Revised June 1972

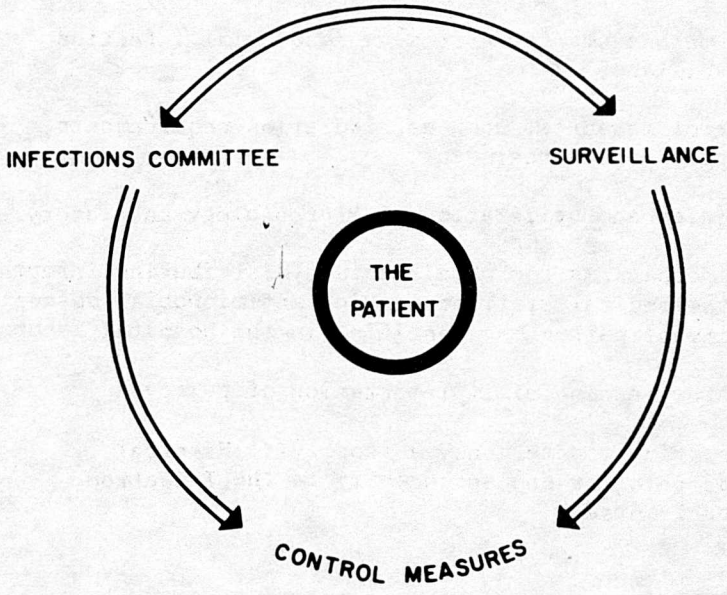
OUTLINE FOR SURVEILLANCE AND CONTROL OF NOSOCOMIAL INFECTIONS

A nosocomial infection is one that develops during hospitalization and is not present or incubating at the time of admission to the hospital. Occasionally, in neonatal nosocomial infections, in maternal mastitis, and in postoperative surgical wound infections, the nosocomial infection may not be clinically symptomatic until after the discharge of the patient from the hospital.

Approximately 5 percent of all patients admitted to general hospitals in the United States will develop a nosocomial infection. Diagnosis and therapy of these infections probably add at least one-third of a billion dollars annually to the cost of hospitalization for the patients who acquire them. Although general trends concerning the most likely sites of nosocomial infections and the services where risk is greatest do exist, each hospital has its own unique problem areas. This outline is designed to provide the framework of an infection control program and fundamental information about the why, who, and how of a functioning surveillance system. It is necessary to remember that patients admitted with infection--the "community-acquired" infection--are relevant to the problem of nosocomial infections insofar as the ability of their community-acquired infection to spread to susceptibles in a hospital setting. The goal will always be to prevent acquisition of nosocomial infections where possible. Optimal control of nosocomial infections depends on surveillance capable of identifying the number and characteristics of such infections at the time they occur.

FIGURE 1

ESSENTIALS OF AN INFECTION CONTROL PROGRAM



The figure depicts the central concern of any infection control program--the patient--and surrounds him with the elements of an infection committee, surveillance, and control measures. The interrelation of these elements is shown by the direction of the arrows. It is the primary purpose of this outline to detail surveillance. However, a brief discussion of the infections committee and control measures is essential to the understanding of surveillance.

The Infection Committee

I. Membership should include

A. Physicians

1. the Hospital Epidemiologist

2. representatives of the major clinical departments (Medicine, Surgery, OB-Gyn, Pediatrics)

3. the Pathologist (or the person responsible for the Microbiology Laboratory)

B. Nurse

1. Infection Control Nurse(s)

2. Director of Nursing and/or nursing supervisors

C. Administration representative

D. Ex officio members (Pharmacy, Housekeeping, Central Supply, Dietary, Inhalation Therapy, Housestaff, local health department, etc.) as appropriate

II. Functions

A. Determine all hospital policy related to infection control including

1. the mechanisms for effective nosocomial infection surveillance

2. control measures, such as, isolation requirements, aseptic procedures, etc.

3. adequacy and utilization of Microbiology Laboratory.

4. the mechanisms for obtaining and distributing information to the medical staff concerning antimicrobial susceptibility of pathogens identified in the hospital laboratory.

B. Provide for meaningful implementation of policy

1. delegation of emergency authority to Hospital Epidemiologist and secondarily to the Infection Control Nurse

2. relate policy to those who must carry it out

3. provide methods for assessing completeness and effectiveness of implementation.

