

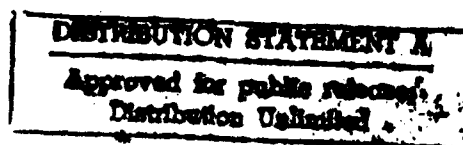
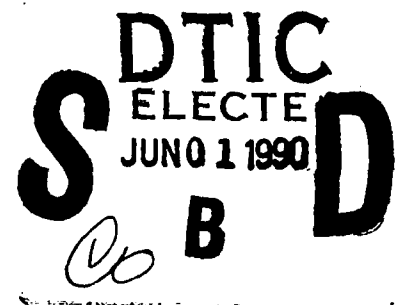
DTIC FILE COPY

2

AD-A222 171

UTILIZATION OF THE TRACER METHODOLOGY
TO ASSESS
THE CARE PROVIDED BY AN OUTPATIENT CLINIC
AT WALSON ARMY COMMUNITY HOSPITAL, FORT DIX, NEW JERSEY

A Graduate Research Project
Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the
Requirements for the Degree
of
Master of Health Administration
by
Captain Raymond P. Dalton, MSC
July 1985



90 05 30 057

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; Distribution unlimited		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
4. PERFORMING ORGANIZATION REPORT NUMBER(S) 14-89			7a. NAME OF MONITORING ORGANIZATION		
6a. NAME OF PERFORMING ORGANIZATION US Army-Baylor University Graduate Program in Health Care		6b. OFFICE SYMBOL (If applicable) Admin/HSMA-IHC	7b. ADDRESS (City, State, and ZIP Code)		
6c. ADDRESS (City, State, and ZIP Code) Ft. Sam Houston, TX 78234-6100			9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	10. SOURCE OF FUNDING NUMBERS		
8c. ADDRESS (City, State, and ZIP Code)			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
			WORK UNIT ACCESSION NO.		
11. TITLE (Include Security Classification) UTILIZATION OF THE TRACER METHODOLOGY TO ASSESS THE CARE PROVIDED BY AN OUTPATIENT CLINIC AT WALSON ARMY COMMUNITY HOSPITAL, FORT DIX, NEW JERSEY					
12. PERSONAL AUTHOR(S) CPT Raymond P. Dalton					
13a. TYPE OF REPORT Study		13b. TIME COVERED FROM Jul 84 TO Jul 85		14. DATE OF REPORT (Year, Month, Day) Jul 85	
15. PAGE COUNT 67					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP	Health Care, Outpatient Care Quality		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
This study was conducted to assess the care provided by an outpatient clinic of Walson Army Community Hospital using the Tracer Methodology. Tracers were selected from common ailments treated by the outpatient clinic. Minimum care criteria were established for those ailments selected as tracers. A sample of medical records with the identified ailments were evaluated against the minimal care criteria. Specific problems in treatment were identified. The author concluded that the tracer methodology was a viable system of assessing quality of care.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION		
22a. NAME OF RESPONSIBLE INDIVIDUAL Lawrence M. Leahy, MAJ, MS			22b. TELEPHONE (Include Area Code) (512) 221-6345/2324		22c. OFFICE SYMBOL HSMA-IHC

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	11
LIST OF FIGURES AND TABLES	111
Chapter	
I. INTRODUCTION	1
Research Statement	5
Objectives	5
Criteria	5
Assumptions	6
Limitations	7
Review of the Literature	7
Methodology	12
II. DISCUSSION	20
Selection of an Outpatient Clinic, Target Groups, and Tracer Illness.	20
Establishing Minimal Care Criteria.	25
Random Sample of Target Groups.	28
Comparison of Records to Minimal Care Criteria.	32
Male/Female 0-5 Years Old	32
Females 26 to 45 Years Old.	37
Male/Female 46 Years and Older.	40
Overall Evaluation of Care.	43
III. CONCLUSION	48
APPENDIX	
A. MINIMAL CARE CRITERIA FOR MIDDLE EAR INFECTION	51
B. MINIMAL CARE CRITERIA FOR IRON-DEFICIENCY ANEMIA	53
C. MINIMAL CARE CRITERIA FOR URINARY TRACT INFECTION.	56
D. MINIMAL CARE CRITERIA FOR CERVICAL CANCER.	59
E. MINIMAL CARE CRITERIA FOR ESSENTIAL HYPERTENSION	61
BIBLIOGRAPHY	64

Acknowledgements

I wish to acknowledge the following persons for their support and guidance during the completion of this project:

COL Irvin Jenkins, my preceptor, for his guidance and patience with me during the completion of this project;

Dr. John Mosby, Chief of the Family Practice Service and Dr. Richard Summersgill, Family Practice doctor, for taking an interest in this project. Without their help in the development of the minimal care criteria this project would have never been completed.

CPT Caroline LeBlanc, Head Nurse in the Family Practice Service, for her interest and help in this project. She provided me with a point of contact inside the Service and was a valuable source of information on the operations of the Service.

LIST OF FIGURES AND TABLES

Figures

	<u>Page</u>
1. "Family Practice Clinic Enrollment"	21
2. "Results of Random Sample"	30

Tables

I	"Tracer Conditions and Relevant Age-Sex Groups"	14
II	"Aspects of the Process of Care Highlighted by Accepted Tracers"	16
III	"Aspects of the Process of Care Highlighted by Tracers Selected"	26
IV	"Results of Minimal Care Criteria Comparison for the Male/Female 0-5 Years Old Target Group"	34
V	"Results of Minimal Care Criteria Comparison for the Female 26 to 45 Year Old Target Group"	38
VI	"Results of, Minimal Care Criteria Comparison for the Male/Female 46 Years of Age and Older Target Group"	41
VII	"Results of Comparison of All Tracer Illnesses To the Minimal Care Criteria"	44



Accession for	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

INTRODUCTION

Our health care system is going through a period of dramatic reorganization. The old structures and methods of health care delivery are constantly being questioned and confronted by proposals to overhaul the system in an effort to reduce the cost of providing health care.¹ As a result, there has been an increased emphasis placed on ambulatory care because of its less costly setting. In conjunction with the demand for reorganization is a demand for maintaining the quality of care provided under the new system.

Most quality of care assessment techniques to date have been developed to evaluate the traditionally predominant inpatient settings of our health care system.² However, with the increased usage of outpatient services generated by the demand for the reduction in the cost of health care, many regulatory and accrediting bodies have become interested in ambulatory quality of care. Examples of this can be seen in the actions of the following organizations: The Joint Commission on Accreditation for Hospitals has recently published separate standards for ambulatory care centers; The American Society of Internal Medicine has proposed the use of a formal review of physicians' performance in ambulatory care as the basis for relicensure and renewal of membership in professional associations; the Accreditation Association for Ambulatory Health Care requires all facilities seeking accreditation to have an internal Quality Assurance Program; and the Federal Government, through the Federal Bureau of Community Health Services, which funds ambulatory health services to disadvantaged populations, requires clinics receiving federal grants to have an internal Quality Assurance Program.³

This recent emphasis on Ambulatory Quality Assurance has led to the development of Quality Assurance methods specifically designed for outpatient settings. One of the methods for evaluating ambulatory care which has evolved from this new area of Quality Assurance is the Tracer Methodology. This method uses specific health problems as "tracers" to analyze a health delivery system. In light of the increased concern over Ambulatory Quality Assurance, it is the intent of this research project to use the Tracer Methodology in assessing the care provided by a military outpatient clinic.

The concept of the Tracer Methodology was borrowed from the formal sciences. In physiology, scientists used radioactive tracers to study how a body organ handles a critical substance. These tracers are discrete and identifiable, so as they flow through the organ the scientist can determine how particular parts work, not only in isolation but in relation to the entire organ's system. This same concept is used in assessing the processes (screening, evaluation, management, follow-up) of the provision of health care. Tracer illnesses are selected which are discrete and easily identified. They are followed through the health care system with each of them indicating how particular parts of the process work. The basic assumption of this method is that the quality of care provided to an individual with a tracer ailment will be an indicator of the general quality of care of the system delivering that care.⁴

The use of a specific health problem to evaluate quality of care is not new. What makes this method different from previous methods is its use of a

set of tracer ailments. These sets enable both the quality of care provided to a specific group of individuals and the quality of selected processes of the health care delivery system to be evaluated.

As an example, management of an outpatient clinic decides to evaluate the health services provided by the clinic to a segment of the population it serves: male and female children under 5 years old. To do this, they would select a set of tracers consisting of 2 or more tracers. At least 2 tracers are selected so that services provided to the group can be viewed from more than one perspective.

Tracers selected will highlight the care given to this group. They should have a high enough incident rate to permit adequate collection of data and should be discrete and easily diagnosed. For this example, two tracers that could be selected are middle ear infections and iron deficiency anemia. After the tracer ailments have been selected, minimal care plans will be formulated. Minimal care plans provide the criteria by which the quality of care in these process areas will be evaluated and also indicate which health service process is highlighted by the tracer selected. In this example, middle ear infection will highlight evaluation, management, and follow-up, while iron deficiency anemia will highlight screening, evaluation, management and follow-up.⁵

A sample of records from this target group would be taken and the prevalence rate of the tracer ailments would be determined for the sample. This rate would then be compared to an expected population prevalence rate which was determined from a review of the literature. A lower sample prevalence rate may indicate there is a problem with the clinic's screening procedures.

Next, a sample of the records of individuals identified as having the tracer condition from the target group are compared to the minimal care plan criteria. Information gathered during this procedure will indicate the quality of care provided in the different process activities targeted by the tracer ailments.

