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A STUDY TO DETERMINE
THE LEVEL OF COMPLIANCE WITH THE
JOINT COMMISSION ON ACCREDITATION OF HEALTH CARE ORGANIZATIONS'
STANDARD REQUIRING THE USE OF A MEDICAL SUMMARY LIST
IN OUTPATIENT MEDICAL RECORDS AT
DEWITT ARMY COMMUNITY HOSPITAL,
FORT BELVOIR, VIRGINIA

A Graduate Research Project
Submitted to the Faculty of
Baylor University
In Partial Fulfillment of the
Requirements of the Degree

of

Master of Health Administration

by

Major James R. Lantis, Jr., MSC

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ABSTRACT

A contingency levied by the JCAHO during its most recent accreditation survey of DeWitt Army Community Hospital provided the impetus for this study of compliance with the standard regarding the use of the medical summary list. A review of outpatient medical records revealed the actual level of compliance within the hospital was well below the required standard and the hospital's own goal. It was also seen that a significant improvement could be made over the course of one year and that 90 to 100 percent compliance could probably be achieved within three years or less.

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A Study to Determine
the Level of Compliance With the
Joint Commission on Accreditation of Health Care Organizations'
Standard Requiring the Use of a Medical Summary List
in Outpatient Medical Records at
DeWitt Army Community Hospital,
Fort Belvoir, Virginia

I. INTRODUCTION

"Hospitals and health professionals must collect a large amount of sensitive information about patients in order to provide appropriate diagnosis, treatment, and care" (Miller, 1983, p. 271). The Joint Commission on Accreditation of Health Care Organizations (JCAHO) specifies medical record standards that hospitals must meet in order to be accredited. The Medical Records chapter of the JCAHO's Accreditation Manual for Hospitals lists numerous specific items to be included in the medical record. These are designed to assure that the patient is identified, the diagnosis is supported, the treatment is justified, and the results are accurately documented (JCAHO, 1989.) While many of the specific items are applicable only to inpatients, the general standards are applicable to all patients, including ambulatory care patients. In fact, Standard 5, as it appeared in the Hospital-Sponsored Ambulatory Care Services chapter of the 1985 edition of the Accreditation

Manual for Hospitals required that a medical record be maintained on every patient who receives ambulatory care services (p. 63). Also in 1985, the required characteristics of such a record were expanded to require "a summary list of significant past procedures, past and current diagnosis or problems, and currently and recently used medications [be] legibly recorded in the same location in each patient record" (JCAH, 1985, p. 64).

While a variety of problem list forms had been approved for use at various Army hospitals prior to 1985, the new JCAHO standard was a mandate for the creation of a single form to be used consistently throughout the Army health care delivery system. In order to accommodate this new requirement, in January 1985, the U.S. Army Health Services Command (HSC) developed a test form, the HSC Form 79-R, Master Problem List (Appendix A), to be included in all outpatient medical records. The form was then made available to DeWitt Army Community Hospital (DACH) and other Army medical treatment facilities along with guidance regarding its use and placement in the medical record. This guidance was first fielded in the Commanding General HSC Bulletin No. 3-85, which included directions as to the minimum information to be recorded upon the patient's initial visit after incorporation of the form into the record and information to be recorded

pursuant to subsequent visits. In the years that followed, HSC developed and fielded a newer version of the problem list form, the DA Form 5571 (Appendix B). However, HSC has found that the use of this form and its forerunners within its several clinics and hospitals has not been consistent with the guidance it issued. Indeed, during the time elapsed between January 1985 and the present, results of JCAHO accreditation surveys of Army hospitals have frequently cited noncompliance with the standard regarding the use of the medical summary list as contingencies against full accreditation in those facilities surveyed.

Conditions Which Prompted the Study

In April 1986, DeWitt Army Community Hospital underwent its most recent accreditation survey by the JCAHO. In October 1986 the results of that survey were returned to DACH. The hospital had been granted a three year accreditation, contingent upon the resolution of several contingencies noted by the surveyors. One of these contingencies concerned the use of the medical summary list. The surveyors' specific comment was, "It was noted that of the 25 records reviewed: six contained no summary lists and ten omitted diagnoses (such as hypertension, diabetes, seizures), past surgical

procedures (hysterectomy) and medications (Lopressor, Sockin, Guipze, and Felderene)" (JCAHO, 1986, p. 4). Included in the letter notifying DACH of the survey results was a notice indicating that a return visit, or focused survey, would be scheduled to determine whether action had indeed been taken to correct the contingency regarding the medical summary list. This resurvey occurred on 25 September 1987. As a result of this further examination of DACH's compliance with the JCAHO standard, the contingency was removed, and thus DACH's accreditation preserved. However, while some improvement had been noted, the JCAHO indicated that DACH still was not in substantial compliance with its standard concerning the use of the medical summary list, and that further improvement was needed before the next full survey. The surveyor's specific comment was, "It was noted that not all providers consistently document medications in the same location in summary lists" (JCAHO, 1987, p. 2).

The next full accreditation survey is slated to occur in April 1989. Noting this important date and that concern had also been expressed by the hospital's Quality Assurance Committee, as well as the result of the focused survey, the Deputy Commander for Administration (DCA) directed this investigator to assess DACH's current

position relative to a goal of 90 percent compliance with the accreditation standard. Further, the assessment was to indicate how much progress could be made in one year, toward achieving this goal, if the only action taken were to complete the form each time a patient presented for care rather than a more resource-intensive approach. Other recommendations for achieving this goal were also submitted.

Statement of the Problem

The purposes of this study were threefold. The first of these was to determine DACH's current position relative to the goal of 90 percent compliance with the JCAH standard concerning the use of the medical summary list. The second, was to determine how much can be accomplished if it were achieving this goal in one year if the only action taken was to ensure that the forms are completed each time a patient presents for care. The third purpose of the study was to provide recommendations to the DACH regarding suitable means to achieve this goal, if progress has not already been met.

Objectives

The objectives of this research effort were to:

1. Perform a review of the literature concerning

the origins, purposes, and interventions concerning the use of the medical summary, etc.

2. Determine the number of outpatient medical records held by OACH.

3. Calculate the sample size necessary to achieve a 99 percent level of significance for an audit of the entire population of outpatient medical records held by OACH.

4. Perform an audit to determine the number of records, out of the sample selected, in which:

- a. A medical summary list was present.
- b. The form was either blank or improperly completed.
- c. The form was filed in the correct location.
- d. Patient identification data were affixed to the form.
- e. Medications were recorded in the correct location.
- f. Documentation existed that the patient presented for care during a one year period, in a clinic wherein the medical summary list could have been completed.

5. Establish a 99 percent confidence interval around the true proportion of the population of:

- a. Records in which a medical summary list was

present.

b. Records in which the medical summary list was either blank or improperly completed.

c. Records in which the form was not filed in the correct location.

d. Records in which the patient identification data was not recorded on the form.

e. Records in which medications were not recorded in the correct location.

f. The number of personnel, whose records are held by DACH, who presented for care at a clinic wherein the medical summary list could have been completed during a one year period.

5. Transform the percentages obtained by computing confidence intervals to actual numbers of outpatient medical records to determine the number of records exhibiting the characteristics of concern.

6. Develop conclusions and recommendations to be presented to the DCA regarding means to achieve the goal of 90 percent compliance with the JCAHO standard, if indeed it had not already been met.

Criteria

In the conduct of this research effort the following criteria were applied in collecting the data for

analysis:

1. Any form filed in the outpatient medical records sampled which was designed for the provider to record significant past procedures, past and current diagnosis or problems, and currently or recently used medications was considered to be a medical summary list.

2. Any medical summary list which was not filed on the top, left side of the records jacket was not considered to have been filed in the correct location.

3. The medical summary list was considered to be blank if there was nothing beyond patient identification data entered on it.