C. Meet regularly

1. a monthly meeting is desirable, but may be more often as necessary or as dictated by surveillance data

2. a planned agenda is needed and should include:

a. review of the significant features of the monthly report by the Infection Control Nurse and Hospital Epidemiologist

b. review one major control procedure or policy area each month in light of the newest available information and the hospital's current practice

Control Measures

It is not the purpose of this outline to detail control measures. However, some areas that require specific policies and methods of implementation for each hospital include:

I. Isolation policy

II. Adequate aseptic technique--e.g. handwashing before and after all patient contact

III. Personnel health program--necessary to prevent cross-infection, should include mechanisms for up-to-date immunizations of employees and annual or semi-annual screening for tuberculosis (preferably by PPD--Mantoux tests)

IV. Regular in-service training programs to acquaint and update all who work in a hospital of the whys and hows of current infection control programs

V. Provision for an appropriately clean environment

VI. Established, written policies for closed system urinary catheter care, intravenous catheter care, antiseptic solutions and use, etc.

VII. Physician review for appropriate antibiotic therapy.

Surveillance

I. Why?

A. To identify baseline information about the frequency and type of endemic nosocomial infections in order to permit rapid identification of deviations ("mini-epidemics") from

the baseline so that the Hospital Epidemiologist and the Infection Committee are provided with sound information upon which to determine:

1. Where special studies may need to be performed

2. Control Measures (long term and emergency)

3. Policy decisions

B. To provide a basis for evaluating effects of new control measures or policies

C. To provide the patient (and personnel) with all possible protection from the development of nosocomial epidemics

D. To meet the requirements of the Joint Commission on Accreditation and the standard medical-legal guideline of "accepted standards of patient care"

E. To provide the medical and nursing staff with meaningful data concerning the level of nosocomial infection in the hospital and in their area of interest--

II. Who?

A. The Infection Control Nurse--job description essentials:

1. R.N. with clinical experience in a hospital setting and a reasonable working knowledge of the principles of epidemiology and infectious disease (occasionally, an appropriately qualified bacteriologist or sanitarian can fulfill the same role)

2. Responsible for detecting and recording nosocomial infections on a systematic and current basis

3. Responsible for analyzing nosocomial infections with the help of the Hospital Epidemiologist and preparing a monthly report for the Hospital Infections Committee

4. Responsible for advising others about the hospital isolation policy and disposition of patients admitted with infection

5. Together with the Hospital Epidemiologist, responsible for initial epidemiologic investigation of all significant clusters of infection above the expected level

6. Responsible for assisting in the development and/or implementation of improved infection control measures

7. Responsible for assisting with in-service training programs related to infection prevention and control

8. If directed by the Hospital Epidemiologist, responsible for liaison with local health department in reporting "reportable" infectious disease seen in the hospital

9. Reviews environmental cleanliness

The nurse can be administratively responsible to the Administration, the Department of Nursing, the Pathology Department, or the Infectious Disease Section of the hospital. However, she must have a physician, the Hospital Epidemiologist, as her advisor, co-worker and immediate supervisor if she is to function effectively. As a bare minimum, for each 250 beds in a hospital, 20 hours of work per week are required for the nurse for the job.

B. The Hospital Epidemiologist--job description essentials:

1. Physician with knowledge of and interest in epidemiology and infectious disease; should be familiar with fundamental biostatistics

2. Must be a member of the Infection Committee, preferably, though not necessarily, Chairman. (In community hospitals, the position of Epidemiologist will probably be part-time and appointive.) If the Hospital Epidemiologist is not Infection Committee Chairman, then the chairmanship should be filled by a physician with status in the hospital who has an understanding of the problem of nosocomial infections. It is important not to rotate the chairmanship so frequently that the developed skill of the Chairman is inadequately utilized.

3. Responsible for direction and advice to the Infection Control Nurse in all of her responsibilities

4. Has delegated authority from the hospital Administration and Infection Committee to institute emergency infection control measures and studies to define a suspected or apparent problem when indicated; he also recommends appropriate general control measures to the Committee for endemic problems.

5. Serves as an infectious disease consultant and as an expert advisor to the Infection Committee on infection control measures

6. Supervises accurate collection and analysis of nosocomial infection information and reviews each recorded nosocomial infection to concur that the infection meets the accepted definitions.