The preceding has been a simplified example to show how the tracer method works, and the results would only be applicable to the targeted population. In order to make a reliable evaluation of the overall quality of the clinic, more than one target group, each with a set of tracers, should be selected for a study. Analyses of target groups, by carefully selected sets of tracers and their minimal care criteria, can locate specific deficiencies in a health care program. The use of several sets of tracers permits the consideration of a range of health services activities instead of focusing on an isolated patient or health professional that traditional methods use. The use of tracers allows for specificity in finding when, how, and by whom the condition was first identified; how and by whom it was or was not treated; and what the results were.

The Tracer Methodology can be applied to a variety of organizations providing health services, with the ambulatory or outpatient setting being its primary focus. In all settings, whether it is a neighborhood health clinic, a health maintenance organization, or an individual physician, this method will indicate: how well the organization serves the people in the community, the appropriateness of screening services provided, and whether the care provided meets minimal medical standards.

Research Statement

Utilizing the Tracer Methodology, assess the care provided by an outpatient clinic of Walson Army Community Hospital.

Objectives

1. Determine the demographic characteristics (age, sex) of the population served by an outpatient clinic and select target groups to be studied.
2. Select tracers, from common ailments treated by the outpatient clinic, which will target the groups identified in Objective Number One and the process activities of the health service delivery of the clinic.
3. Establish minimal care criteria for the screening, evaluation, management and follow-up of the ailments selected as tracers.
4. Through a literature review, establish expected prevalence rates of the ailments selected as tracers in the target groups.
5. Sample records to determine prevalence of tracers in individuals from target groups treated at the outpatient clinic.
6. Take a random sample of the records of individuals identified as having a tracer ailment and compare it to the minimal care criteria and evaluate those findings.

Criteria

1. A random sample of the records of individuals in the target groups treated at the outpatient clinic will be taken to determine the prevalence

rate of the selected tracers in the individuals of target groups treated at the clinic. Prevalence rates will be determined with a 95 percent confidence interval and compared to the expected population prevalence rate.

2. A random sample of the records of individuals identified as having a tracer ailment will be taken, and the care documented in their records will be compared to the minimal care criteria established for the particular ailment. If it is found that 20 percent of the records surveyed do not comply with the criteria established for a process element, then this will identify that element as a problem area. The intent of this study is not to define quality of care but to assess the care provided in each of the process elements (screening, evaluation, management and follow-up) of the health care delivery system and to identify problem areas in the system.

Assumptions

1. The demographic information received is representative of the population served by the Walson Army Community Hospital outpatient clinic chosen for this study.

2. The random sample of records taken to be compared to the minimal care criteria are representative of the care received by all individuals in the target groups with the tracer element.

3. The records accurately indicate the care received by a person treated at the outpatient clinic.

4. The quality of care provided to individuals with a tracer ailment will be an indicator of the quality of care of the system delivering that care.

Limitations

1. The results of this study will only indicate the quality of care at the Walson Army Community Hospital outpatient clinic chosen for this project and cannot be used to indicate quality of care for inpatient services at this hospital or other outpatient clinics.

2. Selection of tracer ailments will be limited to illnesses with minimal care plans already established in the literature.

Review of the Literature

A review of the literature showed that until recently the majority of health care evaluation methods revolved around the inpatient setting of health care. However, in the last several years numerous articles have been written discussing the need for Quality Assurance methods designed specifically for the outpatient setting and proposed methods for evaluating ambulatory care.

The need for the development of ambulatory health care assessment techniques was pervasive throughout the literature. Dr. Hill, in his article, states that mandated review of ambulatory care will soon become a reality.⁶ David Kessner, in his article on Quality Assurance, says that there is no longer a question on whether or not there will be mandated Quality Assurance, but only a question of who will be the first to intervene.⁷ The need for quality assurance in ambulatory care is not being driven solely by the regulatory and accrediting agencies mentioned earlier. Several

articles reviewed indicated that with the increased use of outpatient services, third party payers have become increasingly interested in Quality Assurance as a means of cost control.^{8,9,10}

In reviewing articles which propose a method of assessing the quality of care, it becomes obvious that all of these methods are in some way based on the research and work of Avedis Donabedian. Donabedian in the 1950's developed a framework for the assessment of health services which he divided into three categories: structure, process and outcome.¹¹ Utilizing Donabedian's categories, methods were developed to assess a health system evaluating one or all of the categories.

The structure category refers to the physical facilities of the health service organization: is its location accessible to the population it serves; does it have the necessary equipment to provide adequate diagnostic and therapeutic care; etc. This category also refers to the innate characteristics of the health care providers: type of provider specialty; are they board certified; what are the continuing education requirements; etc.

Process and outcome categories are used to evaluate the adequacy of the actual care rendered by the health care provider. Review of the process of care can be accomplished either through an explicit or implicit review of records. An explicit review is one in which the care provided is compared against explicitly defined, generally accepted criteria. An implicit review of the process of care is one in which there is a subjective opinion of the care rendered, by peers of the provider. The outcome category is a

review of the patient's health status after the completion of therapy. Through the utilization of this framework, using one or a combination of the categories of review, most methods of Quality Assurance have been developed.

The Tracer Methodology is no exception, and in fact attempts to evaluate ambulatory care utilizing all three of Donabedian's categories. This is accomplished through the unique use of tracer illnesses which are tracked through the entire health delivery system: screening, evaluation, management and follow-up.

By following a tracer illness through the screening portion of a health system, this method makes an attempt to identify problems in the structure and process categories. If it is found that when evaluating the screening for a tracer illness the prevalence of the illness is less than what would be expected from the served population and the process of screening was acceptable, this can indicate a problem with access to the health system, a structural problem. The process of care is evaluated when the tracer illness is followed through the evaluation and management areas of the health system and compared to a set of minimal care criteria. The outcome category is reviewed when the tracer illness is finally tracked through the follow-up segment of the health system.

The use of a specific health problem, compared to a set of criteria, to evaluate quality of care is not new. Studies of this type have been conducted since the early 1960's when Huntley, Steinhouser, and White¹² used hypertension to evaluate care received by patients in an outpatient

clinic. Similar methods of study were developed in the 1970's, the better known of these being the Comprehensive Quality Assurance System at Kaiser-Permanente and the Quality Assurance Programs at the Harvard Community Health Plan.¹³ These studies differ from the tracer method in that they are used to evaluate discrete aspects of care, looking for specific problems.

The trajectory method developed by Donabedian, which is an extension of Williamson's Health Accounting method,¹⁴ is the most similar assessment technique to the tracer method. This method tracks the care provided to patients for a specified diagnosis through four care factors: diagnostic process, diagnostic outcome, therapeutic process and therapeutic outcome. This makes it very similar to the tracer method of tracking an illness through the processes of care. They differ in that the tracer method is a more involved assessment by including screening and follow-up in the evaluation and by targeting groups of people, not individuals, to be evaluated by sets of illnesses. The trajectory method takes a look at a very specific diagnostic group and is concerned only with evaluating how the specific group was managed. The results of a study using the trajectory method and the other methods using a single illness to evaluate medical care, can only identify problems relating to the care of the specific illness evaluated. The results of these studies cannot be used to make evaluations of the entire system providing the care. Whereas, the Tracer Methodology, because it uses sets of tracer illnesses to evaluate the various activities of a delivery system from multiple perspectives (more than one demographic group and more than one illness) can extrapolate from the results of the analyses of the tracer sets to the delivery system as a whole.

Many of the articles reviewed mentioned the Tracer Methodology and the benefits of using the method, such as being able to evaluate an entire system,¹⁵ being able to use paraprofessionals in the record evaluation because of the type of criteria used,¹⁶ and being able to measure both process and outcome.¹⁷ Despite all the benefits cited in the literature, no article could be found which indicated that the Tracer Methodology had ever been utilized to evaluate an ambulatory health service.

One article was found describing a study of the feasibility of using the tracer method in a pediatric clinic.¹⁸ However, the study did not use the entire tracer method and in actuality only studied the feasibility of using one of the tracer illnesses, anemia, cited in the original development of the method. This study compared the use of a tracer illness to evaluate care, with an implicit review of the same care. The study found that the results were comparable whether using the minimally trained nonprofessional abstractors of the tracer method or the implicit review of specialists. Novick states in his conclusion that, "The experience reported here lends support to the potential usefulness of the Tracer Methodology within the ambulatory setting. The information gathered pointed out serious problems in the process of medical care and lent itself to feedback into the system of health services delivery."¹⁹

Kessner, in the development of the tracer method, was looking for a method which would be easily administered, would allow examination of the entire matrix of a health system, and would lend itself to feedback into

the health system being evaluated. He states that this method provides a workable conceptual framework and data base for assessing the quality of health services. The intent of this research project is to utilize the Tracer Methodology in its entirety to assess the care provided by an outpatient clinic and to provide feedback, from the results of this study, to the system being evaluated. The methodology described below will be used in the application of the tracer method in evaluating an outpatient clinic at Walson Army Community Hospital.

Methodology

1. Select an outpatient clinic for use in this project and determine the demographic characteristics of the population served by this clinic through outpatient enrollment information.

2. Select three target groups from this population based on demographic (sex, age) groups in the population served. Examples of possible target groups which may be selected for study are: male/female patients, 5 years old and younger; female patients, 25 to 64 years old; and male patients, 65 years and older.