4. An entry was considered to be improperly completed if any part of the medical summary list was incomplete. For example, on the DA Form 5571 an entry pertaining to a major problem requires the following data: date of onset; date the entry was made; description of the problem; and the date resolved. If any part of this data were left blank, with the exception of the date resolved, then that entry was considered to be improperly completed.

5. The patient's identification data was considered to be present only if sufficient data appeared on the form that it could be distinguished from another patient's information. That is, such entries must

contain at least the patient's first and last names and the Social Security Account Number of the patient's sponsor.

6. Medications were not considered to have been recorded in the correct location on the form unless they were noted to have been recorded in a location that was specifically labeled for this purpose.

7. Patients whose records documented that they had been seen in an appropriate DACH clinic during fiscal year (FY) 1988, i.e., 1 October 1987 through 31 September 1988, inclusive, were identified as those patients having been seen in the last year.

8. Any of the 35 clinics operated by DACH were considered to be appropriate locations in which the medical summary list could be completed. This, of course, did not include: Radiology, Pharmacy, the Laboratory, the Social Work Service, or the Community Mental Health Activity.

Assumptions

In the conduct of this research effort, the investigator assumed:

1. That the characteristics of interest in the finite population of concern were normally distributed.
2. That the pattern of patient visits evidenced

during the period addressed by the study will remain relatively constant over the following year.

Limitations

The examination, or audit, of outpatient medical records was limited to those held by DACH. Records held by outlying Troop Medical Clinics (TMCs) were not included owing to the Army Medical Department's policy that Army medical treatment facilities (MTFs) will only include data concerning "hospital-based clinics which are an integral part of the hospital" (Department of the Army, 1988b) when completing applications for JCAHO survey.

Also, the cross-sectional nature of this study dictates that the information derived from analysis of the data obtained from the audit of outpatient medical records, presents a picture of DACH's position relative to the goal of 90 percent compliance at one point in time. That is, the dynamic nature of the body of such records held by DACH is not reflected in the results obtained. Similarly, any long term strategy derived to improve compliance with the JCAHO standard should take into account the fact that some number of records held on any given day, in which the medical summary list is present and properly completed, may not be held on any subsequent day, owing to the patient's transfer or other

circumstances. Likewise, records newly added to the body held by DACH may need to have the form enclosed and properly completed. Clearly, the picture today may not be the picture tomorrow.

Review of the Literature

Origin of the Medical Summary List

The works consulted in this review of literature are unanimous in crediting Dr. Lawrence L. Weed with developing the concept of the problem-oriented medical record (POMR) (Watzlaf, 1988; Donaldson and Povar, 1985; Papa, 1985; Margolis, Barak, Vardy, and Winter, 1984; Sigurdsson, Einarsson, Josafatsson, Magnusson, Olafsson, Sigvaldsson, Thorarinsson, and Tulinus, 1984; Freer, 1980; and Holmes, 1980). First presented in 1968, Weed proposed the POMR as an "explicit, logical format for the often fragmented patient record. All clinical notes, laboratory information, and radiologic data in the POMR were to be keyed [to what Weed termed] a master problem list (MPL), an index to the patient's entire medical record" (Donaldson and Povar, 1985, p. 328).

Weed contended that the patient's medical records were frequently "a tangle of illogically assembled bits of information organized by source rather than patient problems" (Holmes, 1980, p. 42). Hence, such a record

was an impediment to the physician's first task, that is, to "identify the patient's problems and organize them for solution" (Weed, 1969, p. 3). Weed's premise was that medical education did little to prepare the physician to apply the sort of scientific methodology to the scrutiny of patient's records that would enable him to deal successfully with complex biological systems. To clarify the point, he makes an analogy between a physician and other scientists:

The scientist defines a problem clearly, separates multifarious problems into their individual components, and clarifies their relationships to each other. He records data in a communicative and standard form and ultimately accepts an audit from objective peers by seeking publication in a journal. Basic scientists are neither better people nor better scholars than physicians; they do not pursue more scientific or intrinsically 'better' problems. They are simply subject to better monitoring by a system that mobilizes the criticism of their peers throughout their lives. Clinical medicine, on the other hand, substitutes qualifying examinations at a single point in a career for a lifelong process of recurring audit and it must frankly be admitted that the customary methodology of medicine fails to provide the kind of structured context that promotes objectivity, sharpens skills, and permits progressive self-evaluation (1969, p. 4).

As presented by Weed (1969), the POMR is a tool to guide and teach clinicians as well as to facilitate and assess the quality of care actually provided a patient. The POMR concept recognizes four basic elements of the

medical record: (1) the data base, which includes the patient's chief complaint, a patient profile and related social data, present illness, past history and review of systems, physical examination, and laboratory reports; (2) the master problem list, i.e., a numbered and titled list of every problem the patient has or has had, to include anything that requires management, as well as, social or demographic problems; (3) the initial plan, which is a list of diagnostic and therapeutic orders which are keyed by number to the original problem list; and (4) the progress notes. Each progress note is written so as to correspond to the specific problem to which it refers. The progress notes consist of: (1) narrative notes, written in a standard format, which are also numbered and titled such that they are keyed to the problem list, and include notes written by nurses and paraprofessional personnel; (2) flow sheets, addressing all of the moving parameters of a given problem; and (3) the discharge summary, which should address each numbered problem on the patient's list. As noted by Holmes (1980) the progress note, with its characteristic S-O-A-P format is perhaps the best known part of the POMR. The first element of such a note is labeled "S," for subjective data, and should address symptomatic data, i.e., what the patient says. This element is listed first as it was

Weed's feeling that the patient's point of view should be taken into consideration at the outset. The second element listed should be labeled "O," for objective data. Physical findings and the results of tests and measurements are recorded under this element. The next element is labeled "A," for assessment. Here the clinician was to record conclusions based on both the subjective and objective data. The last element is labeled "P," for plan. It is here that plans for further diagnostic work-up, therapy, and patient education are documented. The plan is meant to outline specific actions related to patient activity, observations, and diagnostic studies.

Subsequent Development of the POMR and the MPL

Since the introduction of the POMR, both it and the MPL, have been widely used and modified. Ruth, Rigdon, and Brunworth (1979) report the development and use of an integrated family-oriented problem-oriented medical record (INFO-POMR). Based upon Weed's original concept, "the INFO-POMR requires a family chart that encloses individual folders for each member of the family. It cannot be used when charts are filed separately. The Family Master Problem List is attached to the inside of the family folder" (Ruth et al, 1979, p. 1179). This

Family Master Problem List is the only MPL in the record. It is designed in a matrix format and contains the master problems of all members of the family. While Weed's design calls for problems to be listed numerically on the MPL in chronological order, Ruth et al assign numbers to identified problems by the use of the International Classification of Health Problems in Primary Care (ICHPPC). They note that while any classification system, such as the ICHPPC, can be used to number identified problems, such systems lend themselves well to chart audit, disease registry, research, and computerization. Further expanding on Weed's model, the INFO-POMR includes a family profile, meant to offer insight to secondary providers and consultants. This facet of the Family Master Problem List is also an aid to determining whether the problem of concern is in the individual patient or the family (Ruth et al, 1979). "The reverse of the family problem page contains...a genealogy [of the family]" (Ruth et al, 1979, p. 1180). The INFO-POMR also contains, separate from the Family Master Problem List, a Temporary Problem List and a Chronic Medication List. This latter document is maintained on each member of the family and is located on the inside front page of each individual's chart. It is intended as a tool to record self-limited problems. The

creation of the INFO-POMR is a reflection of the concern expressed by many family practice providers and others over putting the family into family practice.

