infection control related issues, and some of it is confusing and incorrect. In addition, no formal mechanism has been set up to allow infection control practitioners to share information on their programs. As a result, practitioners spend time developing educational programs, as well as policies and procedures that have already been established by other VA practitioners at other medical centers. (See pp. 32 to 34.)

Recommendations

GAO recommends that the Secretary of Veterans Affairs require the Chief Medical Director to

- update VA guidance so that it includes components similar to GAO's basic elements (see p. 27),
- require medical center directors to reexamine the level of support given to their infection control programs and to provide additional support where appropriate,
- incorporate procedures in regional office survey requirements to assure that each medical center's infection control program is adequately reviewed, and
- designate a unit in VA's central office to direct and coordinate its infection control programs. (See p. 35.)

Agency Comments

VA concurred with GAO's recommendations and stated that it had initiated actions to implement them.

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Abbreviations

AIDS	acquired immunodeficiency syndrome
AHA	American Hospital Association
CDC	Centers for Disease Control
GAO	General Accounting Office
IV	intravenous
SENIC	Study on the Efficacy of Nosocomial Infection Control
VA	Department of Veterans Affairs

Introduction

Hospital-acquired infections are a sizable health concern in the United States. The Centers for Disease Control (CDC) estimates that 5 percent of all inpatients contract at least one hospital-acquired infection during their hospital stays. The Department of Veterans Affairs (VA) operates the largest health care delivery system in the United States and served 1,279,976 inpatients in 1987. A 5-percent rate of infection would suggest that about 64,000 of these patients could have acquired infections. Although these infections can be relatively minor, some could be life threatening. Even if relatively few of these individuals chose to submit claims against VA for infections contracted while in medical centers, the cost to the government could be significant. Because of the importance of infection control, the Ranking Minority Member of the Senate Veterans' Affairs Committee asked us to evaluate VA's program to control such infections.

Importance of Infection Control Programs

Many factors contribute to the prevalence of hospital-acquired infections. Hospitalized patients tend to be more susceptible to infection than healthy individuals because they are often ill or injured when they enter the hospital. Others may become more susceptible as the result of surgery, insertion of catheters and tubes, or use of other equipment related to hospital care, such as ventilators. Further, patients admitted with infections could expose other patients to those infections. Visitors and hospital staff also introduce disease-causing organisms. Health care workers can reduce the spread of infections from one patient to another by following certain practices when caring for patients. These practices can be simple, such as washing their hands before and after providing care to each patient or using the proper technique to insert a needle intravenously.

To minimize the incidence of infections, hospitals' infection control programs monitor and emphasize patient care practices through two interrelated activities—surveillance and control. Surveillance activities involve (1) identifying patients with hospital-acquired infections and collecting appropriate data to calculate infection rates, (2) analyzing data about those patients and their infections to determine causes, and (3) reporting analyzed data to hospital management and other staff who can use it to identify the causes of infection and weaknesses in their patient care practices. Control activities consist of the specific actions taken to prevent and control infections, such as developing and revising hospital policies; teaching and reinforcing proper patient care practices; and implementing certain practices, such as the isolation of certain infected patients.

In 1974, CDC began a major study on the efficacy of infection control programs in hospitals.[1] The study results showed that when an effective program was present, hospital-acquired infections could be reduced significantly. The study, which was updated in 1983, covered the four major types of hospital-acquired infections: bloodstream, pneumonia, surgical wound, and urinary tract. Researchers conducting the study estimated that such infections constitute more than 80 percent of all hospital-acquired infections. CDC officials informed us that, generally, the findings of this study are as pertinent today as they were in 1974 and 1983. Specifically, if a hospital implements an effective infection control program, it will decrease its hospital-acquired infection rate.

VA's Infection Control Programs

Each VA medical center is required to maintain an infection control program as part of its quality assurance efforts. VA's central office provides general guidance as to how the programs should be conducted and gives medical center directors responsibility for the program. VA's regional offices are responsible for the general oversight of the centers' infection control programs.

Medical Center Administration of Programs

The directors of VA's 159 medical centers are responsible for developing and implementing their own infection control programs.[2] The directors receive general guidance from the central office, which includes the appropriate staffing level for the program and what should be included in surveillance and control activities. In some centers, infection control may be a part-time responsibility of a single practitioner; in others, the staff may consist of several practitioners.

Most of VA's medical centers are large by hospital standards—61 have 400 or more acute-care beds, and only 9 have fewer than 100 acute-care beds. VA guidance calls for each medical center to have at least one infection control practitioner for every 200 to 250 beds. The duties of these practitioners—generally registered nurses—include

- conducting surveillance to identify infections and potential epidemics,
- analyzing infection data (e.g., trending and calculating infection rates),

[1]CDC's Study on the Efficacy of Nosocomial Infection Control (SENIC) evaluated the impact of surveillance and control activities on hospital-acquired infections in a sample of nonfederal hospitals.

[2]A medical center consists of one or more hospitals and one or more outpatient clinics, and may also include a nursing home and a domiciliary.

- preparing written reports of findings for the centers' infection control committees,
- developing policies and procedures, and
- educating patients and staff on infection control practices.

VA guidance also requires each medical center to establish an infection control committee to be chaired by a physician specially trained in and/or especially interested in infectious diseases.[3] The committee represents the center's departments of medicine, surgery, nursing, laboratory, pharmacy, supply, medical administration, building management, and dietetics. The committee also directs the activities of the medical center's infection control staff.

Regional Office Monitoring of Programs

VA is divided into seven geographic regions, each responsible for monitoring from 21 to 28 medical centers. Regional directors exercise direct line supervision over medical centers within their region. They are also responsible for enforcing VA's infection control guidance and evaluating the medical care and related services provided in individual centers.

At the time of our review, the regions' examination of medical care and compliance with VA guidance was conducted primarily through visits to each medical center by a team of health care and administrative personnel. Central office officials told us that each center should be reviewed at least every 3 years. If deficiencies in the infection control program are found, the center is required to respond with an action plan indicating the corrective steps that will be taken. Action plans are submitted to the region and to the central office for review. The region is responsible for ensuring that final action plans are adequate and that they are carried out.

Central Office Role in Infection Control Efforts

No specific office or person in VA's central office is directly responsible for the infection control program. However, two central office program units—the infectious diseases office and the nursing service—have assumed responsibility for those parts of infection control programs that relate to their functional responsibilities. These two units have issued most of the VA guidance used by the medical centers on how infection control programs should be conducted. In addition, the nursing service has assigned an infection control liaison function to one of its

[3]Infectious disease physicians treat patients with infectious diseases, such as hepatitis. However, these physicians do not necessarily have training in hospital infection control.

nurses in the central office. The liaison function is one of many responsibilities assigned to this individual, and no specific infection control program training is either provided or required for the position. In addition, the liaison only interacts with infection control practitioners who are nurses.

In January 1988, VA's central office appointed a program director for infectious diseases and gave him responsibility for developing guidance to the medical centers on infectious disease issues. This individual is located at a medical center and, in addition to his central office role, is the chief of medicine for his medical center. He has not been allocated any additional staff to assist him with his central office responsibilities.

Costs of Hospital-Acquired Infections

The goal of infection control programs is to prevent infections so that patients' suffering and costs to the VA system are minimized. In 1987, VA paid out over $3 million to close 17 malpractice claims related to hospital-acquired infections. Sixteen of these claims were settled out of court and, therefore, do not represent judgments against VA. However, these claims represent only one type of cost to the VA system. Other costs include the extra days the patient is in the medical center being treated for an infection and the additional cost of diagnosing and treating the infection (e.g., extra laboratory test or intravenous antibiotics). Researchers have estimated that an effective infection control program more than pays for itself by preventing infections and thereby reducing patients' length of stay and related costs of treating infections.

The "cost" to the patient who has an infection varies. For example, urinary tract infections are generally the least serious and may cause the patient some discomfort; bloodstream infections or pneumonia could be fatal if not addressed in a timely manner.

In July 1988, the Department of Medicine and Surgery, now the Veterans Health Services and Research Administration, identified infection control programs as a high-risk area under the Financial Integrity Act. High-risk areas identify potential risks in agency operations that require corrective action or further investigation and should be acted on during the first year they are identified.