3. After the three target groups have been identified, two tracer ailments relevant to each target group will be selected to evaluate the care rendered to each group. The selection of two tracer illnesses for each group allows for the services provided to be viewed from two perspectives to avoid the risk of isolating anomalous conditions. Ear infection and iron deficiency anemia are examples of what might be used

as tracer ailments to investigate the care given to the male/female patients, 5 years old and younger. Table I indicates other possible tracer illnesses and the groups that they are relevant to.

4. Tracers selected for use will be based on the following criteria:

- a. A tracer will have a definite functional impact. Health problems that are unlikely to be treated, or those which cause negligible functional impairment, will not be chosen.
- b. A tracer will be well defined and easy to diagnose.
- c. Each tracer will have a prevalence rate high enough to permit adequate collection of data [$N(1-P) > 10$] from a limited population sample. This formula is a general guideline which is used to help select a sample size which is large enough to be statistically representative of the population.
- d. Conditions for which health services do not alter progress of the disease will not be chosen.
- e. The techniques of medical management of each condition will be well-defined for at least one of the processes: screening, evaluation, management and follow-up.
- f. Ailments which have been identified as candidates for use as tracers are: middle ear infection, vision disorders, iron-deficiency anemia, hypertension, urinary

TRACER CONDITIONS AND RELEVANT AGE-SEX GROUPS

<u>Age Group (Years)</u>	<u>Middle Ear Infection</u>	<u>Vision Defects</u>	<u>Iron-Deficiency Anemia</u>	<u>Hypertension</u>	<u>Urinary Tract Infection</u>	<u>Cervical Cancer</u>
Female:						
Under 5	+		+			
5 - 24	+	+				
25 - 64			+	+	+	+
65 and over			+	+	+	14
Male:						
Under 5	+		+			
5 - 24	+	+				
25 - 64			+	+		
65 and over			+	+	+	

TABLE I - (Taken from A Strategy for Evaluating Health Services, page 18)

tract infections and cervical cancer. All of these illnesses have been found to meet the criteria mentioned above. Table II indicates which processes of the health system these tracer conditions highlight.

5. After the tracer ailments have been selected, minimal care criteria for the screening, evaluating, management and follow-up of the ailments will be established. These criteria will be taken from minimal care plans found in the literature and will be reviewed by the physicians in the outpatient clinic chosen for this study, with final approval by the Deputy Commander for Clinical Services.

6. A random sample of the records of individuals in each target group treated at the outpatient clinic will be taken to determine the prevalence rate of selected tracers in the individuals of the target groups treated at the clinic. Prevalence rates will be determined with a ninety-five percent confidence interval and compared to the expected population prevalence rate.

7. A random sample of the records of individuals in each target group identified in step six as having a tracer ailment (sample size will be determined based on the size of the population) will be taken and compared to the minimal care plan criteria established for the tracer ailment. Each record should meet one hundred percent of the minimal care criteria since the criteria will be established by the physicians rendering the care and these criteria represent the care they feel is necessary to meet minimal medical standards. As the records are compared to the criteria, information will

ASPECTS OF THE PROCESS OF CARE HIGHLIGHTED BY ACCEPTED TRACERS

Process Activities	Tracer Conditions					Cervical Cancer
	Middle Ear Infection	Vision Defects	Iron-Deficiency Anemia	Hypertension	Urinary Tract Infection	
Screening		+	+	+		+
Evaluation	+		+	+	+	+
Management	+	+	+	+	+	+
Follow-up	+		+	+	+	+
						16

TABLE II - (Adapted from a table in A Strategy for Evaluating Health Services, page 19)

be gathered on how many records meet and do not meet the minimum care criteria by process element for each ailment. Also, a cumulative total of how many records overall, for all six tracers, meet or do not meet the minimum care criteria for each process element will be kept. A problem area will be identified when 20 percent of the records overall do not meet the criteria established for a process area. The 20 percent criteria being used to identify a problem area was established through a heuristic approach. A literature review and questioning of regulating agencies (JCAH, New Jersey Hospital Association and New Jersey Professional Review Organization) revealed that criteria for record audits have never been established for outpatient settings. An offshoot of this study will be the gathering of data on the validity of using 20 percent for the standard in identifying a problem area.

FOOTNOTES

1. A Strategy for Evaluating Health Services. David M. Kessner, Project Director (Washington, D.C.: National Academy of Sciences, 1973), p. ix.
2. Ibid. p. 12.
3. R. Heather Palmer and H. Richard Nesson, "A Review of Methods for Ambulatory Medical Care Evaluations." Medical Care, 20 (August, 1982), p. 759.
4. A Strategy for Evaluating Health Services. p. 14.
5. Ibid. p. 19.
6. Richard K. Hill, "Quality Assurance in Ambulatory Care." Primary Care, 7 (December, 1980), p. 713.
7. David M. Kessner, Carolyn E. Kalk, and James Singer, "Assessing Health Quality - The Case for Tracers." The New England Journal of Medicine, 288 (25 January, 1973), p. 189.
8. Hill, p. 713.
9. Mildred A. Morehead, "Evaluation of Ambulatory Care Delivery Systems." Topics in Health Records Management, 1 (March, 1981), p. 19.
10. Alvin I. Mushlin and Francis A. Appel, "Testing an Outcome-Based Quality Assurance Strategy in Primary Care." Medical Care, 18 (May, 1980), p. 1.
11. Morehead, p. 20
12. Kessner, p. 189.
13. Palmer, p. 762.
14. Howard S. Zuckerman, Jo Anne Huntley, and Keith J. Waterbrook, "Effectiveness of Patient Care in a Primary Care Clinic." Medical Care, 18 (October, 1980), p. 1002.
15. Zuckerman, p. 1002.
16. Lloyd F. Novick, Karen Dickinson, Russell Asnes, and Regina Lowenstein, "Assessment of Ambulatory Care: Application of the Tracer Methodology." Medical Care, 14 (January, 1976), p. 11.

17. Nancy O. Graham, Quality Assurance in Hospitals: Strategies for Assessment and Implementation, (Rockville, Maryland: Aspen Systems Corporation, 1982), p. 241.
18. Novick, p. 1.
19. Novick, p. 12.

DISCUSSION

Selection of an Outpatient Clinic, Target Groups, and Tracer Illness

The first step of this project involved the selection of an appropriate clinic in which to conduct this study. The reason for the design of the tracer methodology was to create a method of evaluating the care provided to the entire range (all ages and both sexes) of people being cared for by a health system. In addition, this method was developed to evaluate ambulatory services which served a known population. A review of each of the outpatient clinics at Walson Army Community Hospital revealed that only the Family Practice Clinic was ideally suited to the application of the tracer method. The Family Practice Clinic is the only clinic which treats both male and female patients from pediatrics to geriatrics. Also, because of the enrollment requirements for membership in this clinic, the Family Practice Clinic is the only clinic which serves a known population. Because the appropriate selection of tracer illnesses is based on demographic groups, it is important to know the population served by a clinic in order to utilize the Tracer Methodology.

After the Family Practice Clinic was chosen as the study site, the enrollment files were reviewed to determine the demographics of the population served by this clinic. Figure I shows the results of this review. The demographic information shown should be accurate because the Family Practice Clinic had just recently updated their enrollment files.

The next step of the project was to select the three demographic groups to be used in this study. By comparing the demographic information

FAMILY PRACTICE CLINIC ENROLLMENT

	<u>Male</u>	<u>Female</u>
0-5 years	210	217
6-16 years	328	344
17-25 years	163	176
26-45 years	545	531
46-65 years	178	162
66+ years	<u>32</u>	<u>18</u>
Subtotals	1456	1448

Total Enrolled in Clinic: 2904

FIGURE I

in Figure I to the possible tracer illness and their relevancy to the different age groups shown in Table I and keeping in mind that this method was developed to evaluate care provided to the entire range of people served by the clinic, the following target groups were selected.

Male and female children, zero to five years old, was the first group selected. This group was identified for inclusion in the study because it represents approximately 15 percent of the population served and when compared to the possible tracer conditions, it shows that there are two conditions which can be used in the evaluation of this group. In addition, evaluation of this group will provide information concerning the treatment of the youngest age group served by this clinic.

The second group chosen was females between the ages of 26 and 45 years old. Similar reasons were used in the selection of this group. The group represents almost 20 percent of the population served; and when compared to Table I, it shows that there are several tracer conditions to choose from for the evaluation of care rendered to the group. The evaluation of this group will also allow the collection of data on the care rendered to the mid-range of the age distribution of this population. Males aged 26 through 45 were considered as a target group; they were not selected primarily because a review of the literature indicated that the prevalence of the tracer conditions identified for use in this study would not be high enough to permit proper collection of data. A second reason this group was not chosen was because the majority of people who fell into this

category were active duty military who participate in a mandated physical fitness and weight control program. It was felt this group would be healthier than a similar civilian group and would provide skewed data as a result.

The last group chosen was males and females 46 years of age or older. This group was chosen to provide data on the provision of care to the oldest segment of this clinic's population. The last age groups of the family practice enrollment were combined to form one target group large enough to adequately collect data from. Again, a comparison of Table I showed that there were several tracer conditions available for use in the evaluation of this target group.

These three groups when combined represent 46 percent of the population served by the Family Practice Clinic. By evaluating the care provided to these three groups, nearly half of the population served will be evaluated. This is one reason why, when using the tracer methodology, evaluations of entire health systems can be made from the data collected from the analysis of the tracer sets.