Papa (1985) reports the development of an emergency medicine clinical problem-solving system (EMCPSS) which follows from the POMR devised by Weed. Papa contends that "in a field as broad as emergency medicine, no physician can remember the most complete, accurate, and current information necessary for the highest level of diagnostic proficiency. Such limitations make the need for accessible reference materials obvious" (1985, p. 660). In this regard, he notes the primary advantage of the POMR is the inclusion of a concise list of "problem-oriented differentials, or cause lists" (1985, p. 660). Herein, however, he finds the chief flaw in the POMR stating that "as the body of medical information grows, these cause lists lengthen, making it difficult for physicians to use them maximally in clinical problem solving" (1985, p. 660). Papa characterizes Weed's POMR as primarily a record-keeping system which, although it implies an information processing methodology, does not explicitly support information processing. Designed to be compatible with the information recording procedures inherent in the POMR and also to link that data with information sources, the EMCPSS is meant to aid the

physician in making rapid and accurate diagnoses.

The EMCPSS is composed of five phases: (1) a preliminary data base, as described by Weed; (2) problem identification, also as described by Weed; (3) problem-oriented medical inquiry; (4) pattern matching; and (5) patient management, as described by Weed. So it may be seen that in Papa's approach, phases three and four are the information processing phases of the system. Phase three, the problem-oriented medical inquiry, includes four steps: (1) defining the problem-oriented cause list; (2) redefinition of the cause lists into structural, or tissue and organ systems, and functional, or pathiophysiologic process, commonalities; (3) focused patient reevaluation; and (4) ranking of structural and functional commonalities. The first step, according to Papa (1985), is to construct a list of the several possible causes of the problem of concern. Next, the physician attempts to reduce this list of perhaps 20 or more potential causes to a maximum of four to seven, so that he is not overloaded with data. This is to be accomplished by redefining and summarizing the items enumerated in the cause list into structural and functional commonalities. The physician then reevaluates the patient in a general sense, using general clinical skills, "separately focusing on and comparing among a

handful of structural and functional causes" (Papa, 1985, p. 663) as they have been redefined. Finally, in phase three, the physician ranks both the structural and functional issues most likely contributing to the problem. The leading issues are then combined and represent a preliminary impression to be processed in phase four.

Phase four of Papa's model, pattern matching, is comprised of five steps. These are: (1) defining patterns or diseases to be matched; (2) comparison of disease patterns with patient findings; (3) ancillary tests, for further diagnostic refinement; (4) determination of the most likely diagnosis; and (5) estimation of diagnostic confidence. In step one, the signs and symptoms, or patterns, attributable to the diseases or disorders consistent with the preliminary impression derived in phase three are enumerated. In step two, these patterns are matched, where possible, to patient findings. In the third step, the physician may order additional tests to further distinguish among the possible final diagnoses. Upon obtaining the results of these additional tests, in step four, the physician concludes the most likely diagnosis. And finally, in step five, the physician "acknowledges his degree of confidence in his diagnosis in light of the results of

the work so far" (1985, p. 663).

Sigurdsson et al (1984) report the development of a problem-oriented medical record for use in primary care. In Iceland, prior to 1975, documents comprising a patient's medical record were maintained in several separate locations. Separate files for outpatient care, inpatient care, immunization records, preventive health records, and also letters from hospitals and specialists were kept. New legislation, in 1974, mandated the creation of a new, consolidated medical record. This new document was comprised of eight forms: (1) the contact form, used to record data each time a patient touched the health center; (2) a problem list, used as an index to the record; (3) a health questionnaire; (4) a continuation sheet; (5) a flow sheet; (6) a drug sheet; (7) a laboratory results sheet; and (8) a laboratory request form. Partially automated, this system had been adopted by most health centers in Iceland at the time of Sigurdsson's et al report. Advantages perceived with the implementation of the problem-oriented record include a consolidated data base and, owing to the automated nature of the system, a wealth of readily available demographic and epidemiological data, which has been consistently and methodically compiled since 1975, which is easily retrievable at minimal cost.

Effective Implementation and Use of the POMR and MPL

While there have been several modifications and enhancements to both the POMR and the MPL, to facilitate a variety of purposes, their most effective use has also been subject to study. Margolis, Barak, Vardy, and Winter (1984) undertook a study to determine the effect of the POMR on the process of medical problem solving. The use of a POMR consisting of preprinted data base forms, a problem list, and problem-oriented admission and progress notes was implemented in a university hospital. At three months and 15 months following implementation, the quantity and type of data collected and the number of problems identified were measured. Samples of 100 records each, on both occasions, were taken from the university hospital and the two control hospitals, which were of similar size and served approximately the same sized populations. While the two control hospitals were using only a limited preprinted data base form, the study revealed that the quantity of data collected by the three hospitals was not significantly different, although one of the two control hospitals, which listed more items on its preprinted data base form, did score higher in terms of both the subjective and objective data recorded. It was also noted that both subjective and objective data

were more thoroughly recorded at the university hospital following implementation of the POMR. Otherwise, there was no significant difference noted among the hospitals in regard to the number of problems identified at either the patient's admission or discharge. Generally, it was determined that "the introduction of standardized data base forms increased data collection significantly... [and] that the amount and type of data collected corresponds with the length and degree of specification of the preprinted forms" (Margolis et al, 1984, p. 1049).

Notwithstanding the several attributes of both the POMR and the MPL, some authors have identified aspects of the concept which might be improved. One of these has to do with the limitations of the language, i.e., "existing diagnostic terms and taxonomies" (Freer, 1980, p. 867), used by clinicians to describe ill health in an holistic fashion. Freer (1980) suggests that MPLs do not adequately communicate the unique mix of problems for any individual. He also notes that the POMRs implemented in many health care facilities over the years are poorly documented and maintained, suggesting that many physicians using the system are not familiar with Weed's original text. Based on his own study, performed in 1978 wherein patients maintained diaries describing their own health problem, emotions, and feelings, Freer suggests

the implementation of a new, more holistic vocabulary in the description of illness.

Still focusing on improving the effective use of the MPL, Donaldson and Povar (1985) report a case study in changing clinician behavior. They comment that the quality assurance subcommittee of the George Washington University Health Plan (GWUHP), a health maintenance organization located in Washington, D.C., directed a study of the accuracy of MPLs in the modified version of the POMRs they maintained. The committee was concerned at the potential for lack of quality in the care provided, inefficient use of resources, unreliability of the MPL for quality assurance (QA) purposes, and the poor quality of the POMR for educational and legal purposes for the lack of adequate documentation. In their study, "four pairs of physicians reviewed 25 records of follow-up patients with established MPLs" (Donaldson and Povar, 1985, p. 329). Each of the records was reviewed independently by each of the physicians and then the pairings were rotated. Their findings revealed that the accurate status of problems were indicated in the MPLs in only 64 percent of the cases reviewed and that significant problems were not listed in 23 percent of the cases. Overall, they rated only 44 percent of the MPLs as adequately documented. In a concurrent survey of

GWUHP physicians, it was noted that they "regarded the MPL as especially important when seeing patients they did not know...yet practitioners rated their own MPLs as midway between optimal and inadequate" (Donaldson and Povar, 1985, p. 329). Physicians were also noted to have indicated that they were only somewhat likely to maintain accurate MPLs for their own patients. Following these studies, workshops on the use of the POMR and the MPL were conducted. Eighteen months later, however, there had been considerable staff turnover and no appreciable improvement could be discerned in the maintenance of MPLs. Over the course of the ensuing three years, the QA subcommittee attempted four successive interventions to improve the situation. They conducted two in-service workshops, a feedback experiment, and finally a mandate that teams of physicians develop their own method for updating all active records. This latter plan, involving the formulation and implementation of plans by the physicians themselves, produced a significant improvement in the accuracy of the MPLs (Donaldson and Povar, 1985).

