AN EXAMINATION OF PROBLEMS AND POSSIBILITIES FOR HEALTH DATA SHARING BY MIGRANT EDUCATION AND MIGRANT HEALTH

Prepared by the

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Foreword

The NMRP, Inc. is soley responsible for the contents of this document. Some descriptions of data use by both M.E. and M.H. are based upon the author's understanding of those processes at the time of writing. M.E. and M.H. are developing data base content both independently and in concert. This developmental effort creates a climate of change and some degree of uncertainty as to the exact data system design at any particular point in time. This document is based upon a time slice snapshot of both system designs. The extent of variation between the snapshot and reality is, hopefully, one of detail and not of concept.

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INTRODUCTION

Both Migrant Health Clinics and Migrant Education components render some health services to school age migrant children. Both M.H. and M.E. desire to coordinate these services for the attainment of three objectives:

a. to serve the greatest population with the resources available,
b. to eliminate duplication of services, and
c. to facilitate continuity of care of individual subjects.

Although these objectives interact, each stands as an important attainment in and of itself. In fact, each of these objectives is vital to the delivery of health services within M.H. and M.E. and between M.H. and M.E. where their client populations coincide.

One indispensable tool in the attainment of the three objectives is a patient information system which gives health providers access to each patient's medical background regardless of the migratory circumstances. During the past decade, M.E. has developed and operated a central data base containing over 500,000 records of migrant students served by M.E. programs across the U.S. and Puerto Rico. These records are available to about 15,000 school districts through the intermediary vehicle of about 150 terminals located across the United States. The primary mission of the M.E. system is to store, and transmit information which is needed to facilitate continuity of educational services; and, as a consequence, to facilitate continuous educational achievement and growth among migrant students. Associated with, but secondary to, this primary mission is also a data base of student health records. These health records are limited in scope to that health information which is relevant to the types and levels of health services rendered through M.E. field components--the majority of such services being immunizations and screening exams typically given school-age children by school nurses, county health workers, etc. It is possible to place other health information into student records. The M.E. system permits the reporting of "health problem" data. However, health problem data requires a diagnosis and the making of diagnoses is, by law and by medical ethics, usually restricted to physicians and, under some circumstances, nurse practitioners. Except in cases of special programs or referrals, M.E. field components do not normally have these levels of health professionals available.

Although the M.E. student health record has served its purpose, there is always room for improvement and, for several years, M.E. users have been developing a "new" health record to replace the current one.

Until 1979, Migrant Health had not developed a computer based patient information application of national scope. M.H. had, however, developed and operated a manual patient referral system. In its desire to overcome the obstacles to reducing duplication of services and facilitating continuity of care, M.H. decided to take several actions as follows:

a. To develop a design for a comprehensive computer based system of patient information that is appropriate to the types and levels of health services provided by migrant health clinics.

b. To develop a design for a comprehensive health center information system.

c. To use the existing Migrant Education student health information system as it can in the interim (for school-age migrant patient's only).

All actions are well underway although technical difficulties have severely hampered the success of action (c).

The fact that Migrant Education was re-designing its student health record at the same time that Migrant Health was designing its patient information system made it natural for Migrant Education and Migrant Health to coordinate these efforts in an attempt to produce designs that permitted the "sharing" of medical information concerning school age migrant children. The programmatic advantages to be gained by sharing this medical information are significant. It is the goal of this document to identify the problems that must be overcome if such sharing is to take place. Since problem recognition preceeds problem solution, it is felt that a clear understanding of the barriers to sharing migrant student medical information is the first step in removing those barriers.

SECTION I

Examination of Several Key Assumptions Underlying Migrant Education/Migrant Health Coordination of Medical Data

In their mutual zeal to share medical information and to coordinate the delivery of services to migrant students, both Migrant Education and Migrant Health have permitted several assumptions to go unrecognized and unexamined. As it usually the case in human affairs, unexamined assumptions eventually undermine the foundation of collective purpose. The following material examines one such assumption whose mutual understanding is necessary if Migrant Education and Migrant Health are to reach the goal of inter-program coordination for the delivery of health services to school-age migrant children.

ASSUMPTION: Sharing health data equals sharing a system.*

Further evaluation of this basic assumption reveals a hidden but corollary assumption which is:

Sharing data equals sharing a data base (in the literal sense).

As assumptions, neither of the above are necessary; and, if caution is not exercised, can obscure the objectives stated in the introduction.

Sharing health data and sharing a health data system (or data base) are two independent issues. The two questions that must be answered with respect to each issue are:

1. Should it be done, and
2. Can it be done?

Although each issue is decided on the basis of the same identical questions, these questions rely upon quite different criteria to use in resolving each issue. These questions and the criteria by which they may be addressed are discussed in the remainder of this section.

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*the term system is used in the large sense to include hardware, software, communications network, operational procedures, documentation, training materials, etc.

The issue: The sharing of school-age migrant children's health data by M.E. and M.H.

Question 1: Should it be done?

The preceeding portion of the present document has reiterated the very strong reasons for a sharing of data. The alternative to sharing data is not sharing data--together with its negative implications.

Question 2: Can it be done?

This question must consider three areas:

a. operational feasibility,

b. technical feasibility, and

c. economic feasibility.

M.E. has a mission to perform. It has developed the MSRTS to support that mission. The information carried by the MSRTS has been tailored to the kinds and levels of services (including health) that are delivered by M.E. to a particular population (i.e. migrant students).

M.H. likewise has a mission. It must tailor its information system to support the delivery of health services to a particular population (i.e. migrants). There are vast differences in the information required by each program (M.E. and M.H.) to carry out their respective missions in health services delivery. These differences do not, as some have ventured, reflect lesser or greater desire on the part of either program to serve school-age migrant children. They simply reflect the fact that each program, M.E. and M.H., delivers different types and levels of health services, using different levels of health resources operating in different settings from each other. The bulk of the present document addresses itself to these differences, their detailed implications and some alternatives for data sharing. Until these differences and alternatives are well understood, there is little to be gained in examining the technical or economic feasibility of sharing health data.

The Issue:

The sharing of a single health data system by M.E. and M.H. (remembering that the term "system" is used in its larger sense to include hardware, software, communications network, operational procedures, documentation, training materials, etc.)

An adequate analysis of this issue lies outside the scope of this document which is to examine the issue of sharing health data. A few of the salient aspects of this issue will be examined, however, to make further distinct the difference between sharing data and sharing a data system.

System needs are generally determined by a program's mission, the population it serves, and its operational environment. These three factors differ significantly between M.E. and M.H. As might be expected, the system needs of each program differ as a consequence. A discussion of each of these areas of difference follows.

M.E. and M.H. Client Population Differences

In addition to true migrants of all ages, M.H.C.'s often serve seasonal farmworkers, other populations as defined by various funding sources and also carry out specific programs called initiatives. M.E. on the other hand, serves school age migrant children: the following chart serves to illustrate.

	0-4 age	5-18 age	18 up age	seasonal farmworkers	other populations served (as defined by funding source) CHC	RHI	HURA	(INITIATIVES)		
M.E.		X								
M.H.	X	X	X	X	X	X	X	X	X	X

The above chart highlights two significant differences between the populations served by M.E. and M.H.C.'s.

1. M.H.C.'s serve a far larger (many orders of magnitude) population.

2. The population served by both M.E. and M.H. is a very small subset of the population served by M.H. clinics.

It is simply not reasonable to assume that a "slight expansion" or indeed any forseeable expansion of the MSRTS is the best alternative to meeting the population served by M.H.C.'s. To serve only part of a M.H.C.'s population (i.e. school-age migrant children), introduces intolerable redundancies and "add-on" processes into already overburdened clinic administration as will be covered below summarily.

M.E. and M.H. Mission Differences

The mission of M.H. is to deliver health services (inc. appropriate and directly related social services) to families as well as

to individual patients. M.H. does deliver health education services in the areas of self-care, nutrition, etc., but these services are for its entire client population, and are part of an integrated health delivery total service.

The primary mission of M.E. is of course, compensatory education with secondary and limited emphasis on the delivery of health services.

It is not reasonable to assume that the MSRTS, whose major role is to support M.E.'s educational mission, will be able to incorporate the support of an entirely different mission (viz. M.H.'s mission). As one alternative vehicle for M.H., the MSRTS will certainly be evaluated but not in this document.

Even within the specific area of health services delivery, there are significant differences between the two programs as the following chart will reveal.

Health Services delivered Routinely	M.H.	M.E.
Diagnosis:		
medical consultation, observation and evaluation	X	
medical examination of systems and organs	X	
specifying diagnostic procedures	X	
performing diagnostic procedures	X	
interpreting diagnostic procedure results	X	
Treatment:		
Performing minor surgical procedures (in clinic)	X	
(in hospital) major surgical procedures	X	
in hospital care	X	
prescribing and managing medication	X	
issuing medication	X	
managing convalescence	X	
Specialities:		
complete OB-GYN services,	X	
pediatric care	X	
other	X	
Standard Services:		
Immunizations	X	X
Physical exams	X	X
Screeing exams	X	X

As may be observed, even within the area of health services delivery, there are vast differences between M.E. and M.H. Once again, it is not reasonable to assume that the MSRTS is the best alternative vehicle for the M.H. information system. As one inspects the list of services on the preceeding chart, it occurs to one that the statement that "M.E. and M.H both deliver health services" is true in name only and not so much in substance. It is abundantly

clear from that chart that differences in the types and levels of services define two entirely different programs which will need two very different systems of information support.

Differences between M.E. and M.H. in Operational Environment

M.E. is an S.E.A. program operating through the vehicle of various agreements (e.g. service contracts, etc.) with L.E.A. Whereas M.E. (at the state level) may require that certain program attributes be included in (or excluded from) an L.E.A.'s M.E. component, it has little or no direct involvement in L.E.A. management. Each L.E.A. is a self-contained unit which discharges its own management functions (e.g. accounting, personnel, policy setting, payroll, etc.). Neither M.E. nor, as a consequence, the MSRTS supports L.E.A.'s in these management functions. Furthermore, M.E. is a compensatory program prohibited by law from providing services which an L.E.A. would ordinarily provide its students. Thus, M.E. represents an adjunct of concern to an L.E.A. and the MSRTS reflects this role. It supplies information to support compensatory services only. The quality of educational services (including M.E.) delivered by an L.E.A. is affected, vitally, by the quality of each L.E.A.'s internal total management system. (viz-system of management). An L.E.A.'s M.E. program may be enhanced by MSRTS information only to the extent that the Local Educational Agency capitalizes on such information. A well managed Local Educational Agency is able to use MSRTS information to the benefit of its migrant students and a poorly managed L.E.A. cannot. Either way, the MSRTS cannot intervene in the Local Educational Agency's internal management processes.