7. Responsible to the Infection Committee

Unless the positions of Hospital Epidemiologist and Infection Control Nurse are filled with interested people who work well together, no hospital can hope to have even a moderately successful infection control program.

III. How?

Methods for collecting, analyzing and reporting data are described below and in the accompanying appendices.

A. Collecting information about nosocomial infections

1. Definitions that are workable and consistently used are essential. Appendix II indicates the definitions in current use by the Hospital Infections Section.

2. Information about each nosocomial infection to be recorded may vary from hospital to hospital. Some essentials are listed in the column headings of the form "line listing of nosocomial infection" in Form 1. Additional useful information might be primary diagnosis and name(s) of attending physician. (The small boxes in Form 1 facilitate coding the recorded data for IBM card punching and computer analysis, a blank column as well as a column headed by comments are for the use of the hospital at their discretion.)

3. A place to record the information: most infection control nurses use some form of file card or sheet for each patient, on which to place information about the nosocomial infection as it develops. They then transfer this information to a line listing form for further analysis by the Hospital Epidemiologist. A pre-designed McBee "keysort" 5" by 8" card could prove very useful as a method of initial recording of data and to facilitate analysis. Whatever form is used, a designated space should be provided for each bit of information desired. This information should be kept current and be updated as necessary throughout the course of the infection.

4. Footwork is now necessary to gather the information--reporting forms placed on the chart to be completed by physicians or floor nurses have proven of marginal usefulness and are therefore not included in this outline. Footwork, in order of usefulness includes:

   a. Daily review of bacteriology laboratory reports to note positive cultures, chart reviews are necessary to attach clinical meaning to the culture reports.

   b. Regular, preferably daily ward rounds to review patients on isolation, patients with fever, and those receiving antibiotics or special treatments. Review of these patients' records will help the nurse to identify possible nosocomial infections. A visit with the charge nurse on the ward, physicians and occasionally a random chart review are also helpful.

c. Review of visits to personnel health clinics for infectious disease, autopsy reports to detect undiagnosed infections and surveillance of discharged patients--especially newborns and postoperative patients--by telephone survey or soliciting reports from the patient's private physician may all be of some additional help.

Relative usefulness of each of these types of "footwork" will vary depending upon the size of the hospital and personnel time available.

5. Record all the information obtained in the appropriate place.

B. Analyzing data

1. Review - at least every week the line listing of nosocomial infections should be reviewed by the Hospital Epidemiologist and a decision made by him as to whether each case represents a true infection. The line listing form should be scrutinized for evidence of clustering by wards and services, and for infections in two or more patients caused by strains of a given microorganism with the same antibiogram. Such reviews may suggest the presence of common-source infections or cross-infections, which should lead to special investigations by the Infection Control Nurse as directed by the Hospital Epidemiologist.

2. Denominators - in order to analyze the data, rates of infection by site, service, ward and pathogen may be calculated. A rate requires a numerator (e.g. the number of nosocomial urinary tract infections in Gynecology patients for January) and a denominator (the number of discharges from the Gynecology service in January). The denominator should reflect the appropriate population at risk.

3. Visual Aids - a map or graph of nosocomial infections by site, service, ward, and pathogen--kept current and on a bulletin board may prove very useful in keeping infection control personnel up to date.

4. Worksheets - for monthly analysis of nosocomial infections are attached as Appendix I

5. Special Problems - may be analyzed as illustrated in Appendix IA.

C. Reporting

1. How - Appendix I contains a sample of one type of monthly summary report.

2. To whom - the monthly report should be prepared by the Infection Control Nurse and Hospital Epidemiologist and

presented to the Hospital Infectior Committee before each monthly meeting. The current month's report should be compared and contrasted with previous month's data. After approval by the committee, a summary or the complete report should be distributed to the medical staff and appropriate members of the nursing staff in order to keep them informed of the progress of the infection control program in the hospital.