Objectives, Scope, and Methodology

On November 18, 1986, the former Chairman of the Senate Veterans' Affairs Committee requested that we evaluate VA's infection control program. Based on the Senator's request letter and discussions with committee staff, we agreed to determine

- if VA medical centers have adequately staffed and organized their infection control programs,
- how infection control data are used to help prevent future infections,
- the amount of financial losses resulting from tort claims due to hospital-acquired infections, and
- how the VA medical centers' programs compare with similar nonfederal hospitals' programs.

We conducted this evaluation from June 1987 to June 1989 in accordance with generally accepted government auditing standards.

At the inception of this review, we met several times with CDC officials to discuss, from a conceptual perspective, what a good basic infection control program should consist of (i.e., a program that would consist only of fundamentals). Drawing from these discussions, we determined that there was no current generally accepted written guidance available to the health care community on what constitutes the basic elements of an effective surveillance program.[4] Given the lack of guidance, we sought out eight additional organizations recognized by the medical community as having expertise in infection control, and one infection control expert, to develop a comprehensive list of elements that might be included in an infection control program in today's medical environment. Appendix I describes how the basic elements were developed and gives the organizations and individual we contacted to assist us in this effort.

The list developed as a result of these interactions contains 56 basic elements that we believe represent the minimum requirements of an effective infection control program (see app. II). Although the basic elements place emphasis on surveillance activities, control activities are vital to an effective infection control program. We included in our list only broad categories of control activities performed by infection control staff because some control activities, unlike surveillance activities, are performed not only by the infection control staff but by other hospital

[4]Guidance on infection surveillance programs should be differentiated from guidance on patient care practices related to infection control. CDC guidelines detail recommendations on practices to be carried out by providers to prevent infections but specific guidance on surveillance procedures was not available.

personnel. Further, the control activities performed by the infection control staff depend heavily on the surveillance findings and circumstances within the hospital. The basic elements are limited to those appropriate for acute-care hospitals with 50 or more beds because infection control experts informed us that infection control needs and practices differ for hospitals providing long-term care and for hospitals with fewer than 50 beds.

We prepared a questionnaire based on the elements we developed to help evaluate the content of infection control programs in VA medical centers and to compare VA and nonfederal programs. The questionnaire was developed in close consultation with CDC infection control experts and sent to all 159 VA medical centers. Responses were received from all the centers.[5] However, one VA medical center indicated that it had fewer than 50 acute-care beds and was excluded from our review. We also mailed questionnaires to a random sample of 567 nonfederal hospitals with 50 or more beds and received 443 usable responses. The data from these hospitals were used to make estimates about the universe of nonfederal hospitals with 50 or more acute-care beds (estimated at 3,872). All of the data on nonfederal hospitals in this report are based on our sample and are subject to sampling error. Appendix III describes the methodology we used to select the nonfederal hospitals and presents the sampling errors associated with the estimates for the nonfederal hospitals.

We promised respondents confidentiality to encourage them to answer the questionnaire accurately. In addition, in the letter that accompanied our questionnaire to VA medical centers, we stated that we would ask some centers to provide documentation to support the accuracy of their responses. Later, we requested documentary support for nine questions from 32 VA centers (about 20 percent) randomly selected from returned questionnaires. We were able to verify 94 percent of the responses for which we sought documentation. Three percent were incorrect and we could not determine the accuracy of the other three percent. We do not believe the incorrect and nonvalidated responses affect our conclusions in this report.

We also visited seven VA medical centers to review their infection control programs (see app. IV). They were selected on the basis of size, geographic location, and medical school affiliation. We selected medium to

[5] We also sent the questionnaire to 79 Department of Defense hospitals. We will provide the results of that analysis in a separate report on infection control activities in military hospitals.

large centers from a variety of geographic regions.[6] Our selection included five centers that were affiliated with medical schools and two that were not. At each center, we interviewed the director, chief of staff, infection control staff, service chiefs, department heads, and ward nurses, as well as officials responsible for the quality assurance program. We also reviewed pertinent files and records pertaining to quality assurance and infection control surveillance and control activities, and accompanied infection control practitioners on ward rounds to observe infection control activities and practices within the center.

We met with officials at three VA regional offices to discuss their monitoring of infection control programs and reviewed a selected sample of regional survey reports, medical center corrective action plans, and regional follow-up reports. We also talked with officials from two additional regional offices to discuss their monitoring of center's programs.

At the VA central office, we determined how VA rated the risk level associated with infection control under the Financial Integrity Act; interviewed previous and current chiefs of the infectious diseases program and officials within the offices of quality assurance, medical inspector, general counsel, nursing services, and building management; and reviewed files on tort claims closed in calendar year 1987 to identify those related to hospital-acquired infections. To help validate the accuracy of our determinations that these claims were related to hospital-acquired infections, we asked VA's medical inspector for verification. Throughout the review, if questions developed about the basic elements or about other matters related to our evaluation, we contacted CDC for clarification or advice.

[6]VA has only nine medical centers with fewer than 100 acute-care beds.

Increased Use of Our Basic Elements Could Improve Infection Control Programs

The 56 elements we identified are applicable to both VA medical centers and nonfederal hospitals. Both groups are using many of these elements and the utilization rates for specific elements are similar. (See app. V.) VA infection control staff generally used 44 of the 56 basic elements we developed, practitioners in the private sector generally used 42. Only 16 of the elements are clearly required by VA guidance.

The elements that were not widely used by either VA or nonfederal practitioners include the frequency of surveillance activities for surgical wound infections, urinary tract infections, and pneumonia; the reporting of infections to ward supervisors and surgeons; and the development of baseline infection rates for pneumonia. Failure to utilize these elements hampers the effectiveness of an infection control program.

Basic Elements of an Infection Control Program

At the inception of this review, we found that VA guidance on infection control programs (1) had not been updated since 1979, and (2) included requirements that were vague and open to interpretation by the practitioners. Further, the guidance on infection control programs that existed in the health care community in general was either outdated, did not cover all the major components of a program, or did not specifically identify the basic elements of a surveillance program. For example, the Joint Commission on Accreditation of Healthcare Organizations was in the process of rewriting its standards on infection control programs.[1] In addition, researchers had published studies showing the effectiveness of individual program activities in reducing the number of infections, but no one had studied the effectiveness of a comprehensive program since CDC's Study on the Efficiency of Nosocomial Infection Control (SENIC). Furthermore, an American Hospital Association infection control handbook listed 15 surveillance and control activities and stated that some or all of the duties may be performed by the practitioner. The handbook did not differentiate between activities that ought to be performed as part of any basic program and activities that could be considered as part of an optimal program.

As discussed on page 12, to fairly evaluate the content of VA's infection control programs, we worked with several organizations knowledgeable in infection control to identify a set of current basic elements that are flexible enough to apply to different acute-care hospital environments.[2]

[1]The revised standards on infection control took effect on January 1, 1990.