Selection of tracer ailments to evaluate each of the selected target groups was the next step in the formulation of this study. Tracers were selected by using Table I, the relevancy of tracer ailments to age groups; Table II, the processes of care highlighted by a tracer ailment and a literature review of the prevalence of each of these tracers. By using the data from each of these tables, tracer ailments were selected insuring that each target group was covered by two relevant tracer ailments and

that each process element of care was also evaluated by at least two tracer conditions. Based on the above information, the following tracers were selected for each of the target groups.

For the male/female zero to five year old group, iron-deficiency anemia and middle ear infection were chosen as the tracers. A literature review showed that the expected prevalence for iron-deficiency anemia for this age group is 4.6 percent¹, and showed a 20 percent prevalence for middle ear infection.² A review of Table II shows that iron-deficiency anemia highlights the health care processes of screening, evaluation, management, and follow-up, while middle ear infection highlights evaluation, management, and follow-up.

For the group females age 26 to 45 years old, urinary tract infection and cervical cancer were selected as the tracers. The expected prevalence found in the literature for urinary tract infections for this group was 10 percent.³ The expected prevalence for cervical cancer was found to be 1.4 percent.⁴ The evaluation of the target group by the ailment, urinary tract infection, will highlight the health care processes of evaluation, management and follow-up, and cervical cancer will highlight screening, evaluation, management and follow-up.

Tracers selected for the last target group, male/female 46 years of age or older, are urinary tract infection and essential hypertension. The expected prevalence for urinary tract infection for this group was found to be 10 percent for women age 45 and older until age 65 when it would increase to 20 percent, the same rate that is expected for men at age 65.⁵

The expected rate for men age 46 to 65 is 1.6 percent.⁶ The prevalence rate for hypertension in males and females of this age group was found to be 16.4 percent.⁷ Urinary tract infection, as in the evaluation of the female age 26 to 45, will highlight the health care processes of evaluation, management and follow-up. Evaluation of this group using essential hypertension will provide information on the care processes of screening, evaluation, management, and follow-up. Table III, which depicts the tracer ailments selected for use in this study and the processes of care they highlight, graphically illustrates how the use of a set of tracers allows for the thorough evaluation of the entire health system. As the table indicates, only one process of care is being evaluated from less than five different perspectives.

Establishing Minimal Care Criteria

One of the most important steps after the identification of target groups and tracer ailments is the establishment of minimal care criteria for each of the tracer ailments. Without formal criteria, objective evaluations and analysis cannot be made. One of the main criticisms of methods of quality assessment which use set criteria to evaluate care is that the criteria are too rigid, leaving no room for clinical judgement in differences in severity of cases.⁸ On the other hand, many complain an implicit review of care is unstandardized, often arbitrary and usually has no measurable feedback in the delivery system.⁹

The development of criteria under the guidelines of the Tracer Methodology makes an attempt to compromise between these two problems in

PROCESSES OF CARE	TRACERS SELECTED FOR USE IN STUDY				
	MIDDLE EAR INFECTION	URINARY TRACT INFECTION	ESSENTIAL HYPERTENSION	IRON-DEFICIENCY ANEMIA	CERVICAL CANCER
SCREENING			+	+	+
EVALUATION	+	++	++	+	++
MANAGEMENT	++	+++	++	++	+++
FOLLOW-UP	+	+	+	+	+

TABLE III - Aspects of the Process of Care Highlighted by Tracers Selected

reviewing the process of care. Kessner, in the development of the tracer method, recognized this problem and set three basic guidelines that when followed should eliminate this problem. These guidelines are: (1) the criteria should outline minimal, or base-line care, with the physicians who are to be evaluated establishing the criteria; (2) the criteria should be pragmatic, taking into account variances in medical practices and equipment available for diagnostic evaluations; and (3) the criteria should be periodically updated and revised. By using these three guidelines and by keeping in mind that the criteria developed are a plan broadly applicable to populations of patients and not a management formula for individual patients, room will be left for an implicit judgement by the reviewer.¹⁰

The minimal care criteria developed by Kessner in the formulation of the tracer methodology were used as the basis for the development of criteria for use in this study. These criteria already met most of the guidelines for development of criteria lacking only updating, revising and agreement by the physicians being evaluated in this study. The participation of the physicians in the updating and agreement of the criteria to be used turned out to be one of the hardest parts of the study. The physicians first showed reluctance to participate in this study even though it was presented to them as a means of providing feedback on how well they were providing care. It was stressed they were the ones who would decide what the base-line care should be, and that the evaluation would provide feedback as to how well they were meeting what they themselves established as minimally acceptable medical care. After several weeks of prodding and further explanation, several doctors took an active role in the updating of the

criteria and the others nodded agreement. The criteria enclosed in Appendices A through E are the result of the update by the Family Practice Clinic physicians and are the criteria used in the evaluation of the care rendered to the selected tracer ailments.

Random Sample of Target Groups

After the criteria had been developed, the next step in the study was to take a random sample of the records of each target group to identify the tracer illness being used to evaluate the care rendered. The random sample method of identifying tracer ailments is used for two reasons, the first being that the point prevalence of the tracer illness in the target population will be determined through this random sample. The second reason for using a random sample is that other methods of identifying cases can influence the findings of the evaluations. For example, if the doctors were asked to keep a record over a period of time of the patients they had treated for a specific condition, then they may be more apt to pay closer attention to these illnesses, in essence the Hawthorne effect. If drug profiles are used from the pharmacy to identify cases, such as identifying patients on iron compounds, which indicates cases of iron-deficiency anemia, then the evaluation of these cases alone will miss the cases of iron-deficiency anemia being treated by diet without drug intervention.

A systematic random sample of each of the targeted groups was used as the sampling technique. The sampling of the respective target populations was drawn from the enrollment files of the Family Practice Clinic. For the target population of male/female children, age zero to five years, every

fourth child falling into this category was selected to be sampled. The same sampling method was used for the female group aged 26 to 45 years; every fourth person falling into this category was selected for sampling. In the last group, male/females 46 years of age and older, every third person falling into this category was selected for sampling. Every third person was selected in this group because of its smaller size. Because the enrollment of the Family Practice Clinic is evenly divided between the doctors this method of sampling also ensured that an equal number of patients from each doctor was selected for review.

The results of the audits for each tracer condition are depicted in Figure II. The 95 percent confidence interval for the sampled point prevalence rates was calculated using the formula $p \pm z_{(1-\alpha/2)} \sqrt{p(1-p)/n}$. Where p is the calculated prevalence of the sample taken, n is the sample size used in the calculation of the sample prevalence, and $z_{(1-\alpha/2)}$ is the reliability coefficient, which is equal to 1.96 when using a 95 percent confidence interval. This method of calculating a confidence interval for a prevalence rate can only be used when np (sample size times prevalence) and $n(1-p)$ (sample size times one minus the prevalence) are both greater than five. When this criteria is met, it can be assumed that the sampling distribution of p is close to the normal distribution and the formula above can be used.

As can be seen in Figure II, all of the sample prevalence rates are slightly higher than the expected prevalence rates, with the exception of cervical cancer and, in the older age group, urinary tract infection. Because

	IRON-DEFICIENCY ANEMIA	MIDDLE EAR INFECTION	URINARY TRACT INFECTION FEMALE 26-45	CERVICAL CANCER	ESSENTIAL HYPERTENSION	URINARY TRACT INFECTION MALE/FEMALE 46+
NUMBER OF RECORDS I.D. FOR SAMPLING	108	108	133	133	129	129
NO. OF RECORDS NOT FOUND	22	22	44	44	21	21
NO. OF INCOMPLETE RECORDS	8	8	4	4	6	6
NO. OF RECORDS AUDITED	78	78	85	85	102	102
NO. OF CASES DIAGNOSED IN RECORDS	4	35	14	1	25	5
PREVALENCE RATE OF SAMPLE	5.1%	45%	16.4%	1.2%	24.5%	4.9%
PREVALENCE RATE WITH 95% CONFIDENCE INTERVAL	*	45% ± 11%	16.4% ± 7.8%	*	24.5% ± 9.7%	4.9% ± 4.2%
EXPECTED PREVALENCE RATE	4.6%	20%	10%	1.4%	16.4%	10% Female; 1.6% Male

FIGURE 2 - RESULTS OF RANDOM SAMPLE

*95 percent confidence interval cannot be determined because the criteria of np 5 cannot be met.

of the low prevalence rate of cervical cancer, the difference seen in the sample prevalence rates and the expected prevalence rate is not considered practically significant and, therefore, does not indicate a problem in the structural evaluation of the clinic, i.e., access to the facility. The analysis of how many records met the screening criteria for this tracer, the next step of this method, will be an indicator of how well the process of screening for this tracer illness is carried out.

At first glance the prevalence rate found for urinary tract infection appears to be lower than was expected; however, it should be noted that the sample prevalence rate is a combination of male and female cases. Of the records audited, 58 were women and 45 were men; based on this and the expected prevalence rates, one should expect to find 5.8 cases of urinary tract infection from the women's group and one case from the male group for a total of 6.8 cases. This is only 1.8 more cases than was found and considering the low prevalence rate of this tracer illness in this age group, the finding was also considered not practically significant.

The prevalence rates determined from the random sample at the target groups do not indicate a problem in Donabedian's structure category of evaluation. However, a finding from this audit does indicate that there is a problem with the administration of records storage, a structural category problem. Thirty-three percent of the records in the female 26 to 45 year old category, 20 percent of the children's records, and 16 percent of the 46 year old and older category could not be found. A record was classified as not found if it was not in the outpatient records room and there was no record of it being checked out to a clinic or individual.