Migrant Health services are delivered through the vehicle of Migrant Health Clinics whose sole function is the delivery of health services to its entire population. Each Migrant Health Clinic is directly funded through an H.E.W. Regional Office as well as through patient fees and third party payments (e.g. insurance, etc.). As in the case of Local Educational Agencies, each Migrant Health Clinic is a unitary organizational entity responsible for its own management and survival. It is answerable to federal, state and local laws as well as local medical codes/practices, and to a governing board comprised of users and other interested parties. Within its available resources (inc. income), the quality of services delivered by a Migrant Health Clinic is vitally affected by the quality of management support underlying the clinic. It is a matter of record that clinic resources always fall below the amount and scope of services needed by the client population. Getting the greatest possible amount and quality of services from available clinic resources is an unrelenting, demanding and constant management task. Clinics are in serious need of information system support services to enable them to function at their optimum level. An information system must support all clinic functions including: patient data, accounting, report generation, utilization of resources, drug inventory, third party billing, cash flow status, budget preparation, monitoring and control, medical management, and on and on.

Migrant Health Clinic management differs from hospital management in size only and not in scope or complexity. Migrant Health Clinics not only need information system support in the aforementioned management functions, they need a system which helps them integrate these functions into a smooth running and efficient operation. A system which addresses only one or two of these functions, or one which addresses these functions in a fragmented fashion is probably more of a burden than a benefit. For example:

A patient visit to a clinic is an encounter. Each encounter is a "unit of services" regarding an individual patient. An encounter generates a broad range of information including diagnoses, diagnostic procedures and results treatment procedures, medications prescribed and/or issued, scheduling for follow-up, etc.

This information resulting from a single encounter affects many management functions that must occur daily such as:

a. patient medical data
b. patient billing
c. third party billing
d. required federal reporting (of diagnoses, etc.)
e. pharmacy inventory
f. diagnostic procedure inventory (X-rays, specimen testing agents, etc.)
g. clinic resource scheduling
h. patient referral documentation preparation
i. accounts receivable
j. etc.
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All these functional sets of clinic management/administrative information are directly affected by an encounter. An INTEGRATED management information support system will be able to take the data generated from an encounter and impact all these functional sets of data. A fragmented system will require that encounter data undergo data entry preparation, reduntantly, for each functional set of data thereby further straining the already overburdened clinic resources. The result of this operational environment is that a clinic cannot operate independent data systems for independent functions. It is, for example, unthinkable and irresponsible to plan a system which requires clinics to prepare encounter data for entry into one system whose sole purpose is that of maintaining patient medical data and to prepare the same data for entry into another system whose purpose is to process management and administrative data for the functions that have been discussed. Whether the MSRTS is a suitable vehicle for such an integrated system is an ALTERNATIVE for consideration and certainly not an acceptable ASSUMPTION.

Unfortunately, those in Migrant Education with whom Migrant Health has been coordinating health data have not had the opportunity to become knowledgeable about the M.H.C. population, mission, and operational setting. This dearth of experience has created a few

misunderstandings. One such misunderstanding is that M.H.'s attention to designing an information system that will be responsive to total M.H.C. needs represents a lesser devotion to serving migrant children.

A second misunderstanding that has arisen is as follows:

> Since both Migrant Education and Migrant Health are serving the same child (i.e. school-age migrant children), it stands to reason that both programs can use the same data base and system.

The content of this document establishes a rational framework for defusing the above minunderstandings. Even though both programs deliver something called "health services," the substance of those services are so different as to warrant their being called by different names.

Another misunderstanding is that a devotion to the cause of sharing data automatically compels both programs to have identical systems including user training materials, etc. Such identicality need not exist, indeed may not be possible, desirable or the best approach for either program. When the Army and Navy coordinate their services to accomplish the common goal of defending the United States, it is not done by insisting that both branches of service use tanks (tanks don't do well on the open seas) or that both use ships (ships are notoriously poor performers in the desert). The same is true in the present case. Both Migrant Education and Migrant Health <u>can</u> coordinate their services to the benefit of school-age migrant children. However, that coordination must be carried out so that it neither prohibits either program from carrying out its mission nor forces either program to distort its mission so that both "fit" a narrower goal-(i.e. that of coordinating services).

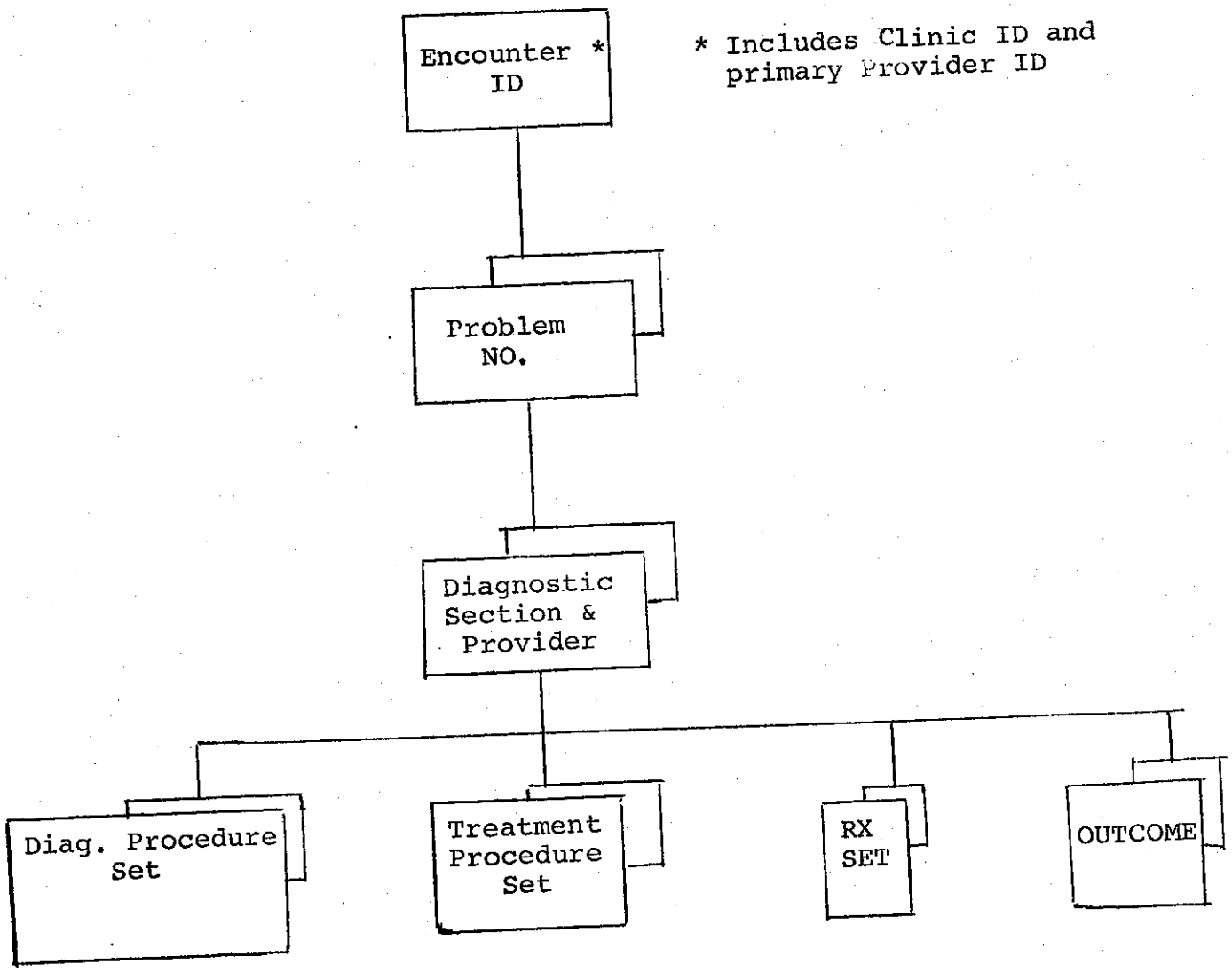
Note: None of the matters discussed under the issue: "the sharing of a single health data system by M.E. and M.H." go beyond this page. The remainder of this document deals with the problems that must be faced if M.E. and M.H. are to share health data on school-age migrant children.

SECTION II

Fundamental Differences Between the Migrant Education and Migrant Health Medical Information Applications

The Migrant Health information system is essentially an "Encounter Driven" application, whereas the Migrant Education Health information application is essentially "Procedure Driven".

A patient/clinic encounter is a set of related data whose natural hierarchy is shown below.



As will be discussed, the above structure is totally inappropriate to the M.E. Medical Record because of major differences in record content and display requirements.

The hierarchical structure shown above constitutes a complete brace of data resulting from each patient/clinic encounter. An encounter is, in fact, a universal corner stone of clinic operation in which all patient data resulting from an encounter is collected together on a single "Encounter Form" which is assigned a (clinic) unique number. For this reason, we refer to the migrant clinic information system as being Encounter Driven.

Health data resulting from services provided by Migrant Education components is generally event oriented. These events are likely to be single procedures (viz., immunizations, a vision screening exam, etc.) and, do not encompass an entire cycle of actions (i.e. diagnosis/procedure/outcome/Rx). This is not to say that Migrant Education health components will never generate complete diagnostic/procedure/Rx sets of patient data, but rather that such complete services will occur infrequently unless delivered by a health care facility. This ratio of health events vs complete health services is born out by inspection of the present MSRTS medical record. A recent analysis of the student medical records shows an average of only 0.4 lines of health problem data (diagnostic/treatment sets) per patient vs far more entries in the health services matrix. The health services matrix reflects individual immunization and screening events.

As a matter of fact, health data resulting from Migrant Education components are highly unlikely to include complete diagnostic/procedure/outcome/Rx descriptors unless:

1) the student has been referred to an M.D., or

2) the Migrant Education component employs the services of a nurse practitioner (NP) or Physician's Assistant (P.A.) and state law permits such activities.

Where Migrant Education contracts with Migrant Health clinics to provide services for students, such services will be reported via an encounter record in the clinic and will thereby become an encounter driven transaction. These differences between health data resulting from Migrant Health and Migrant Education do not reflect upon the quality of either program but rather reflect their different primary missions - Health vs Education.

The storage and retrieval of entire encounter data sets is necessary to the level of services provided by the migrant health clinics (or by private physicians and/or hospitals), whereas the storage and retrieval of health event data is usually sufficient for the purpose of Migrant Education.

Despite the reasons, there are informational differences and these differences affect data base content, input techniques, data retrieval and display, and data base organization. Each of the underlined design areas is discussed below as a complete section of this document.

SECTION III

Migrant Education and Migrant Health
Differences in Data Base Content

As was suggested in Section II, the data required to describe individual events is less than that required to describe complete encounter sets. These differences are described in the following chart.