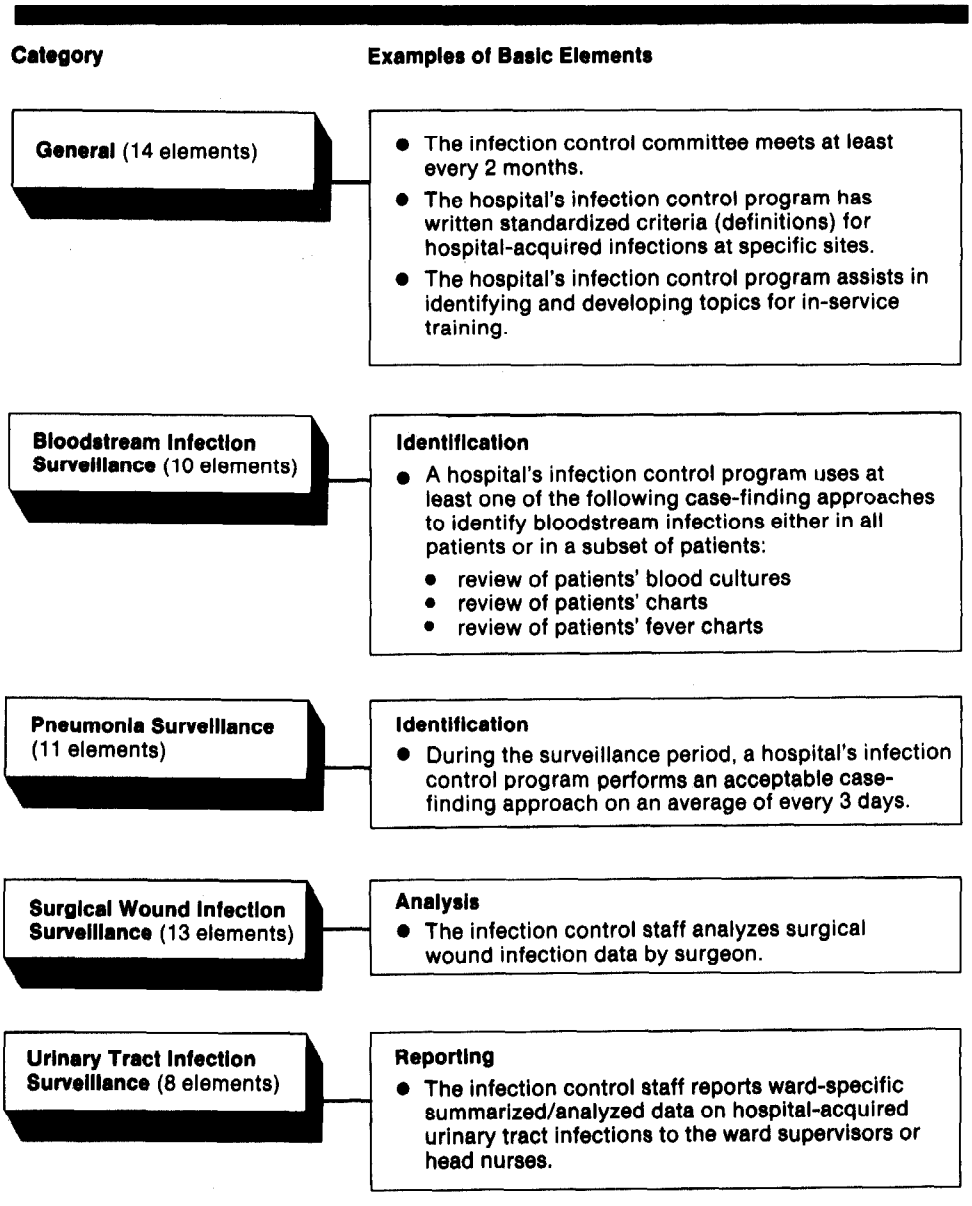
[2]Hospital environments may differ in the types of clinical services offered, types and amount of available resources, and the number and risk of infections.

The result is a set of 56 elements in five categories: general elements, bloodstream infections, pneumonia, surgical wound infections, and urinary tract infections. Appendix II lists all these elements. The general category includes 14 elements that apply to all hospitals and address program structure, surveillance activities, and control activities. The other four categories represent surveillance activities specific to the major types of infections. The surveillance activities relate to

- identification of infections—what sources to use and how often to identify infections,
- analysis of infections—what factors should be analyzed to determine the causes of an infection, and
- reporting of infections—which hospital officials should receive analyzed infection data.

Figure 2.1 cites specific examples of the elements that are included in each of the categories.

Figure 2.1: Main Categories of Elements in Infection Control Programs



Our basic elements allow for two different surveillance approaches: total surveillance or targeted surveillance. Under total surveillance, an infection control practitioner searches for all four major types of infection in every hospital patient, on either a periodic or a continuous basis. Practitioners performing this type of surveillance would generally use

51 of our 56 elements.[3] Under targeted surveillance, the areas of highest risk or concern are periodically identified, and the infection control practitioner focuses on those areas. For example, for a specified period of time a hospital may elect to search for one or more of the infection types in only high-risk patients, such as those in the intensive care unit. Under targeted surveillance, 14 general elements would always apply, and the remaining elements used would depend on the specific infection types (bloodstream, pneumonia, surgical wound, or urinary tract) being targeted in the high-risk patients.

The type of surveillance used depends on the staff available and the special requirements or interests of the hospital or medical center. CDC officials stated that, in the 1970s, medical authorities believed that all hospitals should conduct total surveillance. Since that time, experts have acknowledged that infection control program resources are better spent focusing on patients with a high risk of infection, such as those in the intensive care unit, where the impact from reducing infections is greater. Thus, targeted surveillance can be an acceptable approach.

VA Staff Use Many Basic Elements on Their Own Initiative

Forty-four of the 56 basic elements were being used by at least 70 percent of VA medical centers when such use was appropriate.[4] Similarly, 42 of the same elements used by VA centers were being used by at least 70 percent of the nonfederal hospitals when appropriate. The other elements were also used by some VA medical centers and nonfederal hospitals, but to a more limited extent.

VA's guidance on infection control programs clearly requires only 16 of the 56 basic elements we developed: 17 of our basic elements are not included in VA's guidance and the other 23 are discussed in such vague terms that the guidance is of little use to the practitioner. For example, our basic elements indicate that ward supervisors[5] should receive data, analyzed by ward, on bloodstream infections, urinary tract infections, and pneumonia. However, VA guidance states only that the practitioner

[3]The five remaining elements include activities that are applicable when targeting certain types of infections (e.g., analyzing hospital-acquired bloodstream infection data by whether or not the patient had an intravenous (IV) catheter).

[4]Because not all centers and hospitals need to use all elements, when we calculated percentages we included only those centers in which the element was applicable.

[5]We use the term "ward supervisors" to also refer to "head nurses."

should prepare a report for "appropriate personnel" and allows infection control staff to decide who is appropriate and what is to be included in the report.

At five of the seven VA medical centers we visited, the practitioners took the initiative to take training, contact others both inside and outside VA, or read literature concerning infection control programs. As a result, they included activities in their programs that went beyond VA guidance and adhered to many of our basic elements.

Some Basic Elements Are Not as Widely Used as Others

Certain elements we identified were not used on a consistent basis by infection control programs in either VA or the nonfederal sector.[6] These elements relate to

- the availability of a trained physician consultant for the infection control program,
- the frequency with which surveillance activities should take place,
- the submission of infection control analyses to personnel who can use them, and
- the development of a baseline rate for pneumonia.

While we did not ask respondents to our questionnaire why these elements were not used as frequently as the others, VA's Chief of Infectious Diseases said that these elements require resources that are not always available to the medical center. In addition, in the case of VA, none of these elements were clearly required in its guidance.

Trained Physician Consultants Needed for Infection Control Programs

One of our elements calls for infection control programs to have, as a consultant or supervisor, a physician who has taken at least one training course in hospital infection control. This element has a relatively low utilization rate in both VA medical centers and nonfederal hospitals when compared with most other elements. According to VA practitioners who filled out our questionnaire, 155 VA medical centers have a physician available to the infection control staff as a consultant or supervisor. But 63 of these physicians had not received any training in hospital infection control.

[6]We define "consistent basis" as when 70 percent or more of the medical centers or nonfederal hospitals use the element.

CDC's SENIC found a correlation between fewer infections and programs with a physician supervisor trained in infection control. While this study is now dated, CDC officials still believe that trained physician consultants or supervisors are an important factor for an effective infection control program.

VA's guidance does not require an infection control advisor to have infection control training—it is optional. Specifically, VA guidance states that the chairman of the infection control committee should be a physician who is specially trained in or especially interested in infectious diseases. Many nonfederal hospitals also had infection control physician consultants or supervisors who had not taken at least one training course in hospital infection control. Further, large VA centers and nonfederal hospitals were more likely to have a trained physician than their smaller counterparts. Table 2.1 provides a comparative analysis of the utilization of this element by VA and nonfederal hospitals.