Bibliography

Books

1. Williams REO, Blowers R, Garrod LP, Shooter RA: Hospital Infections: Causes and Prevention. 2d ed. London, Lloyd-Luke (Medical Books) Ltd., 1966

2. American Hospital Association: Infection Control in the Hospitals. 2nd ed. Chicago, AHA, 1970

3. American Public Health Association, Inc. Proceedings of the International Conference on Nosocomial Infections, Center for Disease Control, August 3-6, 1970

Articles

1. Eickhoff TC, Brachman PS, Bennett JV, Brown J: Surveillance of nosocomial infections in community hospitals. I. Surveillance methods, effectiveness, and initial results. J Infect Dis 120:305-317, September 1969

2. National Communicable Disease Center: Nosocomial Infections in Community Hospitals Rep No. 3 1967-68 and Rep No. 4 1968-69, Atlanta, NCDC, Mar 1969, nd

3. Streeter S, Dunn H, Lepper H: Hospital infection--a necessary risk? Amer J Nurs 67:3, (March) 1967

4. Wenzel K: The role of the infection control nurse. Nurs Clin N Amer 5(1):89-98, (March) 1970 (and other related articles--same issue)

5. National Communicable Disease Center: Isolation Techniques for Use in Hospitals (PHS Pub No. 2054). Washington, GPO, 1970

6. Groschell D, Bradley SR: Surveillance of infections in a community teaching hospital. Yale J Biol Med 44:247-252, 1971

MONTH/YEAR

Appendix I

WORKSHEETS AND REPORTS FOR MONTHLY
ANALYSIS OF NOSOCOMIAL INFECTIONS

Instructions

Data on nosocomial infections from the Line Listing of Infections Forms may be conveniently tallied on worksheets such as those given below. By completing the worksheets, all information needed to complete the monthly reports will have been systematically determined. The worksheets are designed to facilitate the analysis of data on infections and are intended for internal use within the hospital--the worksheets, themselves, do not represent a report. Discharged patients may present with infections only to Emergency Rooms or Outpatient Departments, and not be readmitted--such infections, when recognized should be classified according to the ward and service the patient was on at the time of hospitalization.

Arrangements should be made, in advance, to obtain the total number of discharges and the number of discharges by ward (floor) and service during the month. The samples given below represent a minimum set of recommended worksheets--the same approach can be used to study attack rates by age, sex, or any other parameter for which denominator data may be obtained. These same worksheets can be appropriately altered and used for community-acquired infections. Hand tabulation to acquire data on antibiotic susceptibility patterns of pathogens has proved too time consuming, but special methods are noted on the susceptibility report.

	TOTAL	PERCENT
A. Number of persons with onsets of nosocomial infections during the month:	_____	
B. Total hospital discharges during the month:	_____	
Ratio (in percent of patients with nosocomial infections to total discharges, A/B:		_____

MONTH/YEAR

NOSOCOMIAL INFECTIONS
WORKSHEET

WARD OR FLOOR (Tally Space)	TOTAL INFECTIONS	NUMBER OF DISCHARGES	ATTACK RATE %
TOTAL			

MONTH/YEAR

NOSOCOMIAL INFECTIONS
WORKSHEET

SERVICE (Tally Space)	TOTAL INFECTIONS	NUMBER OF DISCHARGES	ATTACK RATE %
Medical			
General Surgery			
Urology			
Orthopedics			
Obstetrics			
Gynecology			
Other Surgical Specialities			
Pediatrics			
Newborn			
Other (Specify, if possible)			

MONTH/YEAR

NOSOCOMIAL INFECTIONS WORKSHEET
SITES AND SERVICES

SERVICE	ASYMP. BACT.	OTHER UTI	UPPER RESP.	GASTRO-INTESTINAL	BURNS	SURGICAL WOUNDS	OTHER CUTANEOUS	PRIMARY BACTEREMIA	OTHER	TOTAL
Medicine										
Gen. Surg.										
Urology										
Orthopedics										
Obstetrics										
Gynecology										
Other Surgical Specialities										
Pediatrics										
Newborn										
Other (Specify)										
TOTAL										

MONTH/YEAR

NOSOCOMIAL INFECTIONS WORKSHEET
SITES AND PATHOGENS

(Can be used for each service and/or for all services combined)

PATHOGENS	ASYMP. BACT.	OTHER UTI	UPPER RESP.	LOWER RESP.	GASTRO-INTEST.	BURNS	SURG. WNDS.	OTHER CUT.	PRIMARY BACTER-EMIA	OTHER	TOTAL
S. aureus											
S. epidermidis											
Pneumococcus											
Strep.-Grp. A											
Enterococci											
E. coli											
Klebsiella											
Enterobacter											
Pseudomonas											
Proteus											
Serratia											
Bacteroides											
Candida											
Hemophilus											
Others (specify)											
Not Cultured											
TOTAL											