Because of the very recent updating of the Family Practice Clinic enrollment, it is not thought that these records belonged to people who had moved from the area and had not yet been dropped from the enrollment files. More likely, these records are being kept by the individuals not wanting to turn in their records to the records room. Records not filed in the records room could present a problem in the quality of care in that the results of diagnostic tests, consultation results and other pertinent medical information may not become filed in the medical record. As a result, when a patient does bring their record in when they see a physician, he will not have all the information necessary to make a proper evaluation, or at the very least it will cause a duplication in diagnostic testing and consultations.

Comparison of Records to Minimal Care Criteria

The last step of this study involved the comparison of the tracer cases found in the random sample of the previous step to the minimal care criteria for each condition. The methodology states that a sample of the cases found would be compared to the criteria, but due to the lower number of cases found all tracer illnesses identified were compared to their respective minimal care criteria. The results of the comparison are described below.

Male/Female 0-5 Years Old

The tracers selected for the evaluation of this target group were middle ear infection and iron-deficiency anemia. It was understood that due to the low expected prevalency rate of iron-deficiency anemia not many cases of this tracer would be found. However, the primary reason for the

use of this tracer was to evaluate the process of screening in this clinic. All 78 records sampled in this group were compared to the screening criteria for iron-deficiency anemia. Because of this and the fact that the second tracer in this set had a high expected prevalency rate, it was felt this tracer set would provide adequate data for the analysis of the care provided to this target group. Table IV shows the results of the comparison of the identified cases against the established minimal care criteria, Appendices A and B. This table shows the number of records which met and did not meet 100 percent of the criteria by process element.

In evaluating the cases of middle ear infection, two of the cases identified in the random sample of records were not compared to the minimal care criteria. These two records indicated follow-up visits for middle ear infection but the initial evaluation and management information were not in the record; because of this they could not be evaluated against the criteria. This may be an example of the result of records not being maintained in the records room. As an example, the initial treatment of these cases may have occurred in the Emergency Room. If the records were not maintained in the records room Emergency Room treatment information could not be filed in the record when it was sent to the records storage room, the end result being an incomplete record.

Three cases did not meet the criteria for the health process of evaluation because the records did not indicate presenting symptoms and their duration. All 11 cases which did not meet the criteria for management of this condition did so, not because of inappropriate prescription of

	<u>MIDDLE EAR INFECTION</u>		<u>IRON-DEFICIENCY ANEMIA</u>		<u>TOTAL</u>	
	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>
SCREENING	N/A	N/A	73	5	73	5
EVALUATION	30	3	2	2	32	5
MANAGEMENT	22	11	3	1	25	12
FOLLOW-UP	29	4	3	1	32	5
						34

TABLE IV - Results of Minimal Care Criteria Comparison for the Male/Female 0-5 Years Old Target Group
(Number of Records Meeting and Not Meeting 100 Percent of the Criteria By Process Element)

drugs, but because these records did not indicate the duration of the drug treatment. The four records not meeting the follow-up criteria did so because the records did not show any directions for follow-up and a follow-up exam was not noted in the records. Because the physicians cannot make an individual come in for a follow-up exam, the criteria for a follow-up exam were considered to be met if the record indicated instructions were given for a follow-up exam. Information of interest to the physicians of this clinic which came out of the evaluation of this process was that of the 29 patients instructed to schedule a follow-up appointment, 23 actually came in for a follow-up exam.

In the evaluation of the processes of care by the iron-deficiency anemia tracer, it should be noted that of the 78 records compared to the screening criteria, there were no records identified that did not meet the screening time and frequency criteria. All infants 6 to 12 months of age were screened and all individuals identified as being in a high risk group were being screened at least once a year. An individual was considered to be in a high risk group if there was a prior history of anemia, was in a low socio-economic group, or was a member of the Women and Infant Children (WIC) Program. The pay grade of E-5 and below was used as an indicator of lower socio-economic group, because it is from this group that most of the WIC members are identified. A possible explanation, revealed through the audit of these records, for the 100 percent compliance with the time and frequency screening criteria is that the doctors in this clinic appear to regularly order a hemoglobin and hematocrit during the annual physical exam for all children in this age group.

The five records which did not meet the criteria for screening are five cases in which abnormal lab results, hemoglobins less than 11 Hgb (100m), were found in the record but no mention of an evaluation of this condition could be found in the record. A positive note to this finding is that, although there is no mention of the abnormal result in the record, in all but one of these cases another hemoglobin and hematocrit, which was normal, was found in the record ranging from two weeks to two months after the initial abnormal finding. The lab results of the one case with no repeat hemoglobin were dated just one month prior to the audit of the records.

The two cases that did not meet the criteria for evaluation did so because the cardiac and abdominal description and the diet and milk intake history were not recorded in the record. The one case that did not meet the management criteria failed to indicate in the records what management actions were being taken in this case. The one case which did not meet the follow-up criteria did not indicate that a repeat hemoglobin or hematocrit had been taken.

In reviewing the care provided to this group, through the evaluation by a set of tracer conditions, it appears that they are receiving more than adequate care. There is only one health care process, management, in which 80 percent of the records audited did not meet 100 percent of the minimal care criteria. The reason for this process not meeting 100 percent of the criteria, failure to indicate the duration of treatment, is not a crucial health risk finding considering the widely accepted standard of a seven to ten day course of antibiotic treatment for middle ear infection.

However, this information is still important, especially if follow-up care is required, and steps should be taken in the clinic to ensure proper documentation of the duration of treatment.

Females 26 to 45 Years Old

This target group has one tracer, cervical cancer, with a low prevalence rate, but as was the case with the evaluation of the children's target group, this tracer was primarily used to gather information about the screening process. Again, the other tracer, urinary tract infection, has a high enough prevalence rate to permit the adequate collection of data to evaluate the care provided in the other process areas. The minimal care criteria for these two tracers can be found at Appendices C and D.

A review of Table V shows that the only problem area identified in the evaluation of this target group was in the process of evaluation. The primary problem that occurred in this area was under the physical exam portion of the evaluation criteria. Of the eight records which did not meet the evaluation criteria, all eight failed to indicate in the records an exam of the genitalia. In addition to this, four of these eight records did not mention the palpation of the abdomen with reference to the suprapubic and costovertebral angle. Because the criteria are the minimum or base-line care, this appears to be a clinically significant finding. It may be argued that the exam was conducted by the physician but not documented in the record; however, the criteria developed for this area were relatively few in number and considered important data to be recorded in the patient's record. The lack of recording important elements of the process of care is in itself a medical care deficiency.

	<u>URINARY TRACT INFECTION</u>		<u>CERVICAL CANCER</u>		<u>TOTAL</u>	
	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>
SCREENING	N/A	N/A	77	8	77	8
EVALUATION	6	8	1	0	7	8
MANAGEMENT	14	0	1	0	15	0
FOLLOW-UP	14	0	1	0	15	0
						38

TABLE V - Results of Minimal Care Criteria Comparison for the Female 26 to 45 Year Old Target Group
(Number of Records Meeting and Not Meeting 100 Percent of the Criteria by Process Element)

Another finding from the evaluation of this target group is that approximately 10 percent of the records audited did not meet the screening criteria for cervical cancer. A description of the eight cases found not to meet the screening criteria is as follows: none of the women were on oral contraceptives; three of the women had no indication in their records of a PAP smear for four years and all had been a member of the Family Practice Clinic for more than a year; the other five women had no history of a PAP smear in the records ranging from five to ten years with all but one being a member of the Family Practice Clinic for at least a year.

There are two positive findings of this evaluation, the first being the one case of a Class III PAP smear finding met all the criteria established for this tracer illness. The second positive finding highlighted by the screening criteria of this tracer is that all women who were on oral contraceptives and all women with a history of abnormal PAP smears met the screening criteria. This indicates high risk categories are receiving proper screening attention.

A review of the overall results of the evaluation of this target group shows that only one process of care, evaluation, did not have at least 80 percent of the results audited meet 100 percent of the minimal care criteria. Because of the possible clinical significance of the specific criteria not met in this evaluation, further study into this area is indicated. Having spent time observing the operation of this clinic, a possible explanation for the high number of records not indicating an exam of the genitalia and abdomen is the way the doctors' offices are set up. A doctor does not have an office and an exam room; they are combined in one room. As a result,

when a woman comes in with a complaint it appears to be difficult to make the transition from a doctor's office to an exam room. This is only conjecture at this point and provides an area which can be looked into in follow-up studies of this finding.

Male/Female 46 Years and Older

The care rendered to this group was evaluated by the tracer set of urinary tract infection (Appendix C) and essential hypertension (Appendix E). Essential hypertension was chosen because it provides information on the screening process and has a high enough expected prevalency rate to be useful in the collection of data for the evaluation of the other process elements. Urinary tract infection was chosen because this is an illness which can be applied to both male and female and because the expected prevalency rate becomes approximately equal after the age of 65.