Implementation of the MPL by the Army Medical Department

Prior to the appearance of Standard 5, in the Hospital-Sponsored Ambulatory Care Services chapter of the 1985 edition of the Accreditation Manual for

Hospitals, there had been no impetus to create a MPL for consistent use throughout the Army health care delivery system. The growth of family practice as an area of clinical specialization gave rise to the sporadic use of MPLs, of local design, and the concern of a limited number of individual physicians in individual hospitals and clinics sometimes produced locally developed MPLs. The use of these documents, however, often waned with the frequency of staff turnover and the press of other priorities. Beginning in 1985, however, Standard 5 gave new urgency to the need to field a MPL across the Army health care delivery system and to provide guidance for its use and placement in the medical record.

Procedures for the preparation, maintenance, and use of ambulatory or outpatient medical records within Army medical treatment facilities (MTFs) are prescribed in Army Regulation 40-66, Medical Record and Quality Assurance Administration. A review of this document reveals that the Army does not maintain its outpatient records in the POMR format. Thus, guidance concerning the proper use of a MPL, to be incorporated into these records, was needed. This guidance first appeared in the Commanding General, HSC Bulletin No. 3-85. This guidance stated that the Office of The Surgeon General had authorized the MPL to be filed as the top document on the

left side of the records jacket, and that MTFs could achieve gradual and systematic compliance with Standard 5, by requiring the following action pursuant to a patient visit:

(a) First visit on or after 1 January 1985:

1 Incorporation of a Master Problem List in the [outpatient] record.

2 As a minimum, documentation of the current problem for which the patient is seen, medications prescribed, and procedures performed.

(b) Subsequent visits: as a minimum, documentation of the current 'problem' for which the patient is seen, medications prescribed, and procedures performed.

(Department of the Army, 1985).

HSC also developed and fielded a MPL form, the HSC Form 79-R. Later, in October 1986, the form was slightly revised and reissued as DA Form 5571. Compliance with its guidance has become a problem for HSC however. The HSC Inspector General's Office reports that no less than five Army MTFs surveyed by the JCAHO during calendar year 1988 have received contingencies relating to their level of compliance with Standard 5 (Jack, 1988).

Summary

Several salient points were derived from the literature. First, it is evident that the MPL is only a component of the larger POMR concept advanced by Weed. It is not intended to stand alone, rather it should serve

as an index to the patient's record, facilitating order and continuity in the document. Second, the identification and documentation of significant problems is enhanced when the MPL is used in conjunction with a preprinted data base form. In this regard, the literature suggests that the more specific the data base form, the better the documentation. Third, use of the MPL, in conjunction with appropriate data base forms, progress notes, and plans not only facilitates clinical problem solving, but provides a base for continuing education, quality assurance, utilization review, and research. Fourth, the POMR, to include the MPL, is easily adapted to facilitate implementation in a variety of settings. Fifth, that physicians recognize the value and significance of the MPL, but are not likely to be conscientious in keeping it updated. The literature further suggests that the accurate maintenance of the MPL by physicians can be improved if the methodology for doing so is one of their own design. Finally, it is evident that the MPL currently in use within the Army health care delivery system is not an index to the outpatient record nor is it keyed to any other documentation. Further, judging by the results of recent JCAHO accreditation surveys, it has been poorly implemented, at least insofar as significant compliance

with Standard 5 is concerned.

Research Methodology

The initial step of this research effort focused on determining the number of outpatient medical records held by DACH. This information was obtained through discussion with the Noncommissioned Officer in Charge of the Outpatient Treatment Records Branch of the Patient Administration Division, which is responsible for maintaining all of the hospital's outpatient medical records. The data obtained was used to compute the sample size necessary to achieve a 99 percent level of significance in a cross-sectional audit of the finite population of outpatient records held by DACH (Appendix C). In order to enhance the reliability of the sample, an interval estimate of five percent was selected. Further, since the proportions of the characteristics of interest in the population of concern were not known, a value of .5 was selected for this probability, as it was known that this would yield the maximum sample size.

Having determined the appropriate sample to be obtained, a cross-sectional audit of the finite population of outpatient medical records was conducted to determine the proportions of the population in which:

- (1) a medical summary list was present, (2) the form was

either blank or improperly completed, (3) the form was filed in the correct location, (4) patient identification data was affixed to the form, (5) medications were recorded in the correct location, and (6) documentation existed that the patient had presented for care at least once in a clinic wherein the medical summary list could have been completed, during the period 1 October 1987 through 31 September 1988.

Once the sample data was collected, 99 percent confidence intervals were constructed around the true proportions of the characteristics of interest within the population of concern. The percentages derived in this fashion were transformed into actual numbers of outpatient records exhibiting these characteristics. Thus, both best and worst case values were obtained for each of the characteristics of interest. This data was then analyzed to determine the current level of variance from DACH's goal of 90 percent compliance with the JCAHO standard and the extent of improvement that could be achieved within the ensuing year if only cursory action was taken to address shortcomings.

II. DISCUSSION

In considering how to best approach the assessment of DACH's position relative to the goal of 90 percent compliance with the JCAHO standard concerning the use of the MPL, the first critical task was to determine those characteristics of an outpatient record and of the MPL which represented compliance. The ground work for making this determination was established by reviewing the 1989 edition of the JCAHO's Accreditation Manual for Hospitals, the results of the most recent accreditation survey, the results of the subsequent focused survey, and the requirements of Army Regulation (AR) 40-66. Synthesis of these materials culminated in the identification of the following characteristics of interest: (1) presence of the MPL in the medical record, (2) consistent placement of the MPL in the same location in every record, i.e., on top of all other documents on the left hand side of the records jacket, (3) presence of patient identification data on the MPL, i.e., at least the patient's first and last names and the Social Security Account Number of the patient's sponsor, (4) presence of all of the data required by the MPL in each entry, and (5) consistent recording of medications in that section of the MPL labeled for that purpose. In addition, it was determined

that it was necessary to record whether or not the patient had been seen at DACH, in a clinic wherein it could be expected that the MPL could be completed within the last fiscal year. This data was determined to be necessary as a gauge to the number of these patients which might be anticipated to be seen in the following year and, thus, the number of opportunities to improve compliance with the JCAHO standard that may occur.

Upon selecting the characteristics of interest, the next tasks were to determine the number of outpatient medical records held by DACH and the quantity of these that would have to be audited to achieve a 95 percent level of significance. Discussion with the Non-Commissioned Officer in Charge (NCOIC) of the Outpatient Records Branch revealed that a count of the actual number of records held was completed on October 31, 1988. This revealed that a total of 47,843 records were on file. In further discussion, however, he also indicated that several additional records had been received and a number of others permanently removed from the files in the two weeks since this inventory was completed. On the whole, it was his impression that the actual stock of records held had increased moderately. Given this appraisal, the investigator determined to round the number of records held by DACH up to 48,000.

Based on this number, the required sample size was determined to be 666 records. Also based on this number, it was determined that the 90 percent level of compliance was equal to 43,200 records. Sample records were selected at random by the investigator and reviewed in the records room. In order to ensure that all of the records held were equally represented, an approximately equal number of records was selected from each of the 10 color coded groups of records held.

Audit Results

Of the 666 records audited, the MPL was noted to be present in 383, or 57.51 percent. In another 119 records, it was observed that only one side of the MPL, a two sided form, was present. However, since the form was not complete, these were not counted as contributing toward the goal of compliance. Of the 383 records wherein the MPL was found to be present, 347, or 52.1 percent of the records sampled, were filed in the correct location in the records jacket in accordance with AR 40-66. In 316, or approximately 44.45 percent, of the records sampled the MPL was either blank or improperly completed and only 116 records, representing 17.42 percent of the sample, evidenced the necessary patient identification data. Medications were recorded in only

68 of the records reviewed. Of these, medications were recorded in the correct location in 60, or nine percent of the sample. No medications were recorded in the remaining 315 records wherein the MPL was present. Only one, or .15 percent of the 666 records audited, was indisputably in full compliance with the JCAHO standard. In another 25 records, there were no apparent deficiencies except that no medications were recorded on the MPL. Together, these 25 records and the one record that clearly met the standard, represent 3.9 percent of the records sampled which appeared to be in substantial compliance with the JCAHO standard. It was also noted that 395 of the records reviewed, or 59.31 percent of the sample, indicated that the patient concerned had been seen in a DACH clinic during FY 1988, wherein the MPL could have been updated and deficiencies concerning the location in which the form was filed could have been corrected.