Hospital Name

MONTH/YEAR

MONTHLY INFECTION REPORT NOSOCOMIAL INFECTIONS

	TOTAL	PERCENT
Hospital Discharges		
Number of persons with nosocomial infections		

Ward or Floor	Discharges	Number of Infections	Attack Rate %

Service	Discharges	Number of Infections	Attack Rate %
Medicine			
Gen. Sur.			
Urology			
Ortho.			
Obstet.			
Gyn.			
Other Sur. Specialties			
Ped.			
Newborn			
Other (specify)			

NUMBER OF NOSOCOMIAL INFECTIONS BY SITES AND PATHOGENS

Pathogen	Asymp. Bact.	Other UTI	Upper Resp.	Lower Resp.	Gastro-intest.	Burns	Surg Wnds	Other Cut.	Primary Bacter-emia	Other	Total
S. aureus											
S. epidermidis											
Pneumococcus											
Strep. Grp. A											
Enterococci											
E. coli											
Klebsiella											
Enterobacter											
Pseudomonas											
Proteus											
Serratia											
Bacteroides											
Candida											
Hemophilus											
Others (specify)											
Not cultured											
Normal flora or no pathogens											
TOTAL											

MONTH/YEAR

MONTHLY INFECTION REPORT continued

NUMBER OF NOSOCOMIAL INFECTIONS BY
SITES AND SERVICES

Services	Asymp. Bact.	Other UTI	Upper Resp.	Lower Resp.	Gastro-Intest.	Burns	Surg. Wnds.	Other Cut	Primary Bacter-emia	Other	Total
Medicine											
Gen. Surg.											
Urology											
Ortho.											
Obstet.											
Gyn.											
Other Surg. Specialities											
Peds.											
Newborn											
Other (Specify)											
TOTAL											

SUPPLEMENT TO MONTHLY REPORTS ON NOSOCOMIAL INFECTIONS*

	PERCENT OF INFECTIONS SENSITIVE									PERCENT OF ISOLATES SENSITIVE											
	ALL UTI	UPPER RESP.	LOWER RESP.	GASTROINTEST	BURNS	SURG. WOUNDS	OTHER CUTANEOUS	PRIMARY BACTEREMIA	OTHER SITES	S. AUREUS	S. EPIDERMIDIS	ENTEROCOCCUS	E. COLI	KLEBSIELLA	ENTEROBACTER	PSEUDMONAS	PROTEUS MIRABILIS	INDOLE + PROTEUS	SERRATIA	BACTERIOIDES	HEMOPHILUS
Ampicillin																					
Cephalothin																					
Chloramphenicol																					
Colistin																					
Erythromycin																					
Gentamicin																					
Kanamycin																					
Lincomycin																					
Methicillin																					
Neomycin																					
Nitrofurans																					
Penicillin																					
Streptomycin																					
Sulfonamides																					
Tetracycline																					

*Antibiotic susceptibility should be analyzed each month; when a sufficient number of isolations have accumulated, the information should be appended to the regular monthly report. This type of information can be of considerable value to the clinician in helping him choose antimicrobial therapy before the complete laboratory report is available to him. The information can be collected by a prearranged program in the hospital microbiology laboratory and/or as part of the surveillance program. Some type of card or computer system is necessary to manage the amount of data required to make such a report meaningful. (See the following reference: Schneierson SS, Amsterdam D: A manual punch card system for recording, filing, and analyzing antibiotic sensitivity test results. Amer J Clin Path 47(6), 1967.

Appendix IA

AN ANALYSIS OF SPECIAL PROBLEMS

As an example, if more complete data concerning the relationship between urethral catheterization and urinary tract infections are desired, information as to whether the patient was catheterized or not and if so, when, could be recorded for each patient on the ward or service, or population of interest. This information should be obtained for all patients, whether infected or not, and systematically tabulated. The risk of acquiring a urinary tract infection after catheterization could then be calculated in the following fashion:

	Number of Patients	Number of Patients With Nosocomial Urinary Tract Infections	Percent Developing Urinary Tract
Catheterized			
Not Catheterized			

If indicated, preventive measures such as the adoption of closed-drainage systems or the establishment of special catheterization teams may be instituted, and the effectiveness of these changes monitored by subsequent surveillance data.