Table 2.1: Hospitals That Do Not Have Physician Consultants/Supervisors Trained in Infection Control

Hospitals	Number of applicable hospitals	Hospitals without a trained infection control physician	
		Number	Percent
Under 400 beds:			
VA	97	47	48
Nonfederal	3,363	1,817	54
400 or more beds:			
VA	61	19	31
Nonfederal	509	233	46

Need for Frequent Surveillance

Our basic elements call for an infection control practitioner to take steps at least every 3 days to (1) determine which hospital patients may have infections and (2) identify infections before a patient's discharge. This activity—called case finding—can be done by reviewing laboratory cultures or patient charts, and/or asking nurses about patients with signs or symptoms of infection. These activities are time consuming and require the practitioners continual attention, but performing them every 3 days allows the infection control staff to identify problems and take corrective action before the infections get out of control. CDC officials believe that a frequency of at least every 3 days is necessary because hospitals are emphasizing shorter lengths of stay for patients. Thus, if case finding is not done within this time frame, patients with an infection may not be identified by the program before discharge.

With the exception of surgical wound infection surveillance, current VA guidance does not address the frequency with which surveillance should be performed. For surgical wound infections, a surgical services directive states that such surveillance should be performed daily by surgical service personnel. The guidance does not mention the infection control staff's responsibility in this area.

Our questionnaire results indicated that infection control practitioners at most VA medical centers were performing case finding at least every 3 days for bloodstream surveillance but almost half were not doing so as frequently for surgical wound, pneumonia, and urinary tract surveillance. Many infection control practitioners in nonfederal hospitals indicated a similar pattern of case finding. Table 2.2 compares the utilization by VA and nonfederal hospitals of our case-finding elements pertaining to surgical wound, pneumonia, and urinary tract infections.

Table 2.2: Hospitals Not Performing Case Finding at Least Once Every 3 Days[a]

Category/hospital	Number of hospitals to which element applies	Hospitals not adhering to element	
		Number	Percent
Case finding for surgical wound infections:			
VA	131	55	42
Nonfederal	3,732	1,671	45
Case finding for pneumonia:			
VA	141	62	44
Nonfederal	3,546	1,419	40
Case finding for urinary tract infections:			
VA	141	66	47
Nonfederal	3,586	1,631	45

[a]In this and other tables to follow, when we report the results of our analysis for the universe of VA medical centers and the projected universe of nonfederal hospitals, it is because we did not find significant differences between VA and nonfederal responses by hospital size.

In contrast to the aforementioned utilization rates, only 26 (17 percent) of the 152 VA medical centers and 606 (17 percent) of 3,648 nonfederal hospitals performing bloodstream surveillance did not perform case finding for bloodstream infections every 3 days. One possible explanation for the higher use rate is that the case-finding activities associated with bloodstream infections are less time consuming than those required for other infections. Case-finding for bloodstream infections can be done through a review of laboratory results, whereas identifying the other three types of infections require more time-consuming methods. These methods include a review of laboratory results coupled with discussions with nurses about signs and symptoms of infection in patients or an

examination of patients' medical records. VA's program director for infectious diseases said that these elements were not being used in VA because the activities are labor intensive and the infection control programs are understaffed.

Infection Control Data Should Be Reported to Personnel Who Can Take Preventive Actions

Infection control experts indicate that pertinent data on infections should be reported to hospital personnel who can take action to prevent infections. Thirteen of our basic elements identify specific personnel to whom certain data analyses should be provided (e.g., urinary tract infection data should be analyzed by ward and given to the ward supervisor). VA guidance requires only that the infection control staff "prepare a written report for the Infection Control Committee and other appropriate personnel." The guidance does not elaborate on what the written report should contain, and the determination of who are "appropriate personnel" is left to the discretion of the infection control staff.

Despite the lack of guidance on who should receive infection control reports, nearly all VA medical centers generally used 6 of these 13 elements. Specifically, at least 90 percent of the VA medical centers reported appropriate data on infections to the infection control committee and/or surgical wound infection data to the chief of surgery and operating room supervisor. The other seven elements were used, but to a lesser extent. The elements with relatively low utilization rates involve reporting to ward supervisors, practicing surgeons, and various other hospital groups, such as respiratory therapy teams.

Reporting to Ward Supervisors

Our basic elements state that medical facilities that perform bloodstream, pneumonia, or urinary tract infection surveillance, should analyze their data by ward and report that information to ward supervisors. Our questionnaire results reveal that over 95 percent of the VA medical centers that perform surveillance on each of these types of infections did analyze by ward. But many did not report this infection data to ward supervisors. Hospitals in the nonfederal sector that analyzed infection data by ward reported this data to ward supervisors with about the same frequency as their VA counterparts. Table 2.3 compares the utilization of these elements by VA and nonfederal hospitals.

Table 2.3: Hospitals Performing Bloodstream, Pneumonia, and Urinary Tract Infection Analysis, but Not Reporting Results to Ward Supervisors

Category/hospital	Number of hospitals performing analysis by ward	Hospitals not reporting analysis results to ward supervisors	
		Number	Percent
Bloodstream surveillance:			
VA	148	52	35
Nonfederal	2,988	962	32
Pneumonia surveillance:			
VA	135	47	35
Nonfederal	2,928	789	27
Urinary tract surveillance:			
VA	139	44	32
Nonfederal	3,051	708	23

Reporting to Practicing Surgeons

Studies by various infection control researchers indicate that reporting surgical wound infection rates to the surgeons who perform the operations has a major effect on reducing infections. Several infection control experts argue that reporting surgeon-specific rates is essential if an infection control program is to have any success in preventing surgical wound infections.

Our basic elements call for the analysis of surgical wound infection rates by surgeon and the reporting of the surgeons' specific infection rates back to them. Thus, each surgeon would receive information about the infections contracted by his or her patients. VA's program director for infectious diseases stated that analysis of surgical wound data by surgeon is time consuming and requires adequate staffing to be done correctly. But once the analysis is done, reporting the data to surgeons should not be time consuming. However, he also indicated that surgeons may not be receptive to the infection control staff's analysis of surgical wound data because they generally believe that without their involvement in the collection and interpretation of these data, the data could be misinterpreted.

Table 2.4 compares utilization rates on these elements of VA medical centers and nonfederal hospitals.

Table 2.4: Hospitals That Perform Surgical Wound Surveillance, Analyze the Data, and Do Not Report Results to Practicing Surgeons

Hospital	Hospitals performing surgical wound surveillance	Hospitals analyzing data by surgeon	Hospitals not reporting analysis results to surgeon	Percentage not reporting analysis results
VA	131	93	72	77
Nonfederal	3,732	2,973	2,234	75

Reporting to Other Groups

Our basic elements include the reporting of pneumonia infection rates to the respiratory therapy department and bloodstream infection rates to the intravenous therapy team. In both instances, these personnel provide direct patient care and would benefit from knowing such infection rates. Questionnaire results indicated that of the 65 VA medical centers with respiratory therapy teams, 35 did not have infection control programs that reported the results of pneumonia surveillance back to the teams. Only nine VA medical centers doing bloodstream surveillance have intravenous therapy teams, and seven of these teams did not receive data from the infection control program.

In the nonfederal sector, of the 1,054 infection control programs at hospitals with respiratory therapy teams, 426 did not report the results of pneumonia surveillance back to the teams. Of the 494 nonfederal hospitals doing bloodstream surveillance that have intravenous therapy teams, 214 teams did not receive data from the infection control program.

Our basic elements also require infection control program personnel to provide surgical wound infection data to the surgical complications committee, which is responsible for reviewing surgical complications, including infections. The purpose of this element is to assure that this committee receives complete and accurate information on surgical wound infections since they discuss surgical complications and actions to prevent them in the future. Further, in our opinion, the discussions can be enhanced if information collected by the infection control staff is analyzed before it is submitted to the committee so that trends can be identified. At the present time, the committee usually relies on physicians to report on complications caused by surgical procedures; research indicates that self-reporting does not provide complete information.

Questionnaire results revealed that the infection control staff at 39 (42 percent) of the 92 VA medical centers that monitored surgical wound infections with surgical complications committees, did not share surgical

wound surveillance data with the committee. In the nonfederal sector, infection control staff in 745 (38 percent) of the 1,975 hospitals that monitor surgical wound infections with surgical complications committees did not share pertinent data with the committee.