Several other observations were also made during the conduct of the audit. For example, the most common errors made included: entering a major problem on the MPL, but excluding either or both the date of the entry or onset of the problem; filing other forms on top of the MPL, over time, thereby excluding it from its correct placement in the record and easy access by other

providers; and the lack of any patient identification data. It was also noted that several different types of MPLs, other than the HSC Form 79-R or the DA Form 5571, were filed in the records. Of these, there were 12 Navy MPLs, six Air Force MPLs, and 61 Army MPLs. There were at least two versions of these Army MPLs, an HSC Form 79, to which no reference could be found in the literature, and a DeWitt Army Hospital (DAH) Form 3, dated 3 September 1973. The latter form appeared to have been an early version of the MPL generated by the Department of Family Practice. Finally, it was also noted that there were at least two other types of MPLs filed in the records, however, these were all reproductions rather than original documents. All were such poor copies that their origin could not be determined.

Analysis of the Audit Data

In order to realize the first of this study's three purposes, the audit results were analyzed to establish 99 percent confidence intervals around the true proportions of the characteristics of interest within the finite population of outpatient medical records held by DACH. These calculations are presented at Appendix D. The results of this analysis reveals that:

1. The DCA can be 99 percent confident that a MPL

is present in between 53 and 62 percent of the outpatient records held by DACH. This suggests that in the worst case only 25,440 of the 43,200 records required to meet the goal of 90 percent compliance with the JCAHO standard contain a MPL. In the best case this figure improves to a total of approximately 29,760 records which can be anticipated to contain a MPL.

2. The DCA can be 99 percent confident that the MPL is consistently filed in the correct location within the record in between 47 and 57 percent of the outpatient records held by DACH. This suggests that in the worst case only 22,560 records, of the goal of 43,200, contain a correctly filed MPL. In the best case this number of records increases to 27,360.

3. The DCA can be 99 percent confident that, of the 48,000 outpatient records held by DACH, between 42 and 52 percent contain a MPL which is either blank or improperly completed. Given the worst case, this indicates that in 24,960 of the records held by DACH wherein a MPL is present, it is either blank or improperly completed. In the best case, this number declines to 20,160.

4. The DCA can be 99 percent confident that between 13 and 21 percent of the 48,000 outpatient records held by DACH contain a MPL wherein patient identification data has been recorded. In the worst case this suggests that

only 6,240 such records are held. In the best case this number increases to 10,080 records.

5. The DCA can be 99 percent confident that medications are recorded in the correct location on the MPL in between six and 12 percent of the outpatient records held by DACH. This indicates that in the worst case medications are recorded in the correct location on the MPL in approximately 2,880 records. In the best case, this figure improves to 5,760 records.

6. The DCA can be 99 percent confident that, of the 48,000 outpatient records held by DACH, between 54 and 61 percent were those of patients seen in a clinic, during FY 1988, wherein the MPL could have been properly completed and filed.

The results of this analysis demonstrate that the stock of outpatient medical records held by DACH are not in substantial compliance. Based on the one record out of the sample taken, wherein all of the characteristics indicating compliance with the JCAHO standard was met, we can be 99 percent confident that no more than 480 of the records held are satisfactory in all respects. The extant degree of the calculated deviation from DACH's own goal of 90 percent compliance with the JCAHO standard is illustrated in Figure 1.

Having determined DACH's current position relative

to the goal of 90 percent compliance, the question which frames the second purpose of the study, is how much progress toward achieving the goal can be made if every opportunity, i.e., patient visit, to correct a deficiency is seized during the next 12 months? Given the

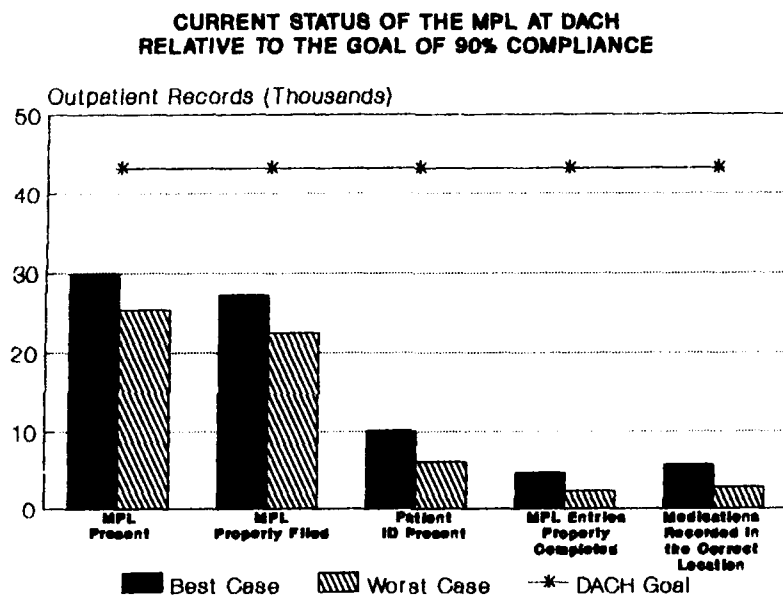


Figure 1.

assumption, made earlier, that the pattern of patient visits experienced during FY 1988 will remain constant in the ensuing year, and based on the information derived from analysis of the audit data, it may be anticipated that between 54 and 61 percent of the patient's whose records are held by DACH will be seen during the next year in a clinic wherein the MPL can be updated and/or properly filed. If each of these opportunities is

seized, then DACH could improve its position relative to the goal from the 480, or fewer records presently in compliance. The relative improvement over the course of the one year would be between 5,400 and 6,100 percent. This difference is illustrated in Figure 2. These

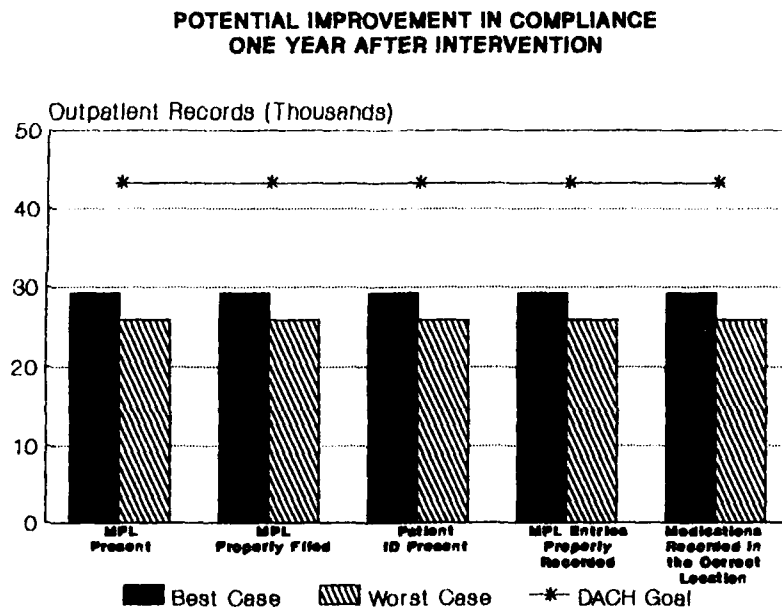


Figure 2.

figures do not, of course, take into consideration the dynamics of the receipt of new records by DACH for newly arrived patients, the transfer of records as some patients depart the area permanently, and the removal of some number of outpatient medical records from the files every year as records are retired. If managed appropriately, the cumulative effect of these factors could serve to enhance the overall compliance with the

the JCAHO's standard. The actual level of improvement within each of the characteristics studied, as well as the remaining deficit, in terms of meeting the goal, following this intervention, are summarized in Table 1. The data presented, however, does not take the positive effects of the aforementioned dynamics into consideration and, thus, should be viewed as the minimum achievable result or as somewhat understated.