Similar studies can be conducted to identify possible associations between IPPB use and pulmonary infections, the use of "intracaths" or cut-downs and septicemias, or to examine any suspected relationship between a given factor and certain infections.

Such special investigations should be directed toward endemic problem areas as determined by baseline incidences.

May 1970

APPENDIX II

GUIDELINES FOR DETERMINING PRESENCE AND CLASSIFICATION OF INFECTION

If the physician indicates in the chart that a nosocomial infection is, or has been present, then the information is recorded unequivocally as an infection, whether or not additional supporting data is present in the chart.

In the absence of such specific information, the examiner must then make a judgment as to whether the chart review revealed an infection. The presence of an infection at the time of admission is usually easily established and determined to represent a community-acquired infection. However, greater difficulty is usually experienced in determining the presence and classifying infections that develop after admission. The following guidelines are primarily directed towards clarification of the latter situation. Hopefully, infections detected by these criteria will correlate well with actual clinical diagnoses. In some instances, suspected infections that do not meet these criteria will nonetheless be sufficiently established on clinical grounds to require therapy.

Nosocomial infections express themselves in hospitalized patients in whom the infection was not present or incubating at the time of admission. When the incubation period is unknown, an infection is called nosocomial if it develops at any time after admission. An infection present on admission can be classified as nosocomial, but only if it is directly related to or is the residual of a previous admission. All infections that fail to satisfy these requirements are classified as community acquired.

Both infections with endogenous organisms carried by the patient and with organisms originating in the animate or inanimate environment of the hospital may be designated to be nosocomial infections. The term, "nosocomial infection", will thus include potentially preventable infections as well as some infections that may be regarded as inevitable.

Application of specific guidelines requires that the clinical and laboratory data be reliable. There must be a high degree of certainty as to when the clinical manifestations of the infection in question had their onset. Additionally, when the diagnosis of infection depends on bacteriologic identification of organisms, colony counts, or other laboratory procedures, it is essential that these procedures be reliably performed on adequately collected and promptly delivered specimens.

It must be emphasized that in a given patient with an established nosocomial infection, two situations can arise which must be considered as new, individual, nosocomial infections: 1. The appearance of clinical infection at a new and different site, even though with the same organisms as the original infection, must be considered as a new nosocomial infection. (This would probably represent self-infection.) 2. Conversely, the appearance in culture of new and different organisms from a previously described site of nosocomial infection must be considered as a new individual nosocomial infection if there is a coincident clinical continuation or deterioration in the patient's condition.

The following guidelines are for the classification of nosocomial infections in specific sites, offered as a practical application of the principles already stated. Though specifically directed towards nosocomial infection, the criteria for establishing the presence of an infection, per se, may also prove useful in identifying community-acquired infections.

A. URINARY TRACT INFECTIONS

1. Asymptomatic Bacteriuria is applied to those persons having colony counts in urine of greater than 100,000 organisms per ml without previous or current manifestations of infection; such asymptomatic urinary tract infections should be classified as nosocomial if an earlier urine culture was negative at a time when the patient was not receiving antibiotics. If a patient is admitted to the hospital with a urinary tract infection, subsequent culture of a new pathogen in numbers greater than 100,000 organisms per ml should be regarded as a nosocomial infection.

2. Other Urinary Tract Infections - The onset of clinical signs or symptoms of urinary tract infection (fever, dysuria, costovertebral angle tenderness, suprapubic tenderness, etc.) in a hospitalized patient in conjunction with one or both of the following factors developing after admission is sufficient for the diagnosis of nosocomial urinary tract infections.

   a. Colony counts of greater than 10,000 pathogens per ml* or visible organisms on a Gram smear of unspun fresh urine.

   b. Pyuria of greater than 10 WBC's per high power field in an uncentrifuged specimen, with a urinalysis negative for pyuria on admission.

*A carefully collected midstream urine specimen is adequate for examination.