Reviewing the results (Table VI) of the evaluation of care provided to this group, it appears there is a problem in both the evaluation and management processes for essential hypertension. In a look at the results of the criteria for the process of evaluation, it was found that of the seventeen records not meeting the criteria, ten of them did not record a supine blood pressure; four did not record a fundoscopic exam; twelve did not record a description of the thyroid and neck veins; thirteen did not record a description of an abdominal exam; eight did not record a description of peripheral pulses and edema; and thirteen did not record a family history of high blood pressure. In addition to these findings, four of the hypertension cases were not compared to the minimal care criteria because no

	<u>ESSENTIAL HYPERTENSION</u>		<u>URINARY TRACT INFECTION</u>		<u>TOTAL</u>	
	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>	<u>Met</u>	<u>Not Met</u>
SCREENING	101	1	N/A	N/A	101	1
EVALUATION	2	17	4	1	6	18
MANAGEMENT	10	9	4	1	14	10
FOLLOW-UP	19	0	5	0	24	0
					41	

TABLE VI - Results of Minimal Care Criteria Comparison For the Male/Female 46 Years of Age and Older Target Group
(Number of Records Meeting and Not Meeting 100 Percent of the Criteria by Process Element)

evaluation of the patient along the lines of these criteria could be found in the record even though the record indicated drugs were being prescribed for hypertension. Another two cases were not compared to the criteria because of incomplete records.

These results are clinically significant and indicate an area which should be studied further. It may be argued that the items not recorded in the record should be recorded only if the findings were abnormal. However, in the development of the criteria, items five through twelve under 2.A. (See Appendix E) were the only items identified as not needing to be recorded if the results were normal. It may also be argued that the exams were conducted but were not recorded in the record and again, the answer to this is that the failure to document is poor medical care in itself. This area warrants further study to determine if the problem is lack of documentation or incomplete evaluations of hypertensive patients.

The results of the evaluation of the management process for this tracer showed that there was no problem in the management of hypertension through proper drug prescriptions or diet but that there was a problem in the documentation of instructions given to the patient. All nine records which did not meet the criteria for this process area failed only because there was no documentation of instructions given to the patient. This appears not to be a clinically significant problem and one which can be corrected through inservices reinforcing the need for proper documentation of instructions given to patients.

Overall Evaluation of Care

Table VII illustrates the overall results of the evaluation of the process elements of care in the Family Practice Clinic. The methodology of this study established that if 20 percent of the records, overall, did not meet the criteria for a process element, this would indicate a problem in this area. A review of Table VII shows that in the process element of evaluation, 40.8 percent of the records did not meet the minimal care criteria and 28.9 percent of the records in the management process did not meet the criteria.

A sub-objective of this study was to determine the reliability of using 20 percent of the records, overall, not meeting the minimal care criteria as the indicator of a problem area. Studies identified in the literature review have shown that 40 to 65 percent of the records audited by explicit criteria do not meet established criteria.¹² As stated in the Introduction, this is why methods which use explicit criteria are criticized. The criteria of the tracer method have been formulated to be both explicit and implicit and because of this it was felt that a better compliance rate would be found. This fact, coupled with the results of the study [all process areas except for evaluation exceeded the low end (40 percent) of the normally expected rate of record compliance for an explicit review] indicate that the 20 percent criteria for identifying a problem area is acceptable.

Because the 20 percent criteria has proven to be acceptable, the two areas identified as not meeting this criteria are identified as

	MIDDLE EAR INFECTION		IRON-DEFICIENCY ANEMIA		URINARY TRACT INFECTION		CERVICAL CANCER		ESSENTIAL HYPERTENSION		TOTAL		PERCENT NOT MET
	Met	Not Met	Met	Not Met	Met	Not Met	Met	Not Met	Met	Not Met	Met	Not Met	
SCREENING	N/A	N/A	73	5	N/A	N/A	77	8	101	1	251	14	5.2%
EVALUATION	30	3	2	2	10	9	1	0	2	17	45	31	40.8%
MANAGEMENT	22	11	3	1	18	1	1	0	10	9	54	22	28.9%
FOLLOW-UP	29	4	3	1	19	0	1	0	19	0	71	5	6.6%

TABLE VII - Results of Comparison of All Tracer Illnesses To the Minimal Care Criteria
(Total Number of Records Meeting and Not Meeting Minimal Care Criteria For Each Process Element)

problem areas and warrant further study to determine the reason for non-compliance with the criteria. The primary concern should be with the assessment of the evaluation process as these results indicate a problem in the evaluation of illnesses or at the very least a significant problem in the documentation of these evaluations. An immediate analysis of this area is needed by the physicians of this clinic to determine the cause of such a high non-compliance with the criteria in this process of care.

The results in the management process of care do not indicate a problem with the actual management of the cases but with the proper documentation of anti-bacterial treatment and instructions given to patients. This problem can be easily solved through the use of inservices, using the results of this study as the stimulant, stressing the need for proper documentation. The proper documentation of care by a provider is as important a part of the health care process as is the actual care rendered.

Another problem area identified by the tracer methodology was a structural problem, the administration of the records storage area. A high number of records could not be found in the records room and, as indicated in each of the evaluations, there were cases which could not be reviewed because of incomplete records. A study should be conducted to determine if the cause is a procedural problem with the withdrawal and turn-in of records or if it is just patient dissatisfaction with the present outpatient record system.

The assessment of the screening and follow-up processes showed no major problems and in fact some very positive findings in the screening process were pointed out. In all three target groups it was shown that the high risk groups for each of the applicable tracer illnesses were being properly screened. In the assessment of the follow-up process, the high compliance with follow-up exams and procedures was another positive finding.

As stated in the methodology, the purpose of this study is not to define good or bad care but to provide feedback to the physicians about the care they are providing. The results of this study have indicated areas which appear to be a problem and other ones which appear to be above the accepted standards.

FOOTNOTES

1. Peter R. Dallman, Ray Yip, and Clifford Johnson, "Prevalence and Causes of Anemia in the United States, 1976 to 1980." The American Journal of Clinical Nutrition, 39 (March, 1984), p. 439.
2. A Strategy for Evaluating Health Services. David M. Kessner, Project Director (Washington, D.C.: National Academy of Sciences, 1973), p. 35.
3. Ibid, p. 173.
4. E. F. MacKenzie, "Changing Patterns of Cervical Cancer." The British Medical Journal (Clinical Response), 287 (24 September, 1983), p. 912.
5. A Strategy for Evaluating Health Services, p. 174.
6. Ibid, p. 174.
7. D. M. Thomson and D. C. Rawlins, "Hypertension and General Practice." The British Medical Journal, 280 (12 January, 1980), p. 109.
8. Mildred A. Morehead, "Evaluation of Ambulatory Care Delivery Systems." Topics in Health Records Management, 1 (March, 1981), p. 21.
9. Lloyd F. Novick, Karen Dickinson, Russell Asnes, Maylan and Regina Lowenstein, "Assessment of Ambulatory Care: Application of the Tracer Methodology." Medical Care, 14 (January, 1976), p. 1.
10. Nancy O. Graham, Quality Assurance in Hospitals: Strategies for Assessment and Implementation, (Rockville, Maryland: Aspen Systems Corporation, 1982), p. 243.
11. Wayne W. Daniel, Biostatistics: A Foundation for Analysis in the Health Sciences, (New York, New York: John Wiley and Sons, Inc., 1983), p. 132.
12. Morehead, p. 21.

CONCLUSION

The intent of this project was to use the tracer methodology to assess the care provided by an outpatient clinic of Walson Army Community Hospital. The discussion portion of this project described the results of this assessment and outlined areas which require further study.

Because the Tracer Methodology had never been used before, its use in this project not only provided information concerning the care provided but also furnished information on the feasibility of using this method in future evaluations of ambulatory care. Examining the effectiveness of an ambulatory care facility is a challenging and difficult task. Many researchers attempting to measure the quality of outpatient care have identified increasing complexities related to the provision of this type care and have stated that these create problems which hamper the establishment of a workable measure to assess quality. Kessner believed these problems could be overcome and that a method of evaluating ambulatory care should be developed. The Tracer Methodology is the result of his efforts to develop a method which overcomes the problems associated with the assessment of ambulatory care.

The type of criteria used in the tracer method is responsible for eliminating most of the problems cited in the literature. As already mentioned, the primary complaint of most quality assurance methods is with the criteria. Implicit criteria lack structure and reproducibility because different reviewers focus on different parameters of the medical care process. Explicit criteria are too structured, leaving no room for clinical judgement.

The results of this study show that the method of establishing criteria which are both explicit and implicit solves the problem of which type of criteria to use.

In addition, this type of criteria solves another problem often complained about in the literature which is the cost of evaluating care, both in dollars and physician time. This method allows for the use of non-professional abstractors in the evaluation of care provided. The physicians are involved only in the establishment of the criteria and, because they are not involved in the actual evaluation, it leaves more time for them to evaluate and take action on the problem areas identified.

Another problem often mentioned in the literature is the poor documentation found in outpatient records. Again the type criteria used in the tracer method comes to terms with this problem. By using base-line or minimally acceptable standards of care for criteria, it is expected that these items will be documented in the records. The results of this study indicate the use of this type criteria worked around the problem of poorly documented outpatient records.

Probably one of the most debated problems associated with quality assurance evaluations is which one of Donabedian's categories, structure, process or outcome, should be used to evaluate care. Kessner felt it was important to measure all three categories in an evaluation scheme. He realized it was impossible to identify the strengths and weaknesses of process without knowing the outcome, but knew outcome alone can be misleading if the patient receives inappropriate treatment. The tracer method

is able to evaluate all three categories by following the tracer illnesses through the health system.