Improvement One Year After Intervention

Characteristic of Concern	Improvement*		Deficit**	
	Best Case	Worst Case	Best Case	Worst Case
MPL Present	480	480	13,920	17,280
MPL Properly Filled	1,920	3,360	13,920	17,280
Patient ID Data Present	24,480	23,520	13,920	17,280
Entries Properly Completed	19,200	19,680	13,920	17,280
Medications Correctly Recorded	23,250	23,040	13,920	17,280

* - Indicates the number of outpatient medical records that could be improved, in regard to each characteristic of interest, one year after implementation of the intervention.

** - Represents the deficit between the improvement achieved one year following implementation of the intervention and the goal of 90 percent compliance.

Table 1.

Summary

It is evident from the information derived in this study that the outpatient medical records held by DACH generally fail, at present, to meet the JCAHO standard and the hospital's own goal of 90 percent compliance. This information also suggests that it is unlikely that the hospital's goal of 90 percent compliance can be achieved in one year if the only action taken to address the problem is to begin correctly completing the MPLs and ensuring that they are enclosed in the patient's records as they present for care in appropriate clinics. While it seems clear that substantial progress toward compliance can be achieved by pursuing this tact, a definitive completion date, or time required to achieve 90 percent compliance, cannot be accurately projected. Certainly, if DACH's goal is to be in 90 percent compliance with the JCAHO standard prior to the next full survey in April 1989, a more resource intensive approach must be considered. Even at this, however, the intervention addressed throughout this paper will need to be an integral part of any remedial program. If not, then only an interim resolution to the problem will have been achieved and the level of compliance will begin to decrease shortly thereafter.

III. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Many conclusions might be drawn from the information derived in the course of this study. In the view of this investigator, however, there three of import to this study itself. The first two have to do with the implementation and use of the MPL within the Army Medical Department (AMEDD), and the third addresses the issue of DACH's compliance with the JCAHO's standard regarding the MPL.

The review of the literature clearly indicated that Weed intended the POMR to be a framework to ensure order and consistency in the medical record. The MPL, in his concept, was the key document in the record, to which all others were indexed. Thus, the MPL was at once the instrument which was the vehicle to facilitate that order and consistency, and also a valuable tool for consultants and secondary providers, researchers and epidemiologists, and quality assurance monitors. Within the AMEDD, however, it would appear that implementation of the use of the MPL was only a response to the creation of a new accreditation standard. More specifically, a response that appears to have occurred without an appreciation of the central role of the MPL in the medical record.

Witness to this conclusion is borne by the office of HSC's Inspector General which freely admits that contingencies regarding compliance with the MPL standard are a common occurrence among Army hospitals that undergo a JCAHO survey. It would seem that what HSC has done is to create a form and mandate its use without an appreciation for its broader purpose, i.e., beyond simply satisfying the JCAHO. And, since the AMEDD's MPL is not an index to the rest of the record, it evidences no thread of continuity with the plans and progress notes recorded elsewhere in the record. Consequently, it is not surprising that AMEDD provider's are neither consistent or conscientious about recording the data required by the MPL, and subsequently, that the JCAHO routinely levies contingencies against Army hospitals that it surveys. The conclusion that this investigator has drawn is that the MPL currently employed by the AMEDD is poorly conceived and implemented.

The second conclusion drawn from the study addresses the AMEDD's implementation of the MPL throughout the Army health care delivery system, and also the ability of DACH and other Army MTFs to execute that effectively implementation. First, cursory discussion with providers at DACH indicates that few if any of them have been given any formal training in the use of the MPL. Second, there

is no existing guidance within the AMEDD which defines exactly what constitutes a problem of such significance that it merits being documented as either a major or minor problem. This dilemma is further exacerbated by the lack of any guidance as to how to record a contact with a patient whose visit has been for the purpose of health maintenance, e.g., immunizations, or something less than a minor problem in an otherwise healthy patient. The difficulty this circumstance poses is that not all providers have a uniform concept of what constitutes a problem, much less a minor versus a major problem. And, as in the latter instance posed above, how does a provider convey to a third party, i.e., a JCAHO surveyor, that while a patient has indeed been seen, the nature of the problem or complaint did not warrant an entry on the MPL? It seems rather clear that the lack of guidance in this area only serves to exacerbate the problem.

The third conclusion drawn from this study is that DACH is not substantially in compliance with the JCAHO standard or its own goal, concerning the use of the medical summary list, at this time. While it seems evident that significant progress toward both can be achieved over the course of the next year by pursuing a tact whereby extant deficiencies are corrected and records are updated as patient's present, there is little

that can be done to achieve a significant improvement prior to April 1989, the scheduled start of the next full survey. This is not to convey that a significant improvement cannot be achieved if some more aggressive and resource intensive approach is taken to the problem. Failing this, it is anticipated that 90 to 100 percent compliance can be achieved within three years, if the program is pursued consistently throughout the period.

Recommendations

It is the recommendation of this investigator that the approach explored in this study, i.e., the proper completion and filing of MPLs as patients present over time, should be pursued. While the immediacy with which a significant improvement in overall compliance can be achieved by a more resource intensive approach to the problem is not discounted, it is felt that this would certainly lead to some decreased availability of care in the short term and might well be perceived by the JCAHO as a shot in the arm rather than a remedy. It is felt that the more conservative approach, although slower, is more likely to yield the desired results. In order to effect this recommendation, the implementation of a program embodying the following points is recommended:

1. Provider education and command emphasis. This

should include a structured command effort to bring the MPL to the attention of providers in the hospital, as the current data suggest many are unaware of it. Further, this effort should communicate the hospital's goal of 90 percent compliance, as well as, the need for complete and accurate entries. In addition, the chief of each clinical department must develop a concurrent review such that no medical record of a patient seen within a subordinate service or clinic is returned to the records room unless the MPL has been updated, the patient's identification data affixed, and the form properly filed.

2. Development of a local policy, i.e., one specific to DACH as opposed to the entire AMEDD, specifying the entry to be made on the MPL to document the visit of a patient with no remarkable medical history, no significant complaint, or simply requiring care in the way of health maintenance. Such an entry would convey to secondary providers, consultants, and third parties, e.g., a JCAHO surveyor, that cognizance of the past medical history as well as current circumstances of the patient, whose record is being reviewed, has indeed been taken and noted by appropriate entities. Further, a taxonomy should be developed, and conveyed to staff providers, enabling them to identify and distinguish among major problems. It is

recommended that the development of this language and framework is the proper province of the chiefs of the various clinical departments working together.

3. Development of a procedure to ensure that the records of all patients which are newly received by DACH, to become a part of its files, are reviewed. The purpose of this review would be to ensure that a MPL is completed on each such patient, that it is made current, and that it is properly filed in the medical record. Further, this procedure should include that records being charged out of the records room will not be released, except in emergent circumstances, until the MPL is filed, or refilled if necessary, in the correct location and the patient's identification data is affixed. Also, no record is to be returned to the files until these actions have been completed.

4. An ongoing monitor be established in order to stay abreast of the changing level of compliance. To that end, it suggested that this study be replicated quarterly until such time as this program is supplanted by a new one or the hospital's Executive Committee determines that such an ongoing monitor is not needed. As the study is replicated each quarter, it is also recommended that a provider with appropriate qualifications, in addition to the required

administrative personnel, be assigned to the monitoring staff. It would be the responsibility of this person to determine whether or not both major and minor problems, past procedures, and current medications, that might not be recognized by administrative personnel, are indeed identified and recorded.