FIGURE III-1

	ENCOUNTER ID	CLINIC ID	PROVIDER ID	DIAG. SET	PROC. SET	RX SET (if prescribed)	OUTCOME SET
Performed and Reported by a Clinic — a health problem	X	X	X	X	X	X	?
Performed and Reported by a Clinic — a screening exam	X	X	X	X	X	X	?
Performed and Reported by a Clinic — an immunization	X	X	X	X	X	X	–
Performed and Reported by an M.E. Component — a health problem				X	X	X	?
Performed and Reported by an M.E. Component — a screening exam					X		X
Performed and Reported by an M.E. Component — an immunization					X		

A discussion of the function of each piece of information (from the above chart) in the context of Migrant Health vs Migrant Education follows:

CONTENT 1: Encounter ID, Clinic ID and Primary Provider ID

A: Function in Migrant Health

Encounter ID, clinic ID and provider ID are needed not only for clinic administrative purposes, but also as essential tools in providing continuity of services in physician-to-physician exchange of patient information by telephone when needed. The presence of these identifiers together with other data (e.g. procedure descriptions) makes contact data, as such, unnecessary. Since these three identifiers are available for retrieval any provider can identify for any patient data:

a) the clinic at which any service was rendered,

b) the provider rendering the service, and

c) the encounter document number

These items makes it convenient for a physician attending a patient to establish communication with a physician rendering a prior service to the same patient and to confer with the prior physician regarding specific patient data. The presence of the encounter number makes it possible for the physician being contacted to locate the relevant patient data from the clinic files. Encounter ID, clinic ID, and primary provider ID is to be part of each data set comprising each encounter in each Migrant Health patient record.

B. Function in Migrant Education

There has never been an expression of need for Encounter ID, clinic ID or primary provider ID by Migrant Education. These items of information seem to be totally superfluous to Migrant Education operations. Neither the old MSRTS "Medical Record" nor the newly proposed Migrant Education "Medical Record" calls for these items of information. Whereas, school ID is included in each Migrant Education input transaction it has not (in the past) been associated with individual health events in the patient data base.

Result

Three items of information have been identified as required by Migrant Health but not needed by Migrant Education.

CONTENT 2: Diagnostic Code Sets

A: Function in Migrant Health

Diagnostic sets (Volume 1 ICD codes and/or CPT 4 codes) are used in every case to describe every encounter . The medical profession has long recognized this need for complete descriptions of each patient/provider encounter and has expended great effort to provide codes applicable to every circumstances.

Volume 1 of ICD·9·CM contains a section of "V" codes to describe encounters for which disease/inquiry codes are inappropriate. Perusal of these "V" codes (pp. 880-929 of Volume 1) will reveal their intended function. Suffice it is to say that the reason(s) a patient encounters a health facility

can be an important item of information in the care (including diagnosis) of the patient. Diagnostic codes, (whether disease/inquiry or "V" codes) are not data items whose inclusion or exclusion from patient data base structure will be decided upon by data processing or lay considerations.

B. Function in Migrant Education

Diagnostic codes are called for by Migrant Education IF AND ONLY IF a health problem line of data is being generated. Migrant Education does not call for (in the old or new patient record) diagnostic codes when reporting patient history, family history, preliminary assessment, lab results or immunizations.

Result

Migrant Health always reports patient data in association with a diagnostic code set. The reported diagnostic code set is always associated with procedure, outcome and Rx data in the patients data base record. Migrant Education only reports diagnostic codes when reporting "health problems

CONTENT 3: Procedure Code Sets

A: Function in Migrant Health

ICD or CPT codes are used to: report procedures involved in a patient/clinic encounter, to store procedure information in the patient data base record, and to generate management reports of resource utilization. Each service rendered by a clinic is reported via a procedure code - (including immunizations, screening exams, and

the taking of patient and family history).

B: Function in Migrant Education

The reporting of patient history, family history, screening exams, lab results and immunizations apparently do not involve the use of ICD or CPT procedure codes. Further, there is no evidence that the proposed Migrant Education Medical Record intends to use procedure codes in reporting health problems. The external data structure of MSRTS field documents (i.e. section ID, Line ID, Column ID) are not compatible with the use of procedure codes in reporting such events. Although the administration of immunizations and screening exams are, technically, procedures, these events are defined in Migrant Education by non-procedural identification codes (i.e. section ID, Line ID, Col ID).

Result

Procedures in the form of ICD or CPT codes are reported for each patient/clinic encounter in Migrant Health whereas no procedure codes are evident in the proposed Migrant Education data base. Migrant Education data structures call for patient services to be reported using a "matrix" style identifier (section, line, column, ID's).

CONTENT 4: Outcomes:

Appendix A presents a decision to be made by Migrant Health providers in so far as Migrant Health clinic operations are concerned. Should alternatives A or C be chosen, then Migrant Health

will report "Lab" results, Physical Exam results, vision and hearing screening results, and growth screening results at the same level of detail as Migrant Education is proposing. Even though the levels of detail are roughly comparable, the techniques of reporting will be different. Migrant Health will use a natural name (e.g. PA means Parasitic, etc.) and Migrant Education is proposing a matrix technique (e.g. section ID, line ID, column ID).

Should Migrant Health elect Alternative B of appendix A the clinics will not deal with screening exam data at the same level of detail or with the same approach as that proposed by Migrant Education.

CONTENT 5: RX:

A: Function in Migrant Health

As of this writing, it is the intent of Migrant Health to use a standard drug code (e.g. NDC = National Drug Code) as a basis for identified Rx prescribed by and/or issued from a clinic. From a standard drug code, Migrant Health will extract the generic code (and possibly other elements) for use in the system. Each RX prescription will be reported.

B: Function in Migrant Education

The use of Rx codes in the proposed Migrant Education medical record is unclear at this time.

Conclusion

There are substantial and non-trivial differences between the types and levels of health information required by Migrant Health and by Migrant Education. These differences are highly visible in their respective implications for patient record content.

SECTION IV

Migrant Education and Migrant Health Differences in

INPUT TECHNIQUES

A. Current MSRTS Input Techniques

The input techniques now traditional to the MSRTS were shaped largely by two factors:

a) the system is forms dependent. The major transfer of information from the computer to the user occurs via computer generated forms (transfer record and medical record) mailed from the central computer site to the user. These forms usually serve as "turnaround" source documents for updating. Hence, in their design, readability had to be somewhat compromised for ease of date entry (viz: filling in the form). The basic reason for the system being forms dependent is economic - the MSRTS has +15,000 user sites and could not entertain the design alternative of a terminal at each site . The "form" containing update data entered by the school or nurse is sent to one of 150 terminal operators who then enters the update data into the patient data base via remote terminals.

b) The initial MSRTS application was designed to operate in the environment of a low speed teletype network - economics again. The use of (now antiquated) *low speed TTY forbade such niceties as self-formatting, the use of CRT updating screens, ease of error correction, etc. This terminal network made it necessary to have a rugged data identification technique for formatting input. Unfortunately this technique, which will be discussed, has become an integral part of the MSRTS system and provides difficulties for the desired M.H. application.

Factors a) and b) above, together with the fact that the MSRTS was to be distributed geographically across rural USA, required that everyone be able to talk about data in a consistent and fairly fool-proof manner in order to facilitate updating processes. The vehicle adopted was, in essence, a highly simplified notion of a matrix in which any data item could be identified by giving its matrix "address" on a "form". The address consisted of:

a) a matrix name
b) a line identifier
c) a column identifier

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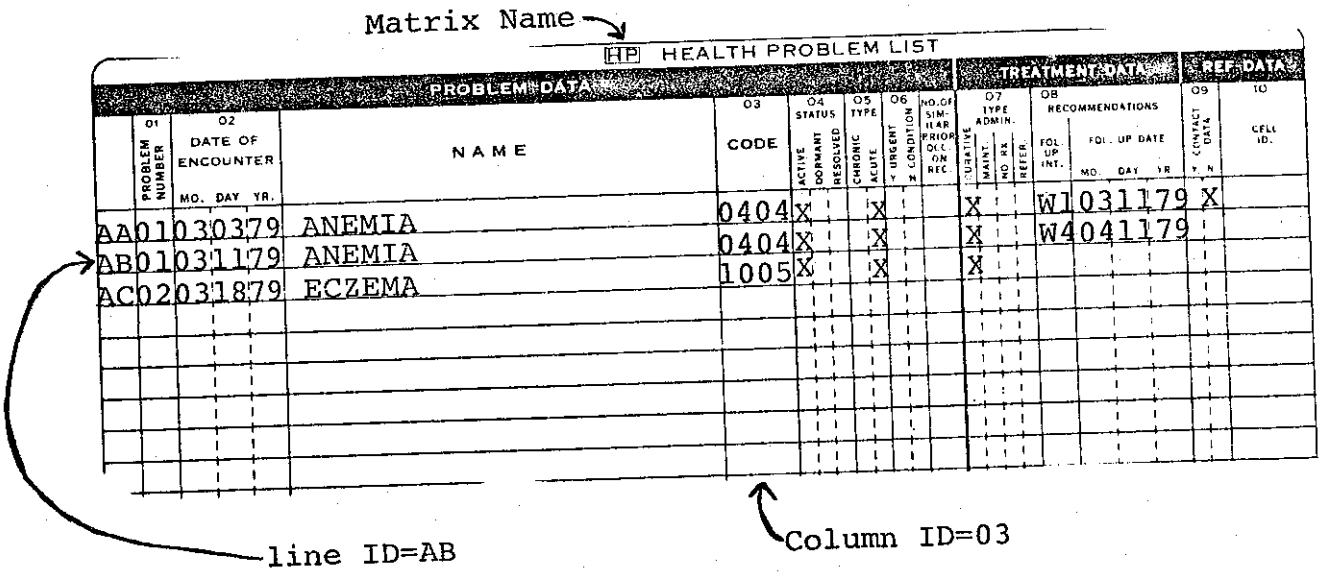
* Comically referred to as "the terminals that walk".

As an example, a diagnostic code, whether in a data base record, on the printed medical record or in a TTY transaction is identified by three items: A matrix name (now called "section" in MSRTS), a line ID and a column ID, below is the appearance of this data item in a teletype transaction (from a functional point of view).

HP AB 03 = 04.04

- HP — the health problem list section of a patient's record
- AB — a particular line of health problem data in a patients record
- 03 — the column on a medical record containing health problem codes
- 04.04 — the literal health problem code

Below is an example of how the data item might appear on a patients' printed record;



As may be observed, the three identifiers of this data item are identical to those used in the terminal operator's transaction format example preceeding. Thus, any required communication by telephone between the school data clerk and the terminal operator concerning this data item is facilitated and made more reliable by the fact that each party may identfy the item by its common name which is HP AB 03. However, during the MSRTS's lifetime, systems and communciations state of the art has made dramatic advances with proportional decreases in cost. The MSRTS application design has not been able to evolve along with these technological advances except to acquire some hardware which will permit it to operate the old design faster.