If a patient with a prior negative urinalysis and/or culture develops clinical symptoms of urinary tract infection while hospitalized, and neither urinalysis nor urine culture have been repeated, he should be considered to have a nosocomial urinary tract infection. Also, as described above, the appearance in culture of new organisms in an existing urinary tract infection together with clinical continuation or deterioration constitutes a new nosocomial urinary tract infection.

B. RESPIRATORY INFECTIONS

1. Upper Respiratory Infections - This category includes clinically manifest infections of the nose, throat or ear (singly or in combination). The signs and symptoms vary widely and depend on the site or sites involved. Coryzal syndromes, streptococcocal pharyngitis, otitis media and mastoiditis are all included in this category; though these diverse entities have been grouped together, the specific diagnosis should be entered on the line listing form to allow separate analysis, if desired. The majority of these infections will be viral or of uncertain etiology. Careful attention must be paid to the incubation period in order to separate community-acquired infections that develop after admission and nosocomial infections.

2. Lower Respiratory Infections - Clinical signs and symptoms of a lower respiratory infection, (cough, pleuritic chest pain, fever and particularly purulence) developing after admission are regarded as sufficient evidence to diagnose respiratory infection, whether or not sputum cultures or chest X-rays are obtained. When there is evidence of both upper and lower respiratory infections, concomitantly, entries should be made for both sites on the line listing form.

   Other conditions which may result in similar signs or symptoms (congestive heart failure, post-operative atelectasis, pulmonary embolism, etc.) may often be differentiated by the clinical course of the patient. However, even if such entities are suspected to be present, the diagnosis of lower respiratory infection is made in the presence of one or more of the following: purulent sputum (with or without recognized pathogen on sputum culture) or suggestive chest X-ray. Supra-infection of a previously existing respiratory infection may result in a new nosocomial infection when a new pathogen is cultured from sputum and clinical or radiologic evidence indicates that the new organism is associated with deterioration in the patient's condition. Care must be used in distinguishing supracolonization from supra-infection.

C. GASTROENTERITIS

Clinically symptomatic gastroenteritis having its onset after admission and associated with a culture which is positive for a known pathogen is regarded as nosocomial gastroenteritis. If the incubation period for the pathogen is known (i.e., salmonella, shigella, etc.), the interval between admission and the onset of clinical symptoms must be greater than the incubation period. Alternatively, nosocomial gastroenteritis may be diagnosed if a prior stool culture or cultures, obtained on or after admission from a patient with gastroenteritis, were negative for the pathogen in question.

Nosocomial gastroenteritis of viral etiology also occurs--in this instance, the main criteria should rest on epidemiologic data indicating likelihood of cross-infection.

D. SKIN AND SUBCUTANEOUS INFECTIONS

1. Burn Infections - Colonization of burn surfaces with bacteria is nearly universal, and the simple isolation of pathogenic organisms is not sufficent, in itself, to allow the diagnosis of infection. Purulent drainage from the burn site and/or clinical evidence of bacteremia in a patient hospitalized for treatment of a burn should lead to a diagnosis of burn infection. Such infections are often caused by organisms carried by the patient on admission; nonetheless, such infections should be regarded as nosocomial if the clinical onset occurs after admission, as nearly all of them do. Supra-infection of burns should be regarded as a separate, new nosocomial infection.

2. Surgical Wound Infections - Any surgical wound which drains purulent material, with or without a positive culture, is considered to be the site of a nosocomial infection. The source of the organisms, whether endogenous or exogenous, is not considered.

3. Other Cutaneous Infections - Any purulent material in skin or subcutaneous tissue first developing after admission is regarded as indicating a nosocomial infection whether or not a culture is positive, negative, or has not been taken. This category includes nonsurgical wounds, as well as various forms of dermatitis and decubitus ulcers. In patients who are admitted with skin or subcutaneous infections, a change in pathogens cultured from the infected site is regarded as a nosocomial infection if continuing purulent drainage can be attributed to a new pathogen. Cellulitus caused by bacterial agents is usually not accompanied by purulent drainage; in such instances primary reliance must be placed on clinical judgement, which may be confirmed by cultures of tissue fluid aspirates.