In addition to the foregoing, it is recommended that the program addressed above, having been satisfactorily implemented and refined, be presented to HSC as a model. Finally, it is recommended that the suggestion be put to HSC that a system wide study to determine just how successful the implementation of the MPL has been should be pursued. It is felt that the result will identify a system-wide problem.

APPENDIX A:

HSC Form 79-R, Master Problem List

APPENDIX B:

DA Form 5571, Master Problem List

APPENDIX C:

Sample Size Calculations

Sample Size Calculations

The objective of these calculations was to determine the necessary sample size, of outpatient medical records to be examined, to achieve a 99 percent level of significance. The population of outpatient records from which the sample was drawn numbered 48,000. In order to enhance the reliability of the sample, an interval estimate of five percent ($d = .05$) was selected. Since no information existed through which estimates of the proportions of the characteristics of interest could be determined, the probability of their occurrence (p) was set to .5, as it was known that this would yield the maximum sample size.

The required sample size was determined by use of the formula:

$$n = \frac{z^2 pq}{d^2}, \text{ where}$$

n = the sample size, or the number of records to be examined,

z = the confidence coefficient for the standard normal curve,

p = that proportion of the population of interest possessing the characteristics of interest,

$q = 1 - p$, and

d = the distance of the sample proportion from the standard normal curve.

Using this formula, we derive:

$$\begin{aligned}n &= \frac{(2.58)^2 (.5)(.5)}{(.05)^2} \\&= \frac{(6.6564) (.25)}{.0025} \\&= \frac{1.664}{.0025} \\&= 665.64 \quad \text{or} \quad 666 \text{ records}\end{aligned}$$

Since five percent of the population of concern was calculated to be 2,400 records, it was determined that the finite population correction factor did not have to be considered. Thus, it was determined that, in order to achieve a sample at the 99 percent level of significance, 666 outpatient medical records would have to be examined.

APPENDIX D:

Confidence Interval Calculations and Transformations

Confidence Interval Calculations and Transformations

In order to accomplish the objectives of this study it was necessary to construct 99 percent confidence intervals around the true proportions of the characteristics of interest in the population of concern. The upper and lower range, for each characteristic, was then transformed into the actual number of records that equated to that percentage. To perform the calculation of confidence intervals, the following formula was employed:

$$P(\tilde{p} - Z_{(1-\alpha/2)} \sqrt{\frac{p(1-p)}{n}} \leq P \leq \tilde{p} + Z_{(1-\alpha/2)} \sqrt{\frac{p(1-p)}{n}}) = .99$$

where,

x = the number of records in the sample taken wherein the characteristic of interest occurs,

$\tilde{p}$ = the proportion of records in the sample taken wherein the characteristic of interest occurs,

$Z_{(1-\alpha/2)}$ = the confidence coefficient for the standard normal curve, and

n = the total number of records sampled.

This procedure simply requires the drawing of a sample from the population of interest. Then, the sample proportion, of the characteristic of concern, is computed by dividing the number of cases wherein this characteristic occurs by the total number of cases in the sample. This sample proportion is then used as a point

estimator of the population. According to Daniel (1983), the confidence interval is then obtained by the formula: estimator $\pm$ (reliability coefficient) $\times$ (standard error). These calculations follow:

1. Calculation of the true proportion of the population of outpatient medical records held by DACH in which a MPL is present:

$$n = 666 \quad x = 383 \quad \bar{p} = \frac{383}{666} = 0.5750751$$

$$P\left(.575 - 2.58 \sqrt{\frac{.575(1-.575)}{666}} \leq P \leq .575 + 2.58 \sqrt{\frac{.575(1-.575)}{666}}\right) = .99$$

$$P\left(.575 - 2.58 \sqrt{\frac{(.575)(.425)}{666}} \leq P \leq .575 + 2.58 \sqrt{\frac{(.575)(.425)}{666}}\right) = .99$$

$$P\left(.575 - 2.58 \sqrt{\frac{.2443637}{666}} \leq P \leq .575 + 2.58 \sqrt{\frac{.2443637}{666}}\right) = .99$$

$$P\left(.575 - 2.58 \sqrt{.0003669} \leq P \leq .575 + 2.58 \sqrt{.0003669}\right) = .99$$

$$P\left(.575 - 2.58 (.0191546) \leq P \leq .575 + 2.58 (.0191546)\right) = .99$$

$$P\left(.575 - .0494189 \leq P \leq .575 + .0494189\right) = .99$$

$$P\left(.5256562 \leq P \leq .624494\right) = .99$$

$$P\left(.53 \leq P \leq .62\right) = .99$$

Thus, we can be 99 percent confident that the true proportion of these records which contain a MPL is between 53 and 62 percent. These percentages are transformed by:

$$\begin{array}{rcl} \frac{X}{48,000} & \times & \frac{53}{100} \\ 100X & = & 2,544,000 \\ X & = & 25,440 \text{ records} \end{array}$$

$$\begin{array}{rcl} \frac{X}{48,000} & \times & \frac{62}{100} \\ 100X & = & 2,976,000 \\ X & = & 29,760 \text{ records.} \end{array}$$

2. Calculation of the true proportion of the population of outpatient medical records held by DACH in which the MPL is properly filed:

$$n = 666 \quad x = 347 \quad \tilde{p} = \frac{347}{666} = .521$$

$$P\left(.521 - 2.58 \sqrt{\frac{.521(1-.521)}{666}} \leq P \leq .521 + 2.58 \sqrt{\frac{.521(1-.521)}{666}}\right) = .99$$

$$P\left(.521 - 2.58 \sqrt{\frac{(.521)(.479)}{666}} \leq P \leq .521 + 2.58 \sqrt{\frac{(.521)(.479)}{666}}\right) = .99$$

$$P\left(.521 - 2.58 \sqrt{\frac{.2495581}{666}} \leq P \leq .521 + 2.58 \sqrt{\frac{.2495581}{666}}\right) = .99$$

$$P\left(.521 - 2.58 \sqrt{.0003747} \leq P \leq .521 + 2.58 \sqrt{.0003747}\right) = .99$$

$$P\left(.521 - 2.58 (.0193572) \leq P \leq .521 + 2.58 (.0193572)\right) = .99$$

$$P\left(.521 - .0499416 \leq P \leq .521 + .0499416\right) = .99$$

$$P\left(.4710794 \leq P \leq .5709626\right) = .99$$

$$P\left(.47 \leq P \leq .57\right) = .99$$

Thus, we can be 99 percent that the true proportion of the population of outpatient medical records held by DACH in which the MPL is properly filed is between 47 and

57 percent. These percentages are transformed by:

$\frac{X}{48,000} \times \frac{47}{100}$		$\frac{X}{48,000} \times \frac{57}{100}$
$100X = 2,256,000$		$100X = 2,736,000$
$X = 22,560 \text{ records}$		$X = 27,360 \text{ records.}$

3. Calculation of the true proportion of the population of outpatient medical records held by DACH in which the MPL is either blank or improperly completed:

$$n = 666 \quad x = 316 \quad \tilde{p} = \frac{316}{666} = .474$$

$$P(.474 - 2.58 \sqrt{\frac{.474(1-.474)}{666}} \leq P \leq .474 + 2.58 \sqrt{\frac{.474(1-.474)}{666}}) = .99$$

$$P(.474 - 2.58 \sqrt{\frac{(.474)(.526)}{666}} \leq P \leq .474 + 2.58 \sqrt{\frac{(.474)(.526)}{666}}) = .99$$

$$P(.474 - 2.58 \sqrt{\frac{.2493484}{666}} \leq P \leq .474 + 2.58 \sqrt{\frac{.2493484}{666}}) = .99$$

$$P(.474 - 2.58 \sqrt{.0003744} \leq P \leq .474 + 2.58 \sqrt{.0003744}) = .99$$

$$P(.474 - 2.58 (.0193494) \leq P \leq .474 + 2.58 (.0193494)) = .99$$

$$P(.474 - .0499215 \leq P \leq .474 + .0499215) = .99$$

$$P(.424553 \leq P \leq .524396) = .99$$

$$P(.42 \leq P \leq .52) = .99$$

Thus, we can be 99 percent confident that between 42 and 52 percent of all of the outpatient medical records

held by DACH contain a MPL which is either blank or improperly completed. These percentages are transformed by:

$$\begin{array}{rcl} \frac{X}{48,000} \times \frac{42}{100} & & \frac{X}{48,000} \times \frac{52}{100} \\ 100X = 2,016,000 & & 100X = 2,496,000 \\ X = 20,160 \text{ records} & & X = 24,960 \text{ records.} \end{array}$$