The MSRTS is caught in a dilemma which does not permit it to capitalize on technological and economic improvements. The facts of this dilemma are:

a) The MSRTS still is "forms" dependent in getting data from the central computer to its users because it still cannot afford 15,000 terminals.

b) It still must operate a number of the "terminal that walk"

c) It now uses a few CRT.

d) The mix of terminal types (a and b above) requires either separate input processing program functions or substantial processing to emulate one terminal type in terms of the other.

e) It has, by now, trained hundreds (maybe thousands) of users in the "matrix" data definition scheme. To retrain all the users in a different technique would require much time, money and overcoming of resistance to change.

f) The "matrix" data definition scheme prohibits the adoption of techniques which are much more compatible with contemporary data base structure and data handling concepts/software.

g) Because it cannot abandon completely its forms dependency, slow speed TTY, and matrix data definition scheme, it cannot lead its users to conceive of new applications in any terms other than within the old constraints. It is therefore developing applications whose implementation will further entrench itself an operational environment it desires to evolve from.

In short, through no fault of its own, the MSRTS is a cat chasing its own tail. It is a wagon being pulled by a mule but propelled by a jet engine - It cannot capitalize on the power of the jet engine for fear of running over its mule - Lest this analogy raise ire, let its meaning be precise:

The Mule = the teletype network, the ingrained forms dependency, the hurculean task of serving 15,000 user sites, and the matrix data definition technique. All of these items were appropriate to the early life of the system but due to circumstances entirely beyond the control of the MSRTS (mainly that of income disproportionate to the mission) these items have become burdensome rather than beneficial .

The Jet Engine = contemporary hardware and software that has become available (technically and economically) over to the past decade.

The Wagon = MSRTS at present.

This dilemma is directly observable in the design of the new "MSRTS medical record". Once again, the application is essentially forms dependent - a particularly severe constraint in that the designers were given the goal of "holding the form to a single page". Thus, we see the dimensions of a piece of paper determining many important aspects of information and data base design. The design of the form is heavily influenced by the requirement to give each piece of data a "matrix definition". This method of data definition led to conceiving of the medical data as being composed of many small but different matricies (e.g. patient history, family history, lab results, physicial exam, immunizations, etc.) in BOTH THE INPUT AND DISPLAY functions. There is no way to design optimum input functions and optimum display functions since they are synonomous from an external (user) point of view. Whatever one does to optimize the design of the input function has the tendency to degrade the display function and vice versa.

2. Desired Migrant Health System Input Techniques

Migrant Health will use input techniques designed to facilitate input processing by the user (physicians, nurses and medical records clerks), by the terminal operator, and by the computer programs. These techniques are described in Appendix B. Input functions are clearly separated from display functions so that each may be optimized separately.

The remainder of this discussion presumes that the reader has read Appendix B . As can be observed, the Migrant Health system will use a "natural language" approach to data definition as opposed to a "matrix" definition. The natural language consists of a coding system created by and for health professionals - ICD, CPT-4 and ADA codes and legends. The fixed format technique requires no independent data definition on the part of the terminal operator or the clinic user. The free format technique does require that data be named in input transactions using (aside from outcomes) a very small number of data names. Each data item CLASS is given a "natural language" two character identifier which is directly suggestive of the name of the data class. The most striking differences between the Migrant Health input technique and current Migrant Education input techniques are as follows:

a) The Migrant Health input technique uses only one structure for input. Each input transaction consists (at most) of ten data items as far as health data content is concerned:

1.	Patient Number	(required)
2.	Encounter Number	(required)
3.	Provider Number	(required)
4.	Problem Number	as appropriate
5.	Diagnosis Codes	(required)
6.	Problem Type	(required)
7.	Problem Status	(required)
8.	Procedure Code	(required except for lab procedures)
9.	Outcome	as appropriate
10.	Rx (NDC) Code	as appropriate

b) The Migrant Health design delineates the input function from the display function. From the above ten items (see A above) displays may be designed to satisfy users information needs under many different conditions. In fact, by using the above ten items of information, one may create an output display which is almost identical to that proposed by Migrant Education - Provided that the Migrant Education user group elects Alternatives A or C of Appendix I. More will be said concerning displays in section V following.

c) The Migrant Health approach introduce a great simplicity into the process of inputting data. Doctors, nurses and medical records clerks need not learn anything (to input data) beyond the proper use of ICD and CPT codes. The use of such codes is part and parcel of medical practice

and is not a set of information which must be learned "for the purpose of inputting data into a computer system". The reliance upon ICD and CPT codes places the Migrant Health application well within data handling and naming conventions practiced universally by medical data systems. The amount of training of field users in vastly reduced if no "extra-subject-matter" data identifying scheme (such as a matrix technique) is incorporated into the system.

On the computer side an equal simplicity is introduced - practicularly in the front end software that must recognize, identify and edit incoming data. Diagnostic, procedure and Rx codes all possess inherently distinguishing characteristics. These characteristics may be used to test syntactical correctness of data "field" content in a straight forward manner without recourse to string analysis.

d) Special user input documents may be designed to optomize the recording of input by users without concern for the impact of such instruments on the "readability" of displays. For example, each of the standard immunizations can be pre-printed on a form together with their ICD diagnostic and procedure codes. When a doctor or nurse records the fact of an immunization, the data items are thereby automatically encoded for input by a terminal operator.

DIAG. CODE	PROC. CODE	IMMUN. NAME	CHECK
V03.1	99.32	Thyroid/ Parathyroid	✓
V03.5	99.36	Diptheria	✓
V03.6	99.37	Pertusis	

As can be seen, all the provider must do is place a check beside the immunizations that were administered. The date for each is picked up from the date of the encounter and need not be entered redundantly.

Many such standard services may be treated in this manner to make input as painless as possible (pardon the pun) for health providers.

e) One of the recurring nightmares facing designers of forms dependent systems is providing for the recording of events that may occur so infrequently that they cannot (because of space limitations on a piece of paper) be included on the input/display form (i.e. a medical record that is computer generated for display and also used as an input recording form). For example, Volume 1 of ICD·9·CM lists some 100 diseases/conditions that may be significant in the personal history of a patient. The proposed M.E. medical record provides space to record some eleven (including birth history factors) such events. In attempting to list a sub-set of diseases/conditions, the designer must face such questions concerning the sub-set as:

i) are these the most important?
ii) are these the most common? (i and ii may not be identical)
iii) what happens if a medical provider wishes to record some condition/disease that is not included in the list?

The usual answer to iii) above is to create a separate and continuously growing list of conditions/diseases and their associated data names (i.e. line identifiers). This list must be updated continuously and supplied to field users who must insure that these supplements are included in their "Personal History" code list. At best, such an enterprise is costly, inefficient and confusing. At worst, it is an unnecessary burden that goes hand-in-hand with a forms dependent system.

The M.H. system handles such problems in a simple manner. A special input document is designed either by a medical task force of doctors and nurses, or by individual clinics based on their local experiences and needs. This document lists some number of Personal history conditions/diseases that occur most frequently. With each entry appears the appropriate ICD diagnostic code. The length of the list is not determined by the "amount of space available on the form" (as in the case of the M.E. medical record)but rather by the number of conditions/diseases the medical task force feels is useful to include. Below is an example of such a list.

All that is necessary on the part of the provider taking the patients personal history is to check or circle the proper codes.

Codes for conditions/diseases not included in the standard set (on the source document) may be input simply by looking up their codes in the ICD·9·CM. This simple device makes it unnecessary for the central system to create, update, coordinate and distribute "supplementary lists" of conditions/diseases and their associated matrix identifiers.

DIAG CODE	PERSONAL HISTORY OF:
V10	Malignant neoplasm
V10.0	-gastronintestinal tract
V10.1	-trachea, bronchus & lung
" "	" "
" "	" "
" "	
V12	Infectious and Parasitic Diseases
V12+033	Whooping Cough
V12+052	Chicken Pox

"052" Means Chicken Pox
"VIZ" Means Personal History of Infectious and Parasitic Disease

Two observations reveal the power of the M.H approach of using ICD Codes as the essential tool of data definition.

a) Between ICD Codes V10-V15.9 are some 100 diseases/conditions defined as Personal History. This uninterrupted range of "Personal History" entries permits a computer program to recognize "Personal History" data without additional definition supplied by a user as input. This fact permits a computer program to retrieve "Personal History" data quite readily. The data can then be used for display, analysis, research, reporting, etc.

b) By coupling a V Code lying between V10-V15.9, with a Diagnostic or Surgical procedure code (using a special symbol such as "+", "$", "*", etc.), a provider may describe any possible disease, condition or surgical procedure than the PHYSICIAN or NURSE (not a committee or a system designer) feels to be significant personal history contributing to the health care of a patient. Devising a system that permits professional health providers to make decisions concerning patient information, is a consuming goal of the M.H. design!

CONCLUSION

There are significant differences between the input techniques to be used in the M.H. system and those presently used in the MSRTS. These differences go far beyond the design of a form and do in fact reflect major architectual differences between the two systems.

SECTION V

Migrant Education and Migrant Health Differences in

DATA RETRIEVAL AND DISPLAY

1. MSRTS display system:

As has been discussed to a rather tiresome extent, the MSRTS is a forms dependent system. Its primary means of transmitting patient information to users is by printing a record (containing all medical information available on a patient) and mailing the record to the field user. The output record is fixed with respect to format and content. This output and display technique evidently meets the needs of the M.E. health component users.

2. M.H. Retrieval and Display needs:

Migrant Health clinics have an entirely different set of output/display needs to support their delivery of health services to migrants. M.H.C.'s deliver primary care services in which a medical doctors (or by surrogate, other qualified providers) examine patients, make diagnoses, order diagnostic procedures, perform (minor) surgical or other theraputic procedures and prescribe medicines. The clinic itself may perform diagnostic procedures (e.g. lab tests, X-rays, etc.), issue medications, and perform other direct support services. These activities require that patient medical information be accessable to the clinic in a manner that directly supports the delivery of services to the patients, facilitates quality of care through continuity of services, and assists in reducing duplication of services. The preceeding objectives require that the display of patient information be responsively flexible to the entire array of clinic activities.

Three factors determine the adequacy of a display system: timeliness, content and format. Each of these display factors will be discussed in the context of M.H.C. needs.

a) Timeliness

In most cases, a provider requires that relevant patient medical information be present just prior to and during an encounter. The understanding of a patient's problem depends in part upon observations (clinical or otherwise) made during the encounter and upon knowledge of the patient's medical history. Whether a patient's visit to a clinic can be pre-planned in sufficient time to print-and-mail a record from a computer depends entirely upon the reason the patient is encountering a clinic and upon the life factors surrounding the patient. It is rare for a migrant to be in control of enough life factors (work schedules, work availability, personal finances, etc.) to pre-plan clinic visits in substantial advance. At any rate, to design a patient information display system which cannot be immediately accessible by the clinic is to guarantee failure of the system.

A variety of techniques has been established to give clinics immediate access to patient data. All involve the use of terminals operating on either dedicated or WATS lines.

b) Display content

Doctors and nurses require certain patient information to be available prior to and during the patient encounter. Although a basic core of patient information may be defined which serves as "a starting place" for a patient encounter, the entire set of information that may be needed during an encounter depends, among other factors, upon the medical condition currently involved and the medical history of the patient.