The tracer method does not attempt to define good care; its purpose is to identify problem areas in a system and to provide feedback to the system concerning these problems. The evaluation of a health system by sets of tracers provides a framework and data base for assessing the care provided by the system. Having utilized the tracer methodology to evaluate the care of an outpatient clinic, it has shown that this method has overcome most of the problems associated with evaluating ambulatory care and is a viable method to use in future evaluations of outpatient care.

APPENDIX A

Minimal Care Criteria for Middle Ear Infection

MIDDLE EAR INFECTION

1. Evaluation.

A. History.

- (1) Presenting symptoms and duration.
- (2) Occurrence of: pain in ears, draining ears, fever, hearing problems.
- (3) Prior treatment for this episode.
- (4) Specify allergies, history of previous middle ear infection, operations on ear, nose, or throat if not a part of a past history previously recorded.

B. Physical examination. Description of:

- (1) temperature.
- (2) abnormal auditory canals.
- (3) abnormal tympanic membranes.
- (4) abnormal cervical lymph nodes.
- (5) abnormal pharynx.

C. Diagnosis: Differentiate between myringitis, suppurative otitis media and otitis media with effusion, acute and chronic.

2. Management.

- A. All drugs are prescribed in acceptable dosages adjusted to the individual patient; contraindications are observed, and patients are monitored for common side effects according to information detailed in AMA Drug Evaluations. Amoxicillin, Pediazole, Septra and Augmentin are drugs of choice.
- B. Treatment: Antimicrobial drugs: The duration of treatment should be 7-10 days. In general, multiple antimicrobials should not be used. If patient is allergic to penicillin, use Septra or Pediozole.

3. Follow-up.

- A. Re-examine 10-14 days after treatment initiated, or sooner if there is no improvement.
- B. Evaluate hearing if there are repeated infections or evidence of hearing loss.
- C. Referral.
 - (1) To otolaryngologist if there is persistent infection or effusion not responsive to treatment.
 - (2) To otolaryngologist for recurrent infection and decision for tonsillectomy and adenoidectomy, tubes, etc.

APPENDIX B

Minimal Care Criteria for Iron-Deficiency Anemia

IRON-DEFICIENCY ANEMIA

1. Screening.

- A. Method: Hemoglobin, standard hematocrit or microhematocrit.
- B. Criteria: Up to age 5 years, fail if hematocrit is 33 percent or less or hemoglobin 11g/100ml or less.
- C. Time and Frequency: Once during 6 to 12 months of age and annually thereafter for high risk groups.

2. Evaluation.

A. History:

- (1) Family history of anemia.
- (2) Birthweight.
- (3) General diet and milk intake, specifying cow's milk or formula.

B. Physical Examination.

- (1) Height and weight.
- (2) Pulse rate.
- (3) Jaundice.
- (4) Cardiac: standard description.
- (5) Abdominal: standard description.

C. Laboratory.

- (1) Any of the following: repeat hemoglobin or hematocrit; red blood count (RBC) indices; red blood cell morphology; serum iron, total iron-binding capacity, and percent transferrin saturation.
- (2) Stool examination for occult blood.

D. Diagnosis.

- (1) Iron Store depletion. Based upon decreased ferritin level.
- (2) Iron limited erythropoiesis. Based on morphology or RBC indices showing hypochromic microcytic red cells.
- (3) Iron deficiency anemia. Based on criteria stated in 1.B. above.
- (4) Anemia, type unspecified.

3. Management.

A. Iron store depletion, iron limited erythropoiesis, and iron deficiency anemia.

- (1) Iron: ferrous sulfate, gluconate, or fumarate to provide 2mg/kg of elemental iron by mouth three times a day.

- (2) Dietary program: limit milk to 1 pint/day with adequate total caloric intake.
 - (3) Treatment of intestinal parasites and gastrointestinal blood loss.
- B. Anemia, type unspecified if not thalassemia. Further evaluation including:
- (1) Complete blood count (CBC).
 - (2) Reticulocyte count.
 - (3) Platelet count.
 - (4) Bilirubin.
 - (5) Coombs.
 - (6) Hb electrophoresis.
 - (7) Serum iron and iron-binding capacity.
 - (8) Blood lead level.
 - (9) Repeat stools for occult blood loss and gastrointestinal evaluation as indicated.
4. Follow-up for iron store depletion, iron limited erythropoiesis, and iron deficiency anemia.
- A. Repeat hemoglobin or hematocrit 3-4 weeks after initiating iron therapy.
 - B. Continue iron therapy 5-6 months after hemoglobin or hematocrit is normal.
5. Outcome criteria: Hemoglobin greater than 11g/100ml and hematocrit greater than 33 percent.

•
•

APPENDIX C

Minimal Care Criteria for Urinary Tract Infection

/

URINARY TRACT INFECTIONS

1. Evaluation (Use WBC's as decision point).

A. History.

- (1) Presenting complaint.
- (2) Previous bladder or kidney infection or kidney stone.
- (3) Previous history of instrumentation or surgery (if yes specify the date).
- (4) Present history of dysuria, hematuria, frequency, nocturia, urgency.
- (5) Pain (if yes, specify location: groin, lower abdomen, costovertebral angle (CVA), genitalia).
- (6) Fever, chills.
- (7) History of previous treatment for this episode.

B. Physical examination.

- (1) Temperature.
- (2) Blood pressure.
- (3) Palpation of abdomen with reference to suprapubic and CVA regions.
- (4) Genitalia (external genital exam for females).
- (5) Rectal (males only).

C. Laboratory: (In addition to quantitative urine culture)
Clean voided urine specimen for routine analysis and microscopic examination of sediment.

2. Management.

A. Criteria for treatment.

- (1) Treat all patients with 10,000 colonies per ml of any organism.
- (2) With symptoms of sepsis or bacteria on spun urine sediment, treat prior to results of quantitative culture.
- (3) Less than 10,000 colonies per ml of any organism and no history of previous treatment: no treatment indicated.

B. Hospitalization with initial infection indicated.

- (1) If patient is acutely ill on presentation as indicated by presence of sepsis (fever, sweat, prostration, chills) or by being too ill to come to physician's office without help.
- (2) Where obstruction is present as well as infection.
- (3) Where infection is accompanied by renal failure.

C. Office treatment indicated: The patient who is uncomfortable, but not septic, and can pass urine should be treated as an outpatient.

D. Treatment.

- (1) Symptomatic treatment for dysuria without evidence of bacterial infection.
- (2) Antibacterial treatment: All drugs are prescribed in acceptable dosages adjusted to the individual patient, contraindications are observed, and patients are monitored for common side effects according to information detailed in AMA Drug Evaluations.
- (3) If within 48 hours the symptoms do not respond to the first drug then alternate drug therapy should be initiated.

3. Follow-up: Intravenous pyelogram (IVP) for history of infection during childhood, more than two episodes in females, and after first episode in males.

4. Referral.

- A. To urologist if there is IVP evidence of genitourinary anomaly or obstruction.
- B. To a specialist for treatment of persistent and resistant bacterial infection in the absence of genitourinary anomaly or obstruction.

APPENDIX D

Minimal Care Criteria for Cervical Cancer

CERVICAL CANCER

1. Screening.

A. Papanicolaou Smear (PAP)

- (1) Any female having sexual intercourse regardless of age.
- (2) Age 20 and over.
- (3) Yearly if on oral contraceptives or more often if previously abnormal.
- (4) Every three years if not on oral contraceptives and there is no history of abnormal smear.

2. Evaluation.

A. History:

- (1) Social: age at first intercourse.
- (2) Obstetrical: how many times patient has been pregnant.
- (3) Menstrual: Are you still having menstrual periods? At what age did bleeding begin? Are they regular? Do you bleed between periods or after intercourse? Do you flow more than 7 days? Do you feel you bleed excessively? Have there been any recent changes in the amount of and or length of time of your flow?
- (4) General: Are you doing anything to prevent pregnancy? Specify what contraceptive method. Do you have a vaginal discharge? Does it have an odor? Does it itch? What color is the discharge? Is it thick? Have you had a PAP test in the past year? Have you ever been told you had an abnormal PAP?

B. Physical Exam: Pelvic and rectal exams: describe external genitalia, vagina, cervix, corpus, adnexa, rectum and breasts.

3. Management and Follow-up.

- A. Class I: Repeat PAP once a year for 3 years and then every third year thereafter, or yearly per ACOG.
- B. Class II: Treatment of cervicitis if inflammation is present and repeat PAP in 3 months. If "atypia" are present repeat PAP in 3 months. If dysplasia is present refer for treatment.
- C. Class III: Asymptomatic or symptomatic, with or without lesion, refer to gynecologist for definitive histologic studies.
- D. Class IV or V: With or without lesion, refer to gynecologist for definitive histologic studies.

APPENDIX E

Minimal Care Criteria for Essential Hypertension

ESSENTIAL HYPERTENSION

1. Screening.

Criteria: An individual is judged in need of evaluation if the mean of three or more systolic or diastolic pressures exceeds 140/90 for all over 18 years old.

2. Evaluation: In the evaluation of elevated blood pressure, the history and physical examination data listed below should be obtained early in the evaluation.