4. Calculation of the true proportion of the population of outpatient medical records held by DACH in which patient identification data is not recorded on the MPL:

$$n = 666 \quad x = 113 \quad \tilde{p} = \frac{113}{666} = .170$$

$$P(.170 - 2.58 \sqrt{\frac{.170(1-.170)}{666}} \leq P \leq .170 + 2.58 \sqrt{\frac{.170(1-.170)}{666}}) = .99$$

$$P(.170 - 2.58 \sqrt{\frac{(.170)(.830)}{666}} \leq P \leq .170 + 2.58 \sqrt{\frac{(.170)(.830)}{666}}) = .99$$

$$P(.170 - 2.58 \sqrt{\frac{.1408819}{666}} \leq P \leq .170 + 2.58 \sqrt{\frac{.1408819}{666}}) = .99$$

$$P(.170 - 2.58 \sqrt{.0002115} \leq P \leq .170 + 2.58 \sqrt{.0002115}) = .99$$

$$P(.170 - 2.58 (.014543) \leq P \leq .170 + 2.58 (.014543)) = .99$$

$$P(.170 - .0375209 \leq P \leq .170 + .0375209) = .99$$

$$P(.1321488 \leq P \leq .2071906) = .99$$

$$P (.13 \leq P \leq .21) = .99$$

Thus, we can be 99 percent confident that between 13 and 21 percent of the outpatient medical records held by DACH contain a MPL on which the patient identification has not been recorded. These percentages are transformed by:

$$\frac{X}{48,000} \times \frac{13}{100}$$

$$100X = 624,000$$

$$X = 6,240 \text{ records}$$

$$\frac{X}{48,000} \times \frac{21}{100}$$

$$100X = 1,008,000$$

$$X = 10,080 \text{ records.}$$

5. Calculation of the true proportion of the population of outpatient medical records held by DACH in which medications are recorded in a location on the MPL that is labeled for that purpose:

$$n = 666 \quad x = 60 \quad \bar{p} = \frac{60}{666} = .090$$

$$P(.090 - 2.58 \sqrt{\frac{.090(1-.090)}{666}} \leq P \leq .090 + 2.58 \sqrt{\frac{.090(1-.090)}{666}}) = .99$$

$$P(.090 - 2.58 \sqrt{\frac{(.090)(.910)}{666}} \leq P \leq .090 + 2.58 \sqrt{\frac{(.090)(.910)}{666}}) = .99$$

$$P(.090 - 2.58 \sqrt{\frac{.246023}{666}} \leq P \leq .090 + 2.58 \sqrt{\frac{.246023}{666}}) = .99$$

$$P (.090 - 2.58 \sqrt{.0001231} \leq P \leq .090 + 2.58 \sqrt{.0001231}) = .99$$

$$P (.090 - 2.58 (.011095) \leq P \leq .090 + 2.58 (.011095)) = .99$$

$$P (.090 - .0286251 \leq P \leq .090 + .0286251) = .99$$

$$P (.061465 \leq P \leq .061465) = .99$$

$$P (.06 \leq P \leq .12) = .99$$

Thus, we can be 99 percent confident that medications are recorded in the correct location on the MPL in between six and 12 percent of the outpatient medical records held by DACH. These percentages are transformed by:

$$\begin{array}{rcl} \frac{X}{48,000} & \times & \frac{6}{100} \\ 100X & = & 288,000 \end{array}$$

$$X = 2,880 \text{ records}$$

$$\begin{array}{rcl} \frac{X}{48,000} & \times & \frac{12}{100} \\ 100X & = & 576,000 \end{array}$$

$$X = 5,760 \text{ records.}$$

6. Calculation of the true proportion of the population of outpatient medical records held by DACH which document that the patient concerned was seen at DACH, in a clinic wherein the MPL could have been properly completed and filed, during FY 1988:

$$n = 666 \quad x = 395 \quad \tilde{p} = \frac{395}{666} = .593$$

$$P(.593 - 2.58 \sqrt{\frac{.593 (1-.593)}{666}} \leq P \leq .593 + 2.58 \sqrt{\frac{.593 (1-.593)}{666}}) = .99$$

$$P (.593 - 2.58 \sqrt{\frac{(.593)(.407)}{666}} \leq P \leq .593 + 2.58 \sqrt{\frac{(.593)(.407)}{666}}) = .99$$

$$P (.593 - 2.58 \sqrt{\frac{.2413337}{666}} \leq P \leq .593 + 2.58 \sqrt{\frac{.2413337}{666}}) = .99$$

$$P (.593 - 2.58 \sqrt{.0003624} \leq P \leq .593 + 2.58 \sqrt{.0003624}) = .99$$

$$P (.593 - 2.58 (.0190368) \leq P \leq .593 + 2.58 (.0190368)) = .99$$

$$P (.593 - .0491149 \leq P \leq .593 + .0491149) = .99$$

$$P (.5439782 \leq P \leq .612218) = .99$$

$$P (.54 \leq P \leq .61) = .99$$

Thus, we can be 99 percent confident that between 54 and 61 percent of the patients whose outpatient records are held by DACH were seen in a clinic during FY 1988 wherein the MPL could have been properly completed and filed. These percentages are transformed by:

$$\frac{X}{48,000} \times \frac{54}{100}$$

$$100X = 2,592,000$$

$$X = 25,920 \text{ records}$$

$$\frac{X}{48,000} \times \frac{61}{100}$$

$$100X = 2,928,000$$

$$X = 29,280 \text{ records.}$$

7. Calculation of the true proportion of the population of outpatient medical records held by DACH which are in complete compliance with the JCAHO standard regarding the use of the MPL:

$$n = 666 \quad x = 1 \quad \tilde{p} = \frac{1}{666} = .002$$

$$P(.002 - 2.58 \sqrt{\frac{.002(1-.002)}{666}} \leq P \leq .002 + 2.58 \sqrt{\frac{.002(1-.002)}{666}}) = .99$$

$$P(.002 - 2.58 \sqrt{\frac{(.002)(.998)}{666}} \leq P \leq .002 + 2.58 \sqrt{\frac{(.002)(.998)}{666}}) = .99$$

$$P(.002 - 2.58 \sqrt{\frac{.0014992}{666}} \leq P \leq .002 + 2.58 \sqrt{\frac{.0014992}{666}}) = .99$$

$$P(.002 - 2.58 \sqrt{.0000023} \leq P \leq .002 + 2.58 \sqrt{.0000023}) = .99$$

$$P(.002 - 2.58 (.0015166) \leq P \leq .002 + 2.58 (.0015166)) = .99$$

$$P(.002 - .0039128 \leq P \leq .002 + .0039128) = .99$$

$$P(-.0024113 \leq P \leq .0054143) = .99$$

$$P(0 \leq P \leq .01) = .99$$

Thus, we can be 99 percent confident that no more than one percent of the outpatient medical records held by DACH meet the JCAHO standard in all respects. This percentage is transformed by:

$$\frac{X}{48,000} = \frac{1}{100}$$

$$100X = 48,000$$

$$X = 480 \text{ records.}$$

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