The basic concepts used to provide display content flexibility is as follows:

- INITIAL DATA

  1. The initial medical data content displayed for a patient depends upon the medical history of the patient.

- FOLLOW-UP DATA

  Beyond this initial set of patient information, additional content is retrieved and displayed depending upon:
  i) the medical facts revealed by the initial display
  ii) the reason for the encounter, and
  iii) the judgement of the attending provider.

Initial and follow-up data displays are discussed in the following:

INITIAL DATA

The initial patient data set (see (a) preceeding) is a "Health Exception Report." This report is generated at the time that the patient signs in the clinic for the encounter. The report consists of data resulting from past encounters which involved certain types of diagnoses, procedures or medications--all as qualified by other factors such as recency of events, etc. The Health Exception Report is formatted and labeled at display time and not on a pre-printed form. It may contain no lines of medical data or many, depending upon the number of health conditions in the past record that meet the exception (search) criteria. Initial exception reporting is a particularly powerful tool which accomplishes two goals.

- It presents the provider a display containing only that medical data which is of immediate interest. The provider does not have to scan through irrelevant childhood health events (sprains, strains, long resolved acute conditions, etc.) to locate data that might bear on current symptoms.

- It avoids using up transmission capacity to move data which is infrequently used.

FOLLOW-UP DATA

Should something in the patient's condition or in the patient's Health Exception Report warrant, the provider may obtain additional medical information along any dimension or to any depth desired (if available, of course). Since no pre-printed forms are involved and since the clinics have immediate access to data base records, the retrieval/display options open to the provider for follow-up are substantial. Below is a description of some of the options.

The provider may obtain:

- The name, address and/or telephone number of any prior facility and/or provider rendering particular services to a patient. The procedure and RX codes will inform the attending physician of procedures about which he may desire additional details from a prior health provider. For example, by scanning a line of data on the Health Exception Report, a provider can identify procedures carried out at prior facilities Such procedures include both non-surgical diagnostic procedures, (e.g. X-rays, lab tests, etc.) and surgical procedures. If the attending physicial desires, he may establish telephone contact with the prior facility regarding details of the procedures and their outcomes.

- The provider may obtain all data in a patient record involving a diagnosis (or diagnoses). The search may further be qualified by period of occurrences.

  Examples:

  - all allergies,
  - a particular allergy,
  - all past history,
  - any "asthma" in past history,
  - all (or specific conditions in) family history,
  - all immunizations or all occurrences of a particular immunization, and
  - all immunizations within the past year.

- The provider may obtain all occurrences of a particular

RX-qualified by any time boundaries.

- The provider may simply request and obtain an entire past record or all events occurring after a certain age or date.

By providing such options, the data retrieval/display function is directly responsive to the dynamic needs of each provider/patient encounter rather than being bound by some preconceived idea inherent in a pre-printed form.

C. Display Formats

Since the M.H. design has taken great care to separate input functions from display functions, a wide range of displays are possible. In general, data will be displayed in accordance with the content sequences and options discussed in the previous section; Display Content. Functional illustrations of various display format options follow. Bear in mind that all legends are generated at display time with no use of pre-printed forms. For convenience, the following illustrations ignore display Header information such as patient I.D., address, etc.

HEALTH EXCEPTION REPORT

PROB NO	DIAGNOSIS CODE	NAME	PROBLEM TYPE	STATUS	PROCEDURE CODE	NAME	OUTCOME	RX(NDC) CODE	GENERIC
			(URGENT PROBLEMS)						
			(CHRONIC PROBLEMS)						
			(UNRESOLVED PROBLEMS)						
			(OTHER EXCEPTION PROBLEMS)						

IMMUNIZATIONS:

	PROC CODE	NAME	DATE(S)
1.			
2.			
3.			

TB-PPD

MOST RECENT-------(Date) Results-------(Negative or Positive)
BCG -------(Yes or No)

Examples of some follow-up displays:

(A follow-up report of ALLERGIES)

PROB NO	DIAGNOSIS CODE	NAME	PROBLEM TYPE	STATUS	PROCEDURE CODE	NAME	OUTCOME	RX (NDC) CODE	GENERIC

(All allergies in a patient record which are not past history--i.e. are DIAGNOSED as a consequence of an encounter).

(All allergies in a patient record which were reported as past history)

(A follow-up report of all X-rays received by a patient)

PROB NO	DIAGNOSIS CODE	NAME	PROBLEM TYPE	STATUS	PROCEDURE CODE	NAME	OUTCOME	RX (NDC) CODE	GENERIC

Contains entries in which X-rays were used as either a diagnostic procedure or a theraputic procedure. It will contain dental X-ray information if and only if requested. If both medical and dental X-rays are requested, they will be displayed in the order:

1. All medical X-rays
2. All dental X-rays

As the reader may observe, the number of different displays which is available to a provider is entirely dependent upon the provider's needs in administering to each individual patient. This flexibility and other by-products to the M.H. display approach yields additional advantages, some of which are discussed below.

A significant factor to recognize in the preceeding examples is their similarity of format. Although not identical (see IMMUNIZATIONS and TB-PPD on the Health Exception Report) in format, they bear enough similarity so as to facilitate readability by the providers. The providers will grow accustomed to the "standard" format and will expect to find the same types of data at the same relative location on each page. This commonality of display avoids providers having to recognize and interpret many different "boxes", "columns", "checkmarks" on displays, and thereby avoids the need for time and resource consuming training activities.

Since the displays are expressed entirely either in standard medical language (ICD, CPT-4, ADA codes and legends), or in common English ("normal", "abnormal", "active", "resolved", "dormant", "chronic", "acute"), any professional health provider will be able to use the displays without having to make time consuming and frustrating reference to "system documentation" in order to interpret the data items being displayed. This display characteristic also makes it possible for non Migrant Health Center physicians to use the information without having to be trained.

The M.H. approach of using consistent display format with variable content also makes possible other time saving methods for meeting user display needs. These methods are discussed briefly in the following.

Standing Display Orders

A clinic may have, for example, an internist, an OB-GYN, a pediatrician, and a family practitioner. Obviously these different specialities are concerned with different (although overlapping) patient populations and different aspects of patient health. Their patient information needs may vary with respect to the initial set of patient information desired on each patient. For example, a pediatrician might always desire immunization data on each new patient. The family practitioner may, on the other hand, desire immunization data on a patient if and only if the patient is below some age limit. The internist may not desire immunization data to be part of the initial data set at all. Finally, the OB-GYN may only want certain immunization data as part of his initial patient data.

In this example, all four practitioner's initial patient data needs may be met by placing a "standing order" in the computer which is unique to each of the four providers. This order would specify the amount (none to all) and kind (e.g. measles only, etc.) of immunization data each provider disires on his/her Health Exception Report for particular groups of patients (e.g. all patients, patients under 16 years of age, males only, etc.) The same method may be applied to any type of data in the patient's record and will operate automatically without further intervention by the provider or the terminal operator. This technique is made possible by the fact that provider I.D. may be included as a part of patient registration for each encounter. Standing display orders may be unique to each clinic or to each provider in a clinic or need not be used at all depending upon the user's needs as perceived by the user.

SECTION VI

An analysis of possibilities for Migrant Education's use of Migrant Health patient data.

RECAP

The previous material has identified some of the ways in which Migrant Education and Migrant Health differ with respect to;

(a) their primary missions--Education and Health services delivery,
(b) their delivery of health services to migrant children of school age,
(c) the populations each serves, and
(d) the operational environment of each program.

These M.E./M.H. differences lead to requirements for information support systems that differ with respect to:

(a) data base content
(b) input techniques
(c) retrieval and display techniques

The above differences create problems in M.E. and M.H. sharing data. These problems have been identified and discussed. The goal of the present section of this document is to identify and examine some alternatives for working around these problems.

Two tasks must be accomplished prior to deciding how M.E. and M.H. may share health data on two school age migrant children.

Task 1 is to identify data that will be available for sharing.

Task 2 is to identify data that is "useful" to each program to share.

Data that is available for sharing.

Previous sections of this document have discussed differences between the M.E. and M.H. medical information systems. Some aspects of these differences are summarized in the tables appearing on the following three pages. Page 37 compares most of the data that has nothing to do with "outcomes." Page ____ shows a comparison of inter-program data if alternative A or C of Appendix A is chosen and Page 39 compares data based upon alternative B of Appendix A.

	THE MIGRANT HEALTH DESIGN					THE MIGRANT EDUCATION DESIGN			
DATA CLASS	CONTENT VALUES	HOW USED AS PART OF INPUT TRANS.	HOW USED AS PART OF HEA. EXCEPTION REPORT	FOLLOW-UP DISPLAY	DATA BASE MAINTENANCE	CONTENT VALUES	HOW USED AS PART OF INPUT TRANS.	HOW USED AS PART OF PRINTED MED. RECD.	CRIT DATA
ENCOUNTER #	A/N	ALWAYS	NEVER	AS REQUESTED	KEEP ALL	N/A	NEVER	NEVER	NEVER
PROVIDER #	A/N	ALWAYS	NEVER	AS REQUESTED	KEEP ALL	N/A	NEVER	NEVER	NEVER
PROBLEM #	N	AS APPROPRIATE MEDICALLY	ALWAYS UNLESS IMMUNIZATIONS OR T.B.-PPD	ALWAYS	KEEP ALL	N	ON HEALTH PROB LIST ONLY	ON HEALTH PROB LIST ONLY	NEVER
DIAGNOSTIC CODE	A/N	ALWAYS	ALWAYS UNLESS IMMUNIZATIONS OR T.B.-PPD	ALWAYS	KEEP ALL	A/N	ON HEALTH PROB LIST ENTRY ONLY	ON HEALTH PROB LIST ONLY	?
DIAGNOSTIC NAME	A	NEVER	ALWAYS UNLESS IMMUNIZATIONS OR T.B.-PPD	ALWAYS	ON "TABLE"	A	NEVER	ON HEALTH PROB LIST ONLY	?
PROBLEM TYPE	A/N	AS APPLICABLE	ALWAYS UNLESS IMMUNIZATIONS OR T.B.-PPD	AS REQUESTED	KEEP ALL	A/N	ON HEALTH PROB LIST ENTRY ONLY	ON HEALTH PROB LIST ONLY	?
PROBLEM STATUS	A/N	AS APPLICABLE	ALWAYS UNLESS IMMUNIZATIONS OR T.B.-PPD	AS REQUESTED	KEEP ALL	A/N	ON HEALTH PROB LIST ENTRY ONLY	ON HEALTH PROB LIST ONLY	?
PROCEDURE CODE	A/N	ALWAYS	ALWAYS	ALWAYS	KEEP ALL	N/A	NEVER	NEVER	NEVER
PROCEDURE NAME	A	NEVER	ALWAYS	ALWAYS	KEEP ALL	N/A	NEVER	NEVER	NEVER
RX CODE	A/N	EACH OCCURENCE	ALWAYS	ALWAYS	KEEP ALL	?	?	?	?