Need for Baseline Rates by Type of Infection

Baseline infection rates give a hospital an indication of its "normal" level of infection. These rates represent the frequency with which a specific type of infection occurs within a targeted population in a particular hospital based on past surveillance. For example, surveillance conducted on bloodstream infections at a given hospital over the last 2 years may show a 1-percent bloodstream infection rate. This percentage becomes the baseline from which future rates will be measured.

Current VA guidance states that baseline rates should be established but does not specify how they should be calculated. Our basic elements specifically require baseline rates to be developed by each of four types of infection—surgical wound, urinary tract, bloodstream, and pneumonia—because the risks and causes of infections vary by type. Although VA medical centers generally calculated baseline rates for surgical wound, bloodstream, and/or urinary tract infections, 31 percent of the centers did not calculate rates for pneumonia. VA's program director for infectious diseases believes that the data for calculating such baseline rates are readily available but noted that VA guidance should more clearly stress the importance of developing baseline rates for each type of infection.

As shown in table 2.5, with the exception of baseline rates for surgical wound surveillance, VA medical centers and nonfederal hospitals were similar in their use of our elements concerning baseline rates.

Table 2.5: Hospitals That Conduct Surveillance but Do Not Have Baseline Rates

Category/hospital	Number of hospitals conducting surveillance	Hospitals without baseline rate	
		Number	Percent
Bloodstream surveillance:			
VA	152	41	27
Nonfederal	3,648	1,327	36
Surgical wound surveillance:			
VA	131	16	12
Nonfederal	3,732	970	26
Pneumonia surveillance:			
VA	141	44	31
Nonfederal	3,546	1,150	32
Urinary tract surveillance:			
VA	141	38	27
Nonfederal	3,586	1,026	29

Use of One Element Differs Significantly Between VA and Nonfederal Sector

One basic element was used significantly less in the nonfederal sector than it was in VA medical centers. This element requires that infection control practitioners and registered nurses have authority to implement isolation procedures in an emergency without a physician's order; this authority should be in writing. Questionnaire results indicated that only 19 percent of VA centers with 100 to 399 beds and 23 percent of those with over 400 beds did not have written authority. Conversely, about 42 percent of nonfederal hospitals with 100 to 399 beds and 45 percent of hospitals with over 400 beds did not have written authority.

Conclusion

The basic elements we developed are fundamental, generally accepted by infection control practitioners in both the public and private sectors, and supported by organizations knowledgeable about infection control. Cumulatively, they form the basis for an effective infection control program whether in VA or nonfederal hospitals.

Infection control programs in both VA and the nonfederal sector are using most of the elements we developed. This is happening because the practitioners are taking the initiative to determine what elements should be used in an effective infection control program. But VA's written guidance on the subject lags well behind the practitioners' activities and, in many cases, is so general that it is of questionable value. We believe that

the use of the elements we identified, included in a basic infection control program, could improve the effectiveness of VA's programs.

Recommendation

We recommend that the Secretary of Veterans Affairs direct the Chief Medical Director to update VA infection control guidance. At a minimum, the guidance should require components similar to those in our basic elements.

Agency Comments

By letter dated November 21, 1989, the Secretary of Veterans Affairs concurred with our recommendation and indicated that VA infection control guidance would be revised to incorporate our basic elements.

Infection Control Should Receive More Managerial Attention at All VA Levels

Although our questionnaire showed that VA infection control programs used most of our basic elements (see ch. 2), a questionnaire cannot capture how well these programs were integrated and supported throughout the VA system. Lack of management support and attention can undercut the programs' effectiveness.

Infection control programs at several of the medical centers we visited were understaffed and not well directed or monitored by the responsible VA offices. Of the seven medical centers we visited, four of the infection control programs were understaffed. At the central office level, no single office is responsible for directing the infection control programs and coordinating guidance. Instead, guidance is developed and issued by six different offices. This has resulted in confusing or inaccurate guidance. Further, regional office surveys conducted at six of the seven medical centers did not always identify existing deficiencies. As a result of these situations, infection control programs were not as effective as they could have been.

Medical Center Management Does Not Emphasize Infection Control

Infection control is one of many medical center programs competing for relatively scarce resources. It is also a program that affects many center activities. At five of the seven medical centers we visited, center directors had either not given the program adequate resources to accomplish its objectives or not enforced participation in the program by all clinical services of the center. This reduced the program's effectiveness.

Medical Center Management Did Not Allocate Adequate Resources to the Infection Control Program

In calendar year 1987, 82 of VA's 158 infection control programs were understaffed. Our criteria for determining the adequacy of staffing is based on VA guidance, which calls for one infection control practitioner for every 200 to 250 occupied beds. Of the seven medical centers we reviewed, four did not meet this staffing standard, and the practitioners at these centers stated that they did not have time to perform some of the essential infection control activities. For example, at one of the centers, the practitioner collected all the necessary data on surgical wound infections but had no time to analyze them and, thus, did nothing with them.

The directors of two of the understaffed medical centers said that they were each planning to hire another nurse as an infection control practitioner. A third medical center director told us that he could not allocate another nurse to infection control because nurses were in short supply.

But adding staff is not the only solution available. For example, the infection control program at the fourth understaffed medical center (the center had one 40-hour-per-week practitioner for 315 occupied beds), met all our basic elements by assigning specific responsibility for parts of the infection control program to medical center services (e.g., nursing, surgery, and medicine). Some center services were responsible for conducting training classes on new infection control policies while others were responsible for monitoring the staff's patient care practices and documenting their findings. This gave the practitioner time to collect and analyze data on infections and prepare reports to the infection control committee and others. We believe this coordination worked at this center because the chief of staff and center director, through their actions, emphasized infection control. Further, at this center, the chief of staff chaired the infection control committee.

In our opinion, VA medical centers should have a designated person who can perform certain infection control activities when the infection control practitioner is absent. This designated person should be trained to perform basic infection control activities so that the program does not stop while the practitioner is away. Four of the seven centers we visited had only one practitioner and no one to perform this function when he or she was absent. At one of these medical centers, during the week the practitioner was away, the center had a number of patients who developed a bacterial infection. When the practitioner returned, she found that the infection started with two patients in the medical intensive care unit who were moved to the surgical intensive care unit. This infection had spread to seven other patients by the time the practitioner returned. The practitioner speculated that had she been in the center or had a backup, the source of the infection would have been identified earlier, the patients who had contracted it would have been treated earlier, and perhaps some of the spread prevented.

In addition to staffing, other resources are needed to carry out an effective infection control program. Since at least 1984, infection control practitioners throughout VA have asked the central office for computer support, and central office officials have said that infection control should be given priority for computer time within a center. But the practitioners were also told by central office personnel that such support is a local policy issue and that they would have to compete for such resources at the center level. The need for computer support apparently still exists at 65 medical centers because those practitioners indicated through their questionnaire responses that they need more computer support (e.g., personal computers, software, and training). Further, in

the seven centers we visited, only two practitioners were using a computer to perform data analysis on infections. Practitioners that were not using computers cited the need for such equipment and indicated that a computer would also help ease the burden of the understaffing because analysis by computer is faster.

At one medical center we visited, the chairperson of the infection control committee delayed surveillance on surgical wound infections for 1 year because, without a computer, the practitioners would not have time to analyze the data collected. Two days before our arrival at this center, the infection control practitioners started their surveillance of surgical wound infections because they had just obtained access to a computer and, therefore, could perform timely analysis of the data collected. Three months later, the physician who headed the program indicated that, as expected, the computer analysis showed that the surgical infection rate for clean surgeries was higher than reported in previous years.[1]

Medical Center Management Gives Infection Control Programs Low Priority

To foster an effective infection control program, all services within a medical center must actively support and participate in it. At five of the seven medical centers visited, it appeared that infection control was not considered a centerwide program, and some medical center components gave it limited attention. For example, we found center directors, medical service chiefs, and other key center officials who (1) did not assure that their representatives attended infection control committee meetings, (2) indicated that infection control surveillance was unimportant, and (3) were unaware of infection control issues within their centers. At one center, the chief of medicine relied on his "intuitive insights" to identify problems from infections rather than on reviews of the infection control practitioner's information.