A. History.

- (1) Personal and social history.
- (2) Family history of high blood pressure, coronary artery disease, or stroke.
- (3) Previous diagnosis of high blood pressure (females: toxemia of pregnancy or pre-eclampsia) and time of first occurrence.
- (4) Previous treatment for high blood pressure: when started, when stopped, and drugs used, if known.
- (5) Chest pain, pressure, or tightness - location, length of symptoms, frequency of symptoms, effect of deep breathing, description of feeling (crushing, strangling, smothering), symptom temporarily curtails activity, and pain radiates into left shoulder, arm or jaw and is accompanied by nausea, shortness of breath, and/or fast or fluttering heart beat.
- (6) Feet swell.
- (7) Shortness of breath.
- (8) Awakens wheezing or feeling smothered or choked.
- (9) Sleeps on two or more pillows.
- (10) Prior history of kidney trouble, nephrosis, or nephritis.
- (11) History of kidney infection.
- (12) Prior x-ray examination of kidneys.

B. Physical examination.

- (1) Weight and height.
- (2) Blood pressure: supine and upright.
- (3) Funduscopic.
- (4) Heart: abnormal sounds or rhythm.
- (5) Neck: thyroid and neck veins.
- (6) Abdomen: standard description, including abdominal bruit.
- (7) Extremities: peripheral pulses and edema.

C. Laboratory.

- (1) Urinalysis.
- (2) Hematocrit or hemoglobin.
- (3) Blood urea nitrogen or serum creatinine.

D. Other tests.

- (1) Electrocardiogram.

E. Diagnosis.

- (1) Essential hypertension as described under 1.
- (2) Secondary hypertension. Hypertension secondary to renal, adrenal, thyroid, or primary vascular disease.

4. Management.

A. Mild essential hypertension (diastolic pressure of 90-105).

- (1) Initial treatment with thiazides, or beta blockers, or diet and exercise alone.
- (2) If pressure not reduced by 10 mmHg or to lowest level that the patient can tolerate without adverse side effects in 2 to 4 weeks, add one of the following to thiazides: alpha methyldopa, hydralazine or one of the other sympatholytics.

B. Moderate essential hypertension (diastolic pressure of 105-115).

- (1) Initial treatment with thiazide and a beta blocker or sympatholytics.
- (2) If no response after 2 to 4 weeks, change medication or dosage of medication being received.

C. Severe essential hypertension (diastolic pressure of 115 or Keith-Wagener Grade III or IV fundoscopic changes).

Refer to a specialist.

D. Secondary hypertension.

Treat or refer for treatment of primary condition.

E. Instructions on: weight loss, decreased sodium intake, aerobic exercise, smoking, alcohol consumption, and importance of taking the medications prescribed.

5. Follow-up.

Undetermined etiology or no response to treatment: Further evaluation to include serum sodium and potassium, if not previously performed, and/or referral to specialist.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

- A Strategy for Evaluating Health Services. David M. Kessner, Project Director. Washington, D.C.: National Academy of Sciences, 1973.
- Daniel, Wayne W. Biostatistics: A Foundation for Analysis in the Health Sciences. New York, New York: John Wiley and Sons, 1983.
- Donabedian, Avedis. The Criteria and Standards of Quality. Ann Arbor, Michigan: Health Administration Press, 1982.
- Graham, Nancy O. Quality Assurance In Hospitals, Strategies for Assessment and Implementation. Rockville, Maryland: Aspen Systems Corporation, 1982.
- Koda-Kimble, Mary Anne; Katcher, Brian S.; and Young, Lloyd Y. Applied Therapeutics for Clinical Pharmacists. San Francisco, California: Applied Therapeutics, Inc., 1978.
- Lilienfeld, Abraham M. and Lilienfeld, David E. Foundations of Epidemiology. New York: Oxford University Press, 1980.
- Marks, Ronald G. Designing a Research Project. Belmont, California: Lifetime Learning Publications, 1982.
- McMillan, Julia A.; Stockman, James A.; and Oski, Frank A. The Whole Pediatrician Catalog, A Compendium of Clues to Diagnosis and Management. Philadelphia, Pennsylvania: W. B. Saunders Company, 1982.

Periodicals

- Boyes, D. A. "The Value of a Pap Smear Program and Suggestions for Its Implementation." Cancer, 48 (15 July, Supplement, 1981), 613-621.
- Brock, Robert H. and Appel, Francis A. "Quality-of-Care Assessment: Choosing A Method for Peer Review." The New England Journal of Medicine, 288 (21 June, 1973), 1323-1329.
- Browning, G. G.; Picozzi, G. L.; Calder, I. T.; and Sweeney, G. "Controlled Trial of Medical Treatment of Active Chronic Otitis Media." British Medical Journal, 287, (8 October, 1983), 1024.
- Dallman, Peter R.; Yip, Ray; and Johnson, Clifford "Prevalence and Causes of Anemia in the United States, 1976 to 1980." The American Journal of Clinical Nutrition, 39 (March, 1984), 437-445.

- Hastings, Glen E.; Sonneborn, Robert; Lee, Gail; Vick, Linda; and Sasmor, Louis. "Peer Review Checklist: Reproducibility and Validity of a Method for Evaluating the Quality of Ambulatory Care." American Journal of Public Health, 70 (March, 1980), 222-228.
- Hill, Richard K. "Quality Assurance in Ambulatory Care." Primary Care, 7 (December, 1980), 713-721.
- Huntley, Robert R.; Steinhauer, Rahel; White, Kerr L.; Williams, T. F.; Martin, Dan A.; and Pasternak, Bernard S. "The Quality of Medical Care: Techniques and Investigation in the Outpatient Clinic." Journal of Chronic Disease, 14 (December, 1961), 630-642.
- Kerr, Markay and Trantow, Don J. "Defining, Measuring and Assessing the Quality of Health Services." Public Health Reports, 84 (May, 1969), 415-424.
- Kessner, David M.; Kalk, Carolyn E.; and Singer, James. "Assessing Health Quality - The Case for Tracers." The New England Journal of Medicine, 288 (25 January, 1973), 189-194.
- MacKenzie, E. F. D. "Changing Patterns of Cervical Cancer Rates." British Medical Journal, 287 (24 September, 1983), 912.
- Mondiek, Priscilla and Green, Ellen S. "Medical Record Quality in Ambulatory Care Settings." Journal of the American Medical Records Association, 55 (May, 1984), 25-29.
- Morehead, Mildred A. "Evaluating Quality of Medical Care in the Neighborhood Health Center Program of the Office of Economic Opportunity." Medical Care, 8 (March-April, 1970), 118-131.
- Morehead, Mildred A. "Evaluation of Ambulatory Care Delivery Systems." Topics in Health Records Management, 1 (March, 1981), 19-31.
- Morehead, Mildred A.; Donaldson, Rose S.; and Seravalli, Mary R. "Comparisons Between OEO Neighborhood Health Centers and Other Health Care Providers of Ratings of the Quality of Health Care." American Journal of Public Health, 61 (July, 1971), 1294-1306.
- Mushlin, Alvin I. and Appel, Francis A. "Testing an Outcome-Based Quality Assurance Strategy in Primary Care." Medical Care, 18 (May, Supplement, 1980), 1-100.
- Novick, Lloyd F.; Dickinson, Karen; Asnes, Russell; Lan, May; and Lowenstein, Regina. "Assessment of Ambulatory Care: Application of the Tracer Methodology." Medical Care, 14 (January, 1976), 1-12.
- Palmer, Heather R., and Nesson, Richard H. "A Review of Methods for Ambulatory Medical Care Evaluations." Medical Care, 20 (August, 1982), 758-781.

- Palmer, Heather R.; Strain, Rose; Maurer, Judith; Rothrock, Janet K.; and Thompson, Marck S. "Quality Assurance in Eight Adult Medicine Group Practices." Medical Care, 22 (July, 1984), 632-643.
- Peitzman, Steven J.; Bodison, Wilhelmina; and Ellis, Ida. "Care of Elderly Patients in a Special Hypertension Clinic." Journal of the American Geriatrics Society, 30 (January, 1982), 2-5.
- Roberts, Kenneth B.; Charney, Evan; Sweren, Ronald J.; Ahonkhai, Vincent I.; Bergman, David A.; Coulser, Molly P.; Fendrick, Gerald M.; Lachman, Barry S.; Lawless, Michael R.; Pantell, Robert H.; and Stein, Martin T. "Urinary Tract Infection in Infants with Unexplained Fever: A Collaborative Study." The Journal of Pediatrics, 103 (December, 1983), 864-867.
- Sibley, John C.; Spitzer, Walter O.; Rudnick, K. V.; Bell, J. D.; Bethune, Richard D.; Sackett, David L.; and Wright, Karen. "Quality-of-Care Appraisal in Primary Care: A Quantitative Method." Annals of Internal Medicine, 83 (July, 1975), 46-52.
- Stephens, W. P.; Tunbridge, R. D. G.; and Moss, D. A. "Evaluation of Screening for Hypertension in General Practice with An Automatic Machine." British Medical Journal, 287 (26 November, 1983), 1600-1602.
- Thomson, D. M. and Rawlins, D. C. "Hypertension and General Practice" British Medical Journal, 280 (12 January, 1980), 108-109.
- Trafford, J. A.; Ireland, R.; McGonigle, R.; Sharpstone, P.; Halford, L.; and Evans, R. "Screening for Hypertension: A Hospital-Based Home-visiting Programme." British Medical Journal, 2 (15 December, 1979), 1556.
- Zalar, Richard W. and Houston-Schrenzel, Deborah. "A Quality Assurance Plan for an Ambulatory Care Department." Journal of Ambulatory Care Management, 5 (August, 1982), 64-69.
- Zuckerman, Howard S.; Huntley, JoAnne; and Waterbrook, Keith J. "Effectiveness of Patient Care in a Primary Care Clinic." Medical Care, 18 (October, 1980), 1001-1012.