ALTERNATIVE A or C of APPENDIX A

	THE MIGRANT HEALTH DESIGN					THE MIGRANT EDUCATION DESIGN			
DATA CLASS	CONTENT VALUES	WHEN USED AS PART OF INPUT TRANS.	WHEN USED AS PART OF HEA. EXCEPTION REPORT	FOLLOW-UP DISPLAY	DATA BASE MAINTENANCE	CONTENT VALUES	WHEN USED AS PART OF INPUT TRANS.	WHEN USED AS PART OF PRINTED MED. RECD.	CRIT DATA
OUTCOMES OF PRE-DEFINED SETS ONLY									
PT. HISTORY ITEMS	ICD CODE	AS OCCURS	UPON EXCEPTION	AS REQUESTED	KEEP ALL	?	AS OCCURS	ALWAYS	?
FAMILY HIST ITEMS	ICD CODE	AS OCCURS	UPON EXCEPTION	AS REQUESTED	KEEP ALL	?	AS OCCURS	ALWAYS	?
PHYS. EXAM ITEMS	NOR/ABN	AS OCCURS	*1 UPON EXCEPTION	AS REQUESTED	*2	NOR/ABN	AS OCCURS	*3	?
GROWTH ITEMS	LITERAL	AS OCCURS	ALL VALUES	AS REQUESTED	KEEP ALL	NOR/ABN	AS OCCURS	*3	?
HEARING ITEMS	LIT+NOR/ABN	AS OCCURS	UPON EXCPTN.*1	AS REQUESTED	KEEP ALL	NOR/ABN	AS OCCURS	*3	?
VISION ITEMS	LIT+NOR/ABN	AS OCCURS	UPON EXCEPTION	AS REQUESTED	KEEP ALL	NOR/ABN	AS OCCURS	*3	?
IMMUNIZATIONS	ICD CODE	AS OCCURS	ALWAYS	AS REQUESTED	KEEP ALL	NOR/ABN	AS OCCURS	ALWAYS	?
BLOOD PR.	LIT+NOR/ABN	AS OCCURS	UPON EXCPTN.*1	AS REQUESTED	KEEP ALL	NOR/ABN	AS OCCURS	*3	?
LAB RESULTS ITEMS	LIT+NOR/ABN OR NOR/ABN	AS OCCURS	UPON EXCEPTION	AS REQUESTED	*2	NOR/ABN	AS OCCURS	*3	?

*1:EXCEPTION Display most recent only, unless "Abn." is present. If "Abn" is present, report all values in Data Base.

*2: Keep most recent only, unless "Abn." is reported. If "Abn." is reported, keep all subsequent values.

*3: Display most recent outcome only.
GENERAL NOTES: NO PROVISION HAS BEEN MADE TO REPORT, STORE, OR DISPLAY OUTCOMES OF HEALTH EVENTS NOT INCLUDED IN THE PRE-DEFINED SETS.

ALL EVENTS ARE DATE ASSOCIATED.

ALTERNATIVE B of APPENDIX A

THE MIGRANT HEALTH DESIGN | THE MIGRANT EDUCATION DESIGN

DATA CLASS	CONTENT VALUES	HOW USED AS PART OF INPUT TRANS.	HOW USED AS PART OF HEA. EXCEPTION REPORT	FOLLOW-UP DISPLAY	DATA BASE MAINTENANCE	CONTENT VALUES	HOW USED AS PART OF INPUT TRANS.	HOW USED AS PART OF PRINTED MED. RECD.
OUTCOMES								
Pt history	ICD Code	as occurs	upon exception	as requested	keep all	?	as occurs	always
Fam. History	ICD Code	as occurs	upon exception	as requested	keep all	?	as occurs	always
Phy. Exam	ICD or NOR CODE *1	as occurs	*2 upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Growth	ICD or NOR CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Hearing	ICD or NOR CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Vision	ICD or NOR CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Immunizations	ICD CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Blood Pr.	ICD or NOR CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3
Lab Results	ICD or NOR CODE	as occurs	upon exception	as requested	keep all	NOR/ABN	as occurs	*3

*1 The ICD code referred to is a diagnostic code resulting from or further describing the abnormal result.
*2 Includes, as display content, the ICD diagnostic code and legend.
*3 Display content consists of most recent results.

General notes: M.E. makes no provision to report, store or display outcomes of health events not included in pre-defined sets, M.H. is not restricted to any pre-defined set. Therfore, M.H. may have outcomes for events which are not displayable on M.E. printed records.

. All events are date associated.

The first impression that one is likely to get upon inspecting the charts on pages 37, 38 and 39 is that little sharing of data is possible as things now stand. There are very few data classes which are identical for both M.E. and M.H. This first impression leads to a subsequent one which is even more noxious: if there is to be data sharing, either M.H. must design its data system to be identical to M.E.'s or vice versa. Fortunately, the situation is not so bleak. The next topic presents a rationale for data sharing between M.E. and M.H.

M.E. Health Data Needs

The purposes for which M.E. requires health data are suggested in the following list:

1. insuring that migrant students have required immunizations
2. insuring that migrant students undergo periodic screening exams
3. detecting those conditions for which referral to a provider is appropriate
4. providing medical information to a provider and/or health facility to which a migrant student is referred
5. identifying migrant student health conditions that might affect classroom behavior or performance
6. being informed of special actions required of the educational facility, including the classroom, its mitigate against particular health conditions

One way to solve the problems of data sharing is to insure that the data system supports the above M.E. health information needs. An examination of data that would be available from the proposed M.H. system to support those needs is presented in the reaminder of this section.

Migrant Education purpose

1. Insuring that migrant students have required immunizations.

Both M.H. and M.E. carry immunization information. There are two differences, however:

a. M.E. carries only a restricted subset of immunizations; whereas, M.H. can handle any immunization, and

b. M.E. uses a "series number" to indicate which in a series of a particular immunization is being (was) administered. M.H. evaluated the use of a "series number" and rejected its use on the following grounds:

i) A series number carries no additional information in that the content substance of each immunization in a series is the same.

ii) A complete record of all immunizations will be available to each provider. The provider may, by referencing a patient's record identify the temporal spacing of the immunizations and take action accordingly.

iii) Assigning a "series number" is an unnecessary invitation to error. The use of a series number depends upon knowing, at 100% accurracy, the prior immunization history. For example, a provider may believe that she or he is administering the first in a series but may in fact be administering a second (or third, etc.) because a prior health component has not yet submitted its immunization data on the patient. Such a circumstance places data in a record which is in error (i.e., the series number). Such errors are very difficult to clear up.

c. Whereas M.E. will use a "matrix" identifier of immunizations on input and its printed record, M.H. will use the ICD or CPT code for input and display.

At any rate, M.H. will carry, using ICD/CPT codes and legends, each immunization and its date of administration for each patient. M.E. will have this data available for field use.

If it so desires, Migrant Education may use the following table of correspondence to transform M.H. immunization identifiers into M.E. matrix identifiers:

M.H. ID procedure (ICD and/or CPT-4)	M.E. Immunization Name	M.E. ID (MATRIX)
99.32	DPT	IMAA
no presently available code	TD	IMAB
no presently available code	Polio (oral)	IMAC
99.41	Polio	IMAD
99.48	MMR	IMAE
99.45	Measles	IMAF
99.46	Mumps	IMAG
99.47	Rubella	IMAH
99.42	Small Pox	IMAI

Since M.E. has no additional space in the "immunization box" on its printed form, it cannot display other immunizations which might be available as a result of M.H.

Migrant Education; Purpose 2

2. Insuring that migrant students undergo periodic screeing exams.

Appendix A outlines two basically different approaches to the treatment of screening exam, lab results and physical exam data. The use of such data for M.E. purpose number 2 is, therefore, discussed separately under each approach. The approaches taken by A and C of Appendix A are similar and are presented as a single approach.

Under Alternatives A and C of Appendix A, screening exam, lab results and physcial exam data will:

a. be similar to M.E. in outcome descriptions. This assertion is based upon recent discussion with MSRTS staff. Apparently, Migrant Education has shifted from wanting "normal"/abnormal" as outcomes to desiring literal values also-- a la the M.H. design.

b. differ from M.E. in data identification. M.H. uses "natural" names; M.E. uses matrix identifiers.

As the following material will show, differences in data naming conventions pose no insurmountable problems for:

"Preliminary assessment" screening exam data (to use M.E. vernacular),

Physical Exam Data, or

Lab Results Data .

"Preliminary Assessment" Screening Exam Data

M.E. uses a matrix approach for identifying the items making up Screening Exams. The following table shows the M.E. "matrix" names for these items.

M.E. Data ID	Screening Exam Item Name
PAAA	Blood Pressure
PAAB	Pulse
PAAC	Temp
PAAD	Vision R
PAAE	L
PAAF	GL/R
PAAG	GL/R
PAAH	Hearing R
PAAI	L
PAAJ	Ht.
PAAK	Wt.
PAAL	Color vision

The data identification technique to be used by M.H. (for those items labeled "preliminary assessment" by M.E.) is shown in the following table.

	DIAG. CODE	PROCEDURE CODE	OUTCOME
	V72.0 or V80.0 V80.2	95.01	RG = 000-999 LG = 000-999 RV = 000-999 LV = 000-999 JU = NOR/ABN
E A R I N G	V72.1 or V80.3	95.41	R1 = R2 = R3 = R4 = R5 = L1 = L2 = L3 = L4 = L5 = RI means Right hearing @ 1,000 HZ, R2 @ 2,000 HZ, etc. the outcome is stated as the threshold DB level at which of signal detection occurred. JU = NOR/ABN
'OOD 'SURE	V70 or V20.2 or V70.5 or V 81.0 -V81.2	89.61	BP = ___/___ Ex: BP=110/70
'R T H	V21- V21.0-V21.9, or V79.3	93.07	HC = 000-999 1N or 000-999CM HT = 000-999 IN or 000-999CM WT = 000-999 LB+00-99 oz JU = NOR/ABN

Note that M.H. does not intend to carry either "pulse" or "temp" as data base items.

It would be possible to develop tables of correspondence so that the "computer" could transform Migrant Health data ID's into Migrant Education data ID's and vice versa. Examples:

M.H. Data ID	Subject	M.E. DATA ID
"95.01 RV="	Vision R	"PAAD="
"89.61 BP="	Blood Pressure	"PAAA="
"93.07 WT="	Weight	"PAAK="

Cautions:

- to have a table of correspondence for hearing, Migrant Education would need to adopt the Migrant Health approach.

- Migrant Health medical Task Force members have emphasized that screening exam outcomes are highly dependent upon transitory and environmental factors such as:

  i) health of patient at the time. For example, the outcome of hearing exams may be strongly influenced by whether the patient has a cold etc.

  ii) test environment, type of apparatus used, skill level of the person administering the test, etc.

In light of these factors, Migrant Health felt that test results, in and of themselves,were of limited value and should be accompanied by a medical judgement of normal or abnormal. By providing such judgements, the providers may give supplementary interpretative information. Whether Migrant Education desires to adopt this approach is not known at this time.

- Migrant Education plans to display only the most recent results wheras Migrant Health uses an "exception reporting "approach to determing screening exam display content.