Infection control programs can be enhanced when there is interest and teamwork within a center, starting with center management. For example in early 1986, the infection control practitioner at one center we reviewed noticed that a large number of vascular surgery patients who should have had a low risk of infection (their surgery would be classified as clean) had wound infections. She began investigating this but, because of concerns with infections occurring in cardiac surgery, had to stop and focus her efforts on cardiac surgery. During this period, the

[1]Surgical wounds can be classified into four wound categories (clean, clean-contaminated, contaminated, and dirty) according to their risk of infection. Clean wounds have the lowest risk of infection and dirty wounds have the highest.

chief of vascular surgery left VA and a new chief was appointed. Upon arrival at the medical center the new chief noted that infection control practices were being neglected by his residents and staff. Within 2 months, with input from the practitioners, he developed a policy manual for his department. It included infection control practices that he enforced. At the time we visited (March 1988), his department had had no infections on clean surgeries since September 1986.

Inadequate Regional Office Monitoring of Programs

At the time of our review, regional offices were required to conduct a general survey of the effectiveness of the medical centers and their quality assurance activities at least every 3 years. During this survey, an examination was to be made of how infection control programs were being implemented. Our review showed that regional offices may not always perform this function. Further, the teams formed by the regional offices to conduct the general survey did not always include personnel knowledgeable in infection control, and the guidance given to teams to review a medical center's performance may not have been appropriate to measure performance accurately.

In 1986 and 1987, the regional offices had surveyed six of the seven medical centers we reviewed. Three of the regional office survey reports made no mention of infection control. But our examination of infection control programs at these centers revealed that at the time the regional office survey was made deficiencies that should have been identified and reported were present in two programs. For example, at one center we found that infection control practitioners were identifying surgical wound infections by using culture results. But officials knowledgeable in infection control told us that many surgical wound infections are not cultured. Therefore, another identification method, such as asking ward nurses about infections, should also be used. In addition, the practitioners were not aware that the chief of surgery was discouraging his staff from culturing obviously infected surgical wounds. The chief of surgery believed that as a result of this miscommunication practitioners were missing about 20 percent of the wound infections.

Of the three regional office survey reports that mentioned infection control, two did not discuss problems that we found during our review. Specifically, one report, dated May 1987, mentioned infection control only to the extent that surgical wound infections were not being categorized by type of wound; that is, clean, contaminated, or dirty wounds. But we found that the practitioner at this center was not performing surgical wound infection surveillance. The acting chief of surgery was tracking

wound infections on certain surgeries because the infection control program was understaffed and could not monitor such infections. In the acting chief's opinion, however, surveillance by the infection control practitioner was still needed. This should have been noted in the regional office report.

Fragmented Central Office Oversight

VA has not given any one office responsibility for providing infection control guidance to its medical centers. As a result, at least six program offices within the central office have issued guidance to the medical centers on infection control and this guidance is sometimes confusing or inaccurate. In addition, practitioners do not know whom to contact when they have questions regarding infection control, and the central office has no mechanism to share medical centers' information related to infection control. Therefore, practitioners spend time developing policies, procedures, and educational programs that have already been developed by practitioners at other VA medical centers.

Infection Control Guidance Is Not Coordinated by the Central Office

Six different program offices in VA's central office have issued guidance relating to infection control. As a result, such guidance sent to the medical centers can be confusing or inaccurate. The need for someone in VA's central office to coordinate such guidance was recognized as early as 1984 at a conference of infection control practitioners. The two central office officials at the meeting, the nursing services' infection control liaison and chief of infectious diseases, said that they would look into the concerns and write a proposal. However, this was not done.

Guidance that has not been coordinated can cause confusion among practitioners. For example, in 1984, VA's engineering services issued guidance to the medical centers on infectious waste that required needles to be capped while being carried. Central office officials told us that they received numerous calls from medical center nurses indicating that the engineering guidance was wrong. The guidance implied that needles should be recapped after use whereas CDC recommended that needles should not be recapped. CDC made this recommendation to decrease the incidence of nurses sticking themselves when recapping a used needle, which could cause blood-borne infection, such as acquired immunodeficiency syndrome (AIDS) or hepatitis. To clear up the matter, the central office nursing service issued a clarification of this circular to all center personnel indicating that needles should only be capped before being used on a patient and that after use they should be discarded in a puncture-proof container.

The fact that different offices issue infection control guidance has also caused communication problems. This was recognized in 1987 by the AIDS program director (former chief of infectious diseases) at VA's central office. At that time, she noted that many practitioners had not received appropriate bulletins because no one program office distributes infection control guidance. For example, medical centers rely on the infection control practitioners to handle AIDS issues. But the practitioners were not receiving all the AIDS-related guidance. Thus, at a meeting of the practitioners, the AIDS program director listed all the guidance addressing AIDS issues. This was the first time many of the practitioners had a complete set of AIDS-related guidance.

Infection Control Practitioners Duplicate Efforts

VA has not implemented a formal, structured mechanism for practitioners to share ideas and disseminate information among themselves. As a result, practitioners spend time developing program activities that may already have been developed at another center. At three of the seven centers we reviewed, practitioners commented that they were frustrated over "reinventing the wheel" in their program. In their opinion, other practitioners within VA might have developed procedures, policies, or training programs that could be used in their own programs. This concern was also raised in meetings of VA practitioners held in 1984, 1986, and 1987. For example, at the 1984 meeting, VA practitioners stated that a compilation of infection control procedures and policies would be helpful to practitioners. If such a document were available, they would not have to write new policies and procedures but could modify others for their center. As of July 1989, this had not been done.

In response to practitioners' requests, VA central office officials suggested that they consider developing a communication network among centers. However, the practitioners had already set up an informal network to share information among themselves. This network encourages practitioners to participate in the annual conference of the Association of Practitioners in Infection Control, where VA practitioners discuss areas of mutual interest. At the initiative of members of the informal network, such meetings were held annually during the 1984 to 1988 conferences. The practitioners involved in the network have identified a number of efforts that would help make their programs more efficient. For example, some VA practitioners have developed videotapes to educate staff on certain practices to prevent infections. The network was trying to identify those centers with educational tapes and set up a mechanism by which other centers could borrow or copy the tapes.

Many of the practitioners we talked with stated that the informal network is very beneficial, but they believe the central office should undertake a more formal coordination of infection control procedures and policies. For example, at one medical center we visited, a recently appointed infection control practitioner found out about the network only because a friend at another VA center mentioned it. The practitioners that help with the network are volunteers, and their time comes out of either their own program or their personal time. As a result, many of the initiatives that are conceived by the network are delayed or never completed.

Conclusion

Infection control is an important aspect of hospital operations, and personnel assigned to conduct such programs should be supported by management at all levels. The fact that six different units provide guidance to infection control practitioners is an indication that the program is not well defined or directed by the central office.

Lack of management attention to a number of areas undercuts the effectiveness of infection control programs. For example, VA has provided limited or no response to continued requests for (1) a formal mechanism to share information, (2) coordination of existing infection control guidance, and (3) computer support for analysis purposes. This gives a signal to the practitioners that their program may not be as important to VA as other programs. Moreover, a failure of medical center management to properly recognize infection control as a centerwide effort and a priority can hamper the program's effectiveness. Finally, a shortage of infection control staff affects the program's ability to accomplish its objectives.

With a minimum of time and money, VA management at the medical center, regional, and central office levels can greatly enhance both the efficiency and effectiveness of infection control programs. Specifically, all infection control guidance should be reviewed and coordinated by one central unit. This will send a message to VA staff at all levels that the program is important, understood, and well directed. The unit selected to perform this function should serve as a mechanism to facilitate communication between all practitioners in the VA system and should assure that developments in the field of infection control, both inside and outside VA, are widely disseminated. At the medical centers, directors must recognize that infection control is important to all center staff—not just the practitioners—and should, through both words and actions,

get this message out to all staff. The words should indicate strong support; the actions should be the provision of appropriate resources to get the job done.