E. OTHER SITES OF INFECTION

1. Any culture-documented bacteremia that develops in a hospitalized patient who was not admitted with evidence of bacteremia is regarded as a nosocomial infection, unless the organism has been judged to be a contaminant. Such nosocomial bacteremias may occur in the absence of recognized underlying infections, or originate from a site of nosocomial infection, or from manipulation of a site which was infected at the time of the patient's admission (i.e., catheters, drains, incision and drainage, etc.)

2. Intravenous Catheters and Needles - Purulent drainage from the site of an intravenous catheter or needle is regarded as a nosocomial infection, even if no cultures are obtained. Inflammation of such sites, without purulent material or strong clinical evidence of cellulitis is not regarded as an infection unless a positive culture is obtained from the catheter tip or from aspirates of tissue fluid.

3. Endometritis - Purulent cervical discharge accompanied by either a positive culture for pathogens or systemic manifestations of infection is regarded as nosocomial endometritis if the onset occurs after admission.

4. Many other possible sites of nosocomial infection must sometimes be considered. Application of the general principles outlined above, however, will generally make classification of these infections possible. It must be reemphasized that CLINICAL IMPRESSIONS/DIAGNOSIS (if available) always supercede laboratory or radiological data.

F. INTRA-ABDOMINAL INFECTIONS

1. Appendicitis, cholecystitis, and diverticulitis should not be coded as infections unless a secondary infectious complication is noted. Abscess formation, peritonitis, and cellulitis are examples of such complications. The infectious complications will generally be classified as community acquired.

2. If a wound infection develops following surgery for uncomplicated appendicitis, cholecystitis, or diverticulitis, the infection should be classified as nosocomial. Surgical wound infection following surgery involving any infectious complication of the above can be classified as nosocomial only if there is clear anatomical and/or temporal separation of the infectious processes.

DHEW, PHS, HSMHA, CDC

HOSPITAL ____________________

STATE ____________________

COUNTY ____________________

LINE LISTING OF

PATIENT'S LAST NAME, FIRST INITIAL	HOSPITAL CODE	PATIENT HOSPITAL NUMBER	ADM. DATE	DATE OF ONSET	AGE AND SEX	SERVICE	SITE INFECTED	Ward	PER / PATHOGE / ANTIBIOG
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6
	1 2 3 4 5 6 7 (A)	8 9 10 11 12	13 14 15	16 17 18	19 20	21 22 23 24	25 26	27 28	29 30 31 32 33 34 35 36 / 1 2 3 4 5 6

*See reverse side for code for indicating susceptibility to drugs.

NOSOCOMIAL INFECTIONS

MONTH, YEAR ____________

TINENT RESULTS FROM INITIAL CULTURES		Bacteremia	TYPE OF SURGERY AND DATE	Mortality	PRECEDING THERAPEUTIC FACTORS	COMMENTS
EN #1 / RAM*	CONCURRENT PATHOGEN #2 / ANTIBIOGRAM*					
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A
37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58	59	60 61 62 63 64	64	65 66 67 68 69 70 71 72 73 74	75 76 77 78 79 80
7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12					A

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
BUREAU OF EPIDEMIOLOGY
ATLANTA, GEORGIA 30333

The bacteriology laboratory runs a standard set of disks for gram-negat
the number or initials corresponding to the drugs to which the organis
MEDIATE, circle the number or initial. Indicate drugs NOT TESTED with
No numbers need to be entered for drugs to which the organism is sensitive

GRAM-NEGATIVES

1. Nitrofurans
2. Chloramphenicol
3. Streptomycin
4. Sulfonamides
5. Cephalosporins
6. Tetracyclines
7. Gentamicin
8. Nalidixic acid
9. Ampicillin
10. Colimycin
11. Carbenicillin
12. Kanamycin

*There is only one exception to this general rule: *Streptococcus fecalis* (Group D
gram-negative set of disks.

ive and a standard set of disks for gram-positive bacteria.* Enter
n is RESISTANT or INTERMEDIATE in susceptibility; if INTER-
the initials "NT" followed by the corresponding numbers or initials.

GRAM-POSITIVES

1. Penicillin
2. Lincomycin
3. Cephalosporins
4. Streptomycin
5. Erythromycin
6. Vancomycin
7. Sulfonamides
8. Chloramphenicol
9. Tetracyclines
10. Methicillin, etc.
11. Kanamycin
12. Neomycin

streptococci, "enterococci"), a gram-positive organism, is tested with the