Conclusion: with respect to the items that Migrant Education calls "preliminary assessment", Migrant Health data may be used for the purpose of insuring that mgirant students receive screening exams with the exceptions of "pulse" and "temp".

Physical Exam Data

Under alternative A or C of Appendix A, physical exam data is identical except for data identification. The M.E. matrix identifiers are presented in the following table.

	PHYSICAL EXAMINATION	OC	DATE	Sl Dl Hp
AA	GENERAL APPEARANCE, POSTURE			
AB	GAIT			
AC	SPEECH			
AD	SKIN			
AE	EYES: EXTERNAL			
AF	OPTIC FUNCTION			
AG	EARS: EXTERNAL AND CANAL			
AH	TYMPANIC MEMBRANES			
AI	NOSE, MOUTH, PHARYNX			
AJ	TEETH			
AK	HEART			
AL	KIDNEYS			
AM	LUNGS			
AN	ABDOMEN (INCLUDE HERNIAS)			
AO	GENITALIA			
AP	BONES, JOINTS, MUSCLES, SCOLIOSIS			
AQ	NEUROLOGIC EXAM			
AR	RECTAL			
AS	PELVIC			
AT	GROSS MOTOR FUNCTION			
AU	FINE MOTOR & MANIPULATIVE FUNCTION			
AV	ADAPTIVE FUNCTION			
AW	LANGUAGE FUNCTION			
AX	PERSONAL SOCIAL FUNCTION			

The M.H. data identification approach as presented below.

GENERAL PHYSICAL

DIAG CODE	PROCEDURE CODE
V70 or V70.0 - V70.9 V20.2 or V793 or specify condition	89.7

OUTCOME

General appearance, posture	AP	=	NOR/ABN
Gait	GA	=	NOR/ABN
Speech	SP	=	NOR/ABN
Skin	SK	=	NOR/ABN
Eyes: External	EE	=	NOR/ABN
Optic Fundi	OF	=	NOR/ABN
Ears: External and Canals	EC	=	NOR/ABN
Tympanic Membranes	TM	=	NOR/ABN
Nose, mouth, pharynx	NM	=	NOR/ABN
Teeth	TE	=	NOR/ABN
Heart	HE	=	NOR/ABN
Kidneys	KI	=	NOR/ABN
Lungs	LU	=	NOR/ABN
Abdomen (include hernias)	AB	=	NOR/ABN
Genitalia	GE	=	NOR/ABN
Bones, joints, muscles, scoliosis	BJ	=	NOR/ABN
Neurologic exam	NE	=	NOR/ABN
Rectal	RE	=	NOR/ABN
Pelvic	PE	=	NOR/ABN
Other			NOR/ABN
DEVELOPMENTAL SCREENING			
Gross motor function	GM	=	NOR/ABN
Fine motor and manipulative functions	FM	=	NOR/ABN
Adaptive function	AF	=	NOR/ABN
Language function	LF	=	NOR/ABN
Personal-social function	PF	=	NOR/ABN

As may be observed readily, a computer housed table of correspondence would premit transisting between the two physical exam data sets.

Conclusion: Migrant Health physical exam data may be used for Migrant Education's purpose of insuring that migrant students receive periodic screening exams.

Lab Results Data

Should Alternative A or C of Appendix A be chosen, Migrant Education and Migrant Health lab results data can be made to be identical except with respect to techniques of data identification This difference may once again be bridged by a computer based table of correspondence.

The Migrant Education Lab Results List.

	LAB RESULTS	01 OC	02 DATE	HP
A	A) PARASITIC			
A	B) BLOOD LEAD			
A	C) PESTICIDE			
A	D) SICKE TEST			
A	E) TB X-RAY			
A	F) TB SKIN			
A	G) HEMATOCRIT			
A	H) HEMOGLOBIN			
A	I) URINANLYSIS			
A	J) FLOURIDE TREAT			
	If outcome is "AB" create HP Line			

The Migrant Health Lab Results List.

	DIAG. CODE	PROCEDURE CODE	TEST NAME	DATA NAME & OUTCOM
L A B	V70 or V70.0-V70.9 V20.2 or V72.6 or specify condition	90.0-90.9 91.0-91.9 or none if not microscopic	ALBUMEN	AL=0,1,2,3,4
			SUGAR	SU=0,1,2,3,4
			BILIRUBIN	BI=NOR/ABN
			PH	PH=LITERAL
			KETONES	KE=NOR/ABN
			BLOOD	BL=NOR/ABN
See V73-V82	V75.8		PARASITIC	PA=NOR/ABN
	V82.5		LEAD	LE=NOR/ABN
	V78.2		SICKLE	SI=PF/NP
			HEMATOCRIT	HE=LITERAL & JU=NOR/ABN
TB-PPD	V74.1	-	PD=NEG OR 00-99MM	

Differences between the two lists are superficial only. They may be brought into exact correspondence upon Agreement by Migrant Education and Migrant Health.

Conclusion: Migrant Health lab results data may used for Migrant Education's purpose of insuring that migrant students receive periodic screening exam results. Attention will be turned next Physicial Exam Data under Alternative B of Appendix A.

Migrant Education Purpose #2

Insuring that Migrant Students undergo Periodic Screening Exams.

(Under Alternative B of Appendix A).

Migrant Education Purpose #2

Insuring that migrant students undergo periodic exams.

Migrant Education purpose #2 is now treated under Alternative B of Appendix A. For the readers convenience, Alternative B is outlined below.

ALTERNATIVE B: Use existing ICD & CPT codes only for screening exams.

This alternative involved the following approach.

a) use Volume 1 "V" code ot indentify the reason for the screening exam under the diagnostic code column.

b) use Volume 3 code to identify the procedure (screening exam) as nearly as possible under the procedure code column.

c) if the diagnostic procedure (screening exam) reveals a disease or condition, enter the proper diagnostic code under the diagnostic code column, and enter AB (abnormal) under the outcome column. If the diagnostic procedure does not reveal a disease or condition, enter NA (for abnormality) under the outcome column.

The rationale underlying this approach is that there are two important items of information regarding screening exams:

Item I) the fact that a patient was screened for a certain condition or, disease (within a certain time period) and

Item 2) the diagnostic (or judgement of no abnormality) arising from the screening exam.

The actual screening exam values are simply part of the data used by a professional provider in arriving at a decision (i.e. a diagnosis or a judgement of no abnormality) and are not necessary except as back up detail to be obtained by telephone contact with the facility housing the exam results.

The reader is invited to review ICD·9·CM, Volume 1, "V" codes, V72-82.9. These codes permit the description of the disease or condition for which a screening exam is being performed.

As in the case of Alternative A and C presented previously, the present objective is to demonstrate how the Migrant Health Alternative B (of Appendix A) design provides information which permits appropriate school personnel to insure that migrant students receive periodic screening exams including lab work.

The simplest way to illustrate the Alternative B approach is to show how such information might be displayed. Following is a sample Migrant Health display of screening exam and lab work data - but only for those items that Migrant Education has listed on its new "Medical Record" form. Please bear in mind that the Migrant Health data base content may include many other screening exam and/or lab results data for which no provision is made to display on the Migrant Education "Medical Record". For ease of understanding, no diagnostic codes (where outcome is abnormal) are presented.

CAUTION: The ICD code set is much richer than the Migrant Education list of screening exams. For ILLUSTRATION purposes, it was necessary to "PICK" example codes from among the many ICD codes that could be used.

CORRESPONDING M.E. ITEM:	DIAGNOSIS CODE	DIAGNOSIS NAME	DATE	PROCEDURE CODE	PROCEDURE NAME	OUTCOME
		SPECIAL SCREENING FOR				
B/P	V81.1	Hypertension		89.61	Systemic Arterial pressure monitoring	Normal
Vision	V72.0	Eyes and Vision		95.01	Limited eye examination	Normal
Color Vision	V72.0	Eyes and Vision		95.06	Color Vision study	Normal
Hearing	V72.1	Ears and Hearing		95.41	Audiometry	Normal
Ht./Wt.	V21	Constitutional states in development		93.07	Body Measurement	Normal
		LAB WORK (Screening for:)				
Parasitic	V75.8	Other specified parasitic infections		(Use 90.0 - 91.9 of ICD Vol. 3 as appropriate)		Normal
Blood Lead	V82.5+ E866.0	Chemical Poisoning & other contamination, Lead & its compounds & fumes				Normal
Pesticide	V82.5+ E863	Chemical poisoning & other contamination, Unspecified agricultural chemical preparation				Normal
Sickle Test	V78.2	Sickle-Cell disease or trait		90.5	Microscopic examination of Blood	Normal
TB X-Ray	V72.5	Radiological examination		87.44	Routine Chest X-Ray	Normal
TB-PPD	V74.1	Pulmonary Tuberculosis (includes diagnostic skin tests)				Normal
Hematocrit	V78.0	Iron deficiency Anemia				Normal
Hemoglobin	V78.0	Iron deficiency Anemia				Normal
Urinalysis	V82.6+ V72.6	Multiphasic screening Laboratory Examination		89.29	Other genitourinary system measurements, includes Urine Chemistry	Normal

Several notes are vital to the full comprehension of the preceeding display.

Screening Exam Data

Note 1: Whereas the Migrant Education list tends to name the particular attribute being screened (e.g. B/P, Ht, wt, etc.), the Migrant Health tends to give:

a) the function of the exam

(i.e. screening for hypertension, consititutional states of development, etc), and

b) the manner in which the screening was performed.

Use of the ICD Volume 3 procedures permits a fairly specific statement of the screening exam procedure. For eyes and vision, the code 95.01 (limited eye exam) was chosen. There are however, twenty five (25) other procedural codes (95.0-95.36) that could be used to further specify or supplement the code as shown. Perusal of these procedural codes will demonstrate the potential descriptive power.

Note 2: There is no risk of confusing the many different procedure codes with a non-screening exam situation because the diagnosis code ("V" codes") state specifically that, whatever the procedure, it is being performed in the context of a screening exam".

Note 2 is of special importance for it paves the way for a table of correspondence to be used in case Migrant Education prefers to stay with their current terminology and matrix data ID scheme. Such a table is presented below.

ME CODE	M.E. NAME	ICD CODE
PAAA	Blood Pressure	V81.1
PAAB	Pulse	
PAAC	Temp	
PAAD	Vision R	V72.0 AND any procedure code≠ 95.06
PAAE	L	
PAAF	GL/R	
PAAG	GL/L	
PAAH	Hearing R	V72.1
PAAI	L	
PAAJ	Weight	V21
PAAK	Height	
PAAL	Color Vision	V72.0 AND 95.06

Migrant Health does not, under Alternative B of Appendix A, specify the occurrence of left and right screening for vision or hearing nor of vision with and without glasses. The rationale for this approach is:

- A screening exam is for the sensory "function".
- Any outcome other than "normal" occurs; then, the ICD diagnostic codes are used to differentiate a one eye condition from a two eye condition.