Recommendations

We recommend that the Secretary of Veterans Affairs direct the Chief Medical Director to

- designate a single unit in VA's central office to oversee its infection control programs, including (1) coordinating the central office's policies and procedures and (2) implementing a mechanism for sharing information among practitioners;
- incorporate procedures in regional office survey requirements to assure that each medical center's infection control program is adequately reviewed; and
- require center directors to reexamine the level of managerial support and resources given to their infection control programs and to provide additional support where appropriate.

Agency Comments

In his November 21, 1989, letter, the Secretary of Veterans Affairs concurred with each of our recommendations. The Secretary stated that an office has been designated to oversee VA's infection control program and this office will work with VA's infectious disease field advisory group in formulating infection control policies and procedures. The regions will work with these program officials to develop appropriate criteria to assess the programs. The Secretary also stated that the Chief Medical Director will require medical center directors to reexamine their infection control program resources and, based on justifications and systemwide priorities, additional support will be provided.

Methodology Used to Develop the Basic Elements of an Infection Control Program

To develop the basic elements, we first consulted with officials of the organizations and the individual listed below:

- American Hospital Association.
- Association for Practitioners in Infection Control.
- Centers for Disease Control (CDC).
- Joint Commission on Accreditation of Healthcare Organizations.
- The Society of Hospital Epidemiologists of America.
- Robert W. Haley, M.D., who directed CDC's SENIC study.

We discussed the activities they thought were necessary for an effective infection control program and, working with CDC officials, compiled a comprehensive list of elements. The list was sent to the above organizations (except CDC) as well as the organizations listed below:

- 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. CDC officials believe these elements represent a good basic infection control program.

Basic Elements of an Infection Control Program

The basic elements are divided into five groups: general 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 types of infection and address surveillance activities (identification, analysis, and reporting) specific to each type.

The elements allow for both total and target surveillance. A program performing total surveillance monitors all four major types 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 the type(s) of infections 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.

The list of elements that follows is not all inclusive, the elements in the tables 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.

Table II.1: 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.
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.

(continued)

Control Activities
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.

Table II.2: Bloodstream Infections

	Applicability to surveillance type	
Identification	**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 hospital-acquired bloodstream infections within the hospital.	X	X
B5. Infection control staff analyze hospital-acquired bloodstream infection data by pathogen.	X	X
B6. Infection control staff analyze data on hospital-acquired bloodstream infections by whether or not patient had peripheral and/or central IV cannulation.		X
B7. Infection control staff analyze hospital-acquired bloodstream infection data by ward.	X	X

Reporting	Applicability to surveillance type: Total	Target
B8. Infection control staff report summarized/analyzed data on hospital-acquired bloodstream infections to the infection control committee.	X	X
B9. Infection control staff report summarized/analyzed data on hospital-acquired 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

Table II.3: 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 hospital-acquired pneumonia within the hospital.	X	X
P5. Infection control staff analyze data on hospital-acquired pneumonia by pathogen.	X	X
P6. Infection control staff analyze data on hospital-acquired pneumonia by whether or not patient was on a ventilator, if target population includes ventilator patients.		X

(continued)

Analysis[b]	Applicability to surveillance type: Total	Target
P7. Infection control staff analyze data on hospital-acquired pneumonia by ward.	X	X
P8. Infection control staff analyze data on hospital-acquired 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 hospital-acquired pneumonia to the infection control committee.	X	X
P10. If target population includes ventilator patients, infection control staff report summarized/analyzed data on hospital-acquired pneumonia to the respiratory therapy department, if one exists.		X
P11. Infection control staff report summarized/analyzed data on hospital-acquired pneumonia to the ward supervisors or head nurses.	X	X

Table II.4: Surgical Wound Infections

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

(continued)

Identification	Applicability to surveillance type: Total	Target
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
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

Table II.5: Urinary Tract Infections

Identification	Applicability to surveillance type: Total	Applicability to surveillance type: 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 hospital-acquired urinary tract infections within the hospital.	X	X
U5. Infection control staff analyze data on hospital-acquired urinary tract infections by pathogen.	X	X
U6. Infection control staff analyze data on hospital-acquired urinary tract infections by ward.	X	X
Reporting		
U7. Infection control staff report summarized/analyzed data on hospital-acquired urinary tract infections to the infection control committee.	X	X
U8. Infection control staff report summarized/analyzed data on hospital-acquired 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.

Methodology for Sampling Nonfederal Hospitals

The sample of nonfederal hospitals for this study was selected from the 1985 listing of American Hospital Association (AHA) memberships. Since our questionnaire on infection control was not relevant to very small hospitals, we excluded memberships with fewer than 50 beds before selecting the sample. Of the 4,411 memberships with 50 or more beds, we selected a stratified sample of 550. To insure statistically reliable estimates for small, medium, and large hospitals, as well as for teaching and nonteaching hospitals, the sample was selected from five subgroups (strata) of hospitals (see table III.1).

Table III.1: Nonfederal Hospitals—Sample Sizes and Response Rates by Strata

Bed size/affiliation	1985 AHA memberships	Initial sample	Adjusted sample[a]	Number of responses/ (response rate)
50-99 beds	1,350	110	110	84 (76%)
100-399 beds/nonteaching	2,133	110	111	92 (83%)
100-399 beds/teaching	376	110	110	95 (86%)
400+ beds/nonteaching	141	90	102	93 (91%)
400+ beds/teaching	411	130	134	116 (87%)
Total	**4,411**	**550**	**567**	**480 (85%)**

[a]Adjusted sample reflects number of hospitals included in survey after adding extra hospitals identified as part of a group membership.

Because we were aware that a small proportion of AHA memberships covered more than one hospital, we used the 1985 AHA guide to identify which of the sampled memberships may have represented multiple hospitals. We then made telephone calls to determine whether those memberships in fact represented more than one hospital and, if so, to obtain addresses for each such hospital. As a result of this effort, we discovered in the sample 12 multiple memberships covering 29 hospitals. Consequently, an additional 17 hospitals were added to the sample, resulting in an adjusted sample of 567 hospitals.

We obtained responses from 85 percent (480 of 567) of the hospitals to which we mailed questionnaires. Among the sampled subgroups, the response rate ranged from 76 to 91 percent (see table III.1).

While the initial sample of hospital memberships was stratified according to the AHA information on total number of beds for the membership, our results are presented according to the number of acute-care beds reported by the hospital. We excluded 37 hospitals that reported having fewer than 50 acute-care beds. Consequently, our results are based on the 443 hospitals that reported having 50 or more acute-care beds.

Since data from 443 hospitals are used to make estimates about the universe of nonfederal hospitals with 50 or more beds (estimated number is 3,872 hospitals), all data in this report on nonfederal hospitals are subject to sampling error. The size of the sampling error reflects the precision of the estimate; the smaller the sampling error, the more precise the estimate.

Sampling errors for reported estimates about nonfederal hospitals are presented in table III.2 at the 95-percent confidence level. This means that the chances are about 19 out of 20 that the actual number or percentage being estimated falls within the range defined by our estimate plus or minus the sampling error.

Table III.2: Estimates and Corresponding Sampling Errors for Nonfederal Hospitals

Element	Estimated number of applicable hospitals	Percent that comply	Sampling error 95-percent confidence level (percentage points)
G2. Trained physician consultant (50 to 399 bed hospitals)	3,363	45	7
(400 or more bed hospitals)	509	54	6
G14. Practitioners and registered nurses have isolation authority (100 to 399 bed hospitals)	2,184	58	9
(400 or more bed hospitals)	509	55	6
Bloodstream infections			
B2. Case finding every 3 days	3,648	83	5
B4. Baseline rates	3,648	63	6
B7. Analyze data by ward	3,648	82	5
B9. Report data to IV team	494	57	17
B10. Report data to ward supervisors	3,648	56	7
Pneumonia			
P2. Case finding every 3 days	3,546	60	7
P4. Baseline rates	3,546	68	6
P7. Analyze data by ward	3,546	83	5

(continued)

Element	Estimated number of applicable hospitals	Percent that comply	Sampling error 95-percent confidence level (percentage points)
Pneumonia			
P10. Report data to respiratory therapy department	1,054	60	11
P11. Report data to ward supervisors	3,546	60	7
Surgical wound infections			
S2. Case finding every 3 days	3,732	55	6
S4. Baseline rates	3,732	74	5
S5. Analyze data by surgeon	3,732	80	5
S10. Report data to surgical complications committee	1,975	62	8
S13. Practicing surgeons receive surgeon-specific data	3,732	20	5
Urinary tract infections			
U2. Case finding every 3 days	3,586	55	7
U4. Baseline rates	3,586	71	6
U6. Analyze data by ward	3,586	85	5
U8. Report data to ward supervisors	3,586	65	6

VA Medical Centers Visited

Medical center	Affiliated with a medical school	Number of acute-care beds
Coatesville, PA	Yes	352
Kansas City, MO	Yes	315
Lebanon, PA	No	297
Memphis, TN	Yes	550
New Orleans, LA	Yes	327
Portland, OR	No	366
Washington, DC	Yes	371

VA Medical Centers' and Nonfederal Hospitals' Use of GAO's Basic Elements

Basic element	VA centers		Nonfederal hospitals (estimated)	
	Number applicable	Percent using	Number applicable[a]	Percent using
General elements:				
G1. Hospital has an infection control practitioner	158	100	3,872	100
G2. Trained physician consultant	158	58	3,872	46
G3. Multidisciplinary infection control committee	158	100	3,872	99
G4. Appropriate permanent committee membership	158	88	3,872	91
G5. Meets at least every 2 months	158	98	3,872	94
G6. Surveillance for at least one of the four major infection sites	158	99	3,872	98
G7. Written criteria for infections at specific sites	158	99	3,872	97
G8. System to detect and control outbreaks of infections	158	99	3,872	97
G9. Help to develop hospital infection control policies and procedures	158	100	3,872	100
G10. Help to develp a system for reporting employee infections	158	99	3,872	97
G11. Help to develop infection control topics for orientation classes	158	91	3,872	88
G12. Help to develop infection control topics for in-service training	158	95	3,872	96
G13. Monitor compliance with specific patient care practices	158	88	3,872	85

(continued)

Basic element	VA centers		Nonfederal hospitals (estimated)	
	Number applicable	Percent using	Number applicable[a]	Percent using
G14. Practitioners and registered nurses have isolation authority	158	78	3,872	63
Bloodstream infections:				
B1. Appropriate case-finding approach	152	100	3,648	99
B2. Case finding every 3 days	152	83	3,648	83
B3. Appropriate case-confirmation approach	152	99	3,648	100
B4. Baseline rates	152	73	3,648	63
B5. Analyze data by pathogen	152	99	3,648	97
B6. Analyze data by whether patient had IV	80	90	1,177	90
B7. Analyze data by ward	152	97	3,648	82
B8. Report data to infection control committee	152	99	3,648	99
B9. Report data to IV team	9	22	494	57
B10. Report data to ward supervisors	152	63	3,648	56
Pneumonia:				
P1. Appropriate case-finding approach	141	88	3,546	93
P2. Case finding every 3 days	141	56	3,546	60
P3. Appropriate case-confirmation approach	141	98	3,546	100
P4. Baseline rates	141	69	3,546	68
P5. Analyze data by pathogen	141	98	3,546	97
P6. Analyze data by whether or not patient was on a ventilator	65	86	976	90

(continued)

Basic element	VA centers		Nonfederal hospitals (estimated)	
	Number applicable	Percent using	Number applicable[a]	Percent using
P7. Analyze data by ward	141	96	3,546	83
P8. Analyze data by whether or not patient had surgery	122	88	3,485	93
P9. Report data to infection control committee	141	99	3,546	99
P10. Report data to respiratory therapy department	65	46	1,054	59
P11. Report data to ward supervisors	141	62	3,546	60
Surgical would infections:				
S1. Appropriate case-finding approach	131	95	3,732	93
S2. Case finding every 3 days	131	58	3,732	55
S3. Appropriate case-confirmation approach	131	99	3,732	99
S4. Baseline rates	131	88	3,732	74
S5. Analyze infection data by surgeon	131	71	3,732	80
S6. Analyze data by type of wound	71	93	1,262	91
S7. Analyze data by pathogen	131	95	3,732	96
S8. Analyze data by ward	131	89	3,732	80
S9. Report data to infection control committee	131	100	3,732	99
S10. Report data to surgical complications committee	92	58	1,975	62
S11. Report data to chief of surgery	131	97	3,732	80
S12. Report data to operating room supervisor	131	90	3,732	91

(continued)

Basic element	VA centers		Nonfederal hospitals (estimated)	
	Number applicable	Percent using	Number applicable[a]	Percent using
S13. Practicing surgeons receive surgeon-specific infection rates	131	16	3,732	20
Urinary tract infections:				
U1. Appropriate case-finding approach	141	83	3,586	90
U2. Case finding every 3 days	141	53	3,586	55
U3. Appropriate case-confirmation approach	141	97	3,586	98
U4. Baseline rates	141	73	3,586	71
U5. Analyze data by pathogen	141	99	3,586	98
U6. Analyze data by ward	141	99	3,586	85
U7. Report data to infection control committee	141	99	3,586	99
U8. Report data to ward supervisors	141	67	3,586	65

[a]The number of nonfederal hospitals applicable represents an estimate for the universe of all nonfederal hospitals, based upon responses to our questionnaire. Sampling errors must be taken into account when drawing conclusions from the percentages (see app. III). In addition, because VA has a higher percentage of large medical centers than the nonfederal sector, caution should be used when comparing the estimated percentage of all nonfederal hospitals to VA centers using the same elements.

Comments From the Department of Veterans Affairs

THE SECRETARY OF VETERANS AFFAIRS
WASHINGTON

NOV 2 1989

Mr. Lawrence H. Thompson
Assistant Comptroller General
Human Resources Division
U. S. General Accounting Office
Washington, DC 20548

Dear Mr. Thompson,

I am pleased to provide the enclosed detailed comments on your draft report INFECTION CONTROL: VA Programs Are Comparable to Nonfederal Programs But Can Be Enhanced (GAO/HRD-89-146), dated October 6, 1989. The Department is concurring with each of the four recommendations, and corrective action is in process to improve our infection control program.

We appreciate your assistance in this matter.

Sincerely,

Edward J. Derwinski

Enclosure

Enclosure

DEPARTMENT OF VETERANS AFFAIRS COMMENTS ON THE OCTOBER 6, 1989, GAO REPORT INFECTION CONTROL: VA PROGRAMS ARE COMPARABLE TO NONFEDERAL PROGRAMS BUT CAN BE ENHANCED

See p. 27.

GAO recommends that I require the Chief Medical Director to update VA infection control guidance. At a minimum, the guidance should require components similar to those in GAO's basic elements.

We concur with the recommendation. Newly published infection control guidance incorporates GAO's basic elements. This guidance will soon be incorporated into a VA manual chapter.

GAO also recommends that I direct the Chief Medical Director to:

See p. 35.

-- **Designate a single unit in VA's central office to oversee its infection control programs, including (1) coordinating the central office's policies and procedures and (2) implementing a mechanism for sharing information among practitioners.**

We concur with the recommendation. The Veterans Health Services and Research Administration Director, Medical Service is designated as the central focus for overseeing VA's infection control program. He will work in concert with the Infectious Disease Field Advisory Group in formulating policies and procedures for the Departments's infection control program.

See p. 35.

-- **Incorporate procedures in regional offices survey requirements to assure that each medical center's infection control program is adequately reviewed.**

We concur with the recommendation. The regions will assure that each medical center's infection control program is adequately reviewed and will work with the infection control program officials in VA Central Office to develop appropriate review criteria.

See p. 35.

-- **Require center directors to reexamine the level of managerial support and resources given to their infection control programs and to provide additional support where appropriate.**

We concur with the recommendation. The Chief Medical Director will require his medical center directors to reexamine resources allocated to their infection control programs. Additional support for these programs will be provided based on justified need and systemwide priorities.

Major Contributors to This Report

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