For vision and hearing the Migrant Health data may be used to indicate the dates on which a screening exam took place and an outcome which will be either a normal or an abnormal associated with diagnoses, etc.

Note 3: The figure on page 52 preceeding is an illustration of how screening exam and lab results data might be displayed for a particular patient. That figure is not an input document. Since the Migrant Health design is careful to separate the input and output functions, it is possible to design an input document which makes it convenient for users to record screening exam and lab results data.

Lab Results Data

Note 4: Whereas the Migrant Educaiton list is oriented towards naming a particular lab test, the Migrant Health use of ICD codes tends to name the condition or disease for which lab work is being done: the ICD approach is very powerful in that it permits a broad specification of diseases and conditions being screened and is not "tied" down to lab test specification. For example, there are nine (9) different classes of agricultural chemicals for which screening may take place. "E" codes E863.0-E863.9 permit specific identification of the chimical class being screened (e.g. herbicides, Fungicides, etc). No such capability exists on the Migrant Education record. In general, this holds true throughout the lab results section. By the co-joint use of "V" and "E" codes with procedure codes, many screening exam situations would be possible to describe.
Extreem caution should be used in creating a table of correspondence between Migrant Education and Migrant Health codes describing lab screening. The relationship is one (Migrant Education code) to many (Migrant Health codes). It is possible that a one-many correspondence may miss several Migrant Health code combinations that might be used. This

situation creates a real problem in that:

- a one-many correspondence cannot be reversed. That is,one cannot "go" from a Migrant Education lab code to a Migrant Health code.

- Migrant Education is limited by the physical size of its form and could not therefore, accommodate a Migrant Health screening exam display approach since the latter is variable is length.

Alternative B would present "challenging" problems in transforming Migrant Health lab results data into the Migrant Education formats.

Physical Exam Data

Physical exam data, as visualized by Migrant Education appears as follows:

	PHYSICAL EXAMINATION	OC	DATE	Sl Dl Hp
AA	GENERAL APPEARANCE, POSTURE			
AB	GAIT			
AC	SPEECH			
AD	SKIN			
AE	EYES: EXTERNAL			
AF	OPTIC FUNCTION			
AG	EARS: EXTERNAL AND CANAL			
AH	TYMPANIC MEMBRANES			
AI	NOSE, MOUTH, PHARYNX			
AJ	TEETH			
AK	HEART			
AL	KIDNEYS			
AM	LUNGS			
AN	ABDOMEN (INCLUDE HERNIAS)			
AO	GENITALIA			
AP	BONES, JOINTS, MUSCLES, SCOLIOSIS			
AQ	NEUROLOGIC EXAM			
AR	RECTAL			
AS	PELVIC			
AT	GROSS MOTOR FUNCTION			
AU	FINE MOTOR & MANIPULATIVE FUNCTION			
AV	ADAPTIVE FUNCTION			
AW	LANGUAGE FUNCTION			
AX	PERSONAL SOCIAL FUNCTION			

The Migrant Health concept under Alternative B is as follows:

1) A physician gives a general physicial exam appropriate to the patient (e.g. age, the known or suspected presence of other conditions, etc.)

2) If the physician detects an abnormality in a system or organ, the abnormality is investigated until a diagnosis results.

3) The fact of the physical exam and its outcome (normal or abnormal + diagnoses, etc.) constitute the data.

Under Alternative B, the Migrant Education physical exam list is regarded as one or a mixture of the following:

- An attempt to standarize physical exams
- A physicians check sheet
- A detailed record to be kept to be kept in the patients local record

Although each of the above serves a justifiable purpose, it does not follow (under Alternative B) that such detail should be placed in a patient's data base record.

Following is a display (fictional) of a patient's physical exam results.

DIAGNOSIS		PROCEDURE		OUTCOME
Code	Name	Code	Name	
V70.5	Health Examination of defined subpopulation (includes school children)	89.7	General Physical Examination	Abnormal
781.2	Abnormality of gait			
781.3	Lack of coordination			
783.4	Lack of expected normal physiological development			

In actuality, the above diagnostics were drawn from a section of the ICD-9-CM titled, Symptoms, Signs and Ill-defined Conditons.

These diagnoses are essentially observational in nature and would be followed by investigations to yield diagnoses of the conditions and/or diseases underlying the observed symptoms.

The strength of the above approach is that it permits concentration on identifying and reporting the conditions that require attention.

Unfortunately, the pre-printed MSRTS medical record does not permit Migrant Education to enjoy the benefits of the Migrant Health data relating to physicial exams.

This concludes the analysis of Migrant Education's use of Screening Exam, Physical Exam and Lab Result Data as such data would be available under Alternative B of Appendix A.

Migrant Education Purpose #3

Detecting those condtions for which referral (of the student) to a provider is appropriate.

The present objective is to show how Migrant Health data may be used for this purpose. It is understood that observation of the student by a professional (i.e. nurse) plays a major role in this activity. This entire purpose is a very delicate and subtle one involving local practices, formal relations between health providers and school nurses, laws and medical ethics regarding the making of diagnoses, matters of privacy and confidentiality(addressed in the next section) and a host of factors which defy reduction into simple interpretation.

As a basis for decision making, however, this analysis will proceed by examining various classes of data for their potential value in meeting the Migrant Education purpose as stated.

Use of Screening Exam Data for Migrant Education Purpose #3

(Includes "Preliminary Assessment" items Physical Exams items and Lab Results Items)

Whether Migrant Health elects to use Alternative A, B or C of Appendix A, it has been shown that the Migrant Health information system design can be used to supply Screening Exam Data sufficient to Migrant Education's Purposes 1 and 2 as previously discussed. All three Alternatives of Appendix A make the following Screening Exam available:

- the ID of the Screening Exam (alternative A or C); or the disease or condition being screened (Alternative B)
- the date of the exam
- the facility providing the exam
- the outcome expressed as a judgement of normal or abnormal plus in some cases, literal values (Alternative A or C). Or, the outcome expressed as a judgement of normal or abnormal plus, if abnormal, a diagnosis (Alternative B).

The above information may be used for the purpose of deciding whether to refer a migrant student to a physician or health care facility.

Use of Immunization Data for Migrant Education Purpose #3

Casual inspection of Migrant Health immunization data (see page 42 preceeding) shows its value for purpose #3).

Use of Health Problem List Data for Migrant Education Purpose #3

Section V of this document shows the Migrant Health data that could be made available to Migrant Education. The "Health Problem List" (Migrant Education's name), contains the following information for Migrant Education's use:

- Problem Number
- Diagnoses
- Problem Type
- Problem Status
- Procedure
- Outcome (if procedure)
- RX

These items are created for and by professional medical providers (RN, NP, FNP, PA, MD, DMD, etc.) and are not intended for use by lay persons such as teachers, school principals, LPN's or LVN's. It has even been suggested by Migrant Education that MH physicians (or other providers) indicate those conditions that are "life threatening" or "urgent". These notions have been rejected by the Migrant Health Medical Task Force for the following reasons:

- Problem data is intended for a medical professional. The data itself, together with the examination of the patient, suggests the seriousness of each conditions. If the patient is not available for examination then the patient will not have checked into the clinic or enrolled into school. Therefore, no data will be present and the "Life Threatening" or "Urgent" indicator will be sitting in the data base anyway.
- "Medical alerts" should be handled separately from direct involvement with the data base. For example, highly communicable diseases are sometimes diagnosed after the patient or student has left the area. There is sometimes a need to "locate" such patients or students through outreach resources around the country. Such occasions may be handled through medical alert messages that are situation/individual unique and need not become part of a patient's data base record!
- To declare some conditions as "life threatening" or "urgent" is, by implication , to declare all other conditions "non-life threatening" or "non-

urgent". This is not a good situation either medically, legally, or ethically. Almost any condition can become "life threatening" or urgent" under certain circumstances and/or without follow-up.

In general, such labeling of conditions is felt to induce unnecessary risk to the patient for no apparent reason other than to try to compensate for the use of health problem data by well meaning but unqualified persons.

There do seem to be at least two avenues open to Migrant Education for use of health problem list data for the purpose of detecting conditions for which referral is an appropriate action. Two of these avenues are discussed in the following.

1) Have qualified medical personnel review each enrolling migrant student's medical record. Wherever this approach is used, the Migrant Health Encounter History (including problem list) is a suitable instrument for the purpose at hand.

In locations where Migrant Health operates a nearby facility, the LEA's Migrant Education program could contract with the MHC to review enrolling migrant students' medical records for the very purpose of determining whether referral is called for. the Migrant Health Center could access the patient data for this purpose through its own communication channel and thus avoid the delays and extra work involved in "getting student records to the clinic". All that would be required would be for the LEA to telephone the MHC and provide either key data or a student number. This possiblity presents a prime opportunity for Migrant Education/Migrant Health program cooperation.

2) Have a suitable medical task force develop an algorithm whose purpose is to identify conditions (or combinations thereof) for which referral is appropriate. The algorithm (in the form of a computer program) could then be run against each students' record upon receipt of an enrollment transaction. The computer could then send a message (via critical data, the educational record or the medical record) which informs the LEA that the student needs referral. This suggestion is not meant to imply that such an algorithm

could or should replace human medical expertise in making a decision concerning referral. Such an algorithm could, however, take care of many routine cases.

Note: There are two errors possible to make in the decision of whether to make a referral:

TYPE I error: to refer unnecessarily
TYPE II error: to fail to make referral when referral should be made

These error possibilities can be capitalized upon as follows:

- Bias the algorithm to favor Type I over Type II errors
- Have a human (professional) review all medical records containing a possibility of a Type II error after the algorithm has run. (i.e. review all medical records for which the algorithm has decided not to recommend referral).

Conclusion: Migrant Health Encounter Data (inc. problem list data) may be of use by Migrant Education in detecting conditions in a student's medical record for which referral is appropriate but only under the restrictions discussed in the foregoing.

Patient History and Family History are discussed in the context of Migrant Education purposes 4, 5, and 6 to follow.

Migrant Education Purpose #4

Providing medical information to a provider and/or health facility to which a migrant student is referred.

The patient record developed by the Migrant Health Medical Task Force was (is being) created by health professionals for use by health professionals. Migrant Education has several options availabe-two of which follow .

a) Use either the Migrant Health medical data display approach (see section V) to generate records suitable for a referral visit; or, develop a medical record suitable for use during referrals.

   Use of the Migrant Health displays will require that such "print outs" be mailed to schools together with the Migrant Education school health records. This is necessary because a student's medical condition may not give Migrant Education time or request and receive (via mail) a full medical record before the student's referral visit takes place.

b) Continue to use the MSRTS student "Medical Record" for purposes 1-6 on page 40 .

Migrant Education Purpose #5

Identifying migrant student health conditions that might affect classroom behavior or performance,

and

Migrant Education Purpose #6

Being informed of special actions required of the educational facility, including the classroom, to mitigate against particular health conditions.

Meeting the two above purposes involves a two step process as follows:

Step 1: Insuring that the data base content design provides for health information relevant to purposes 5 and 6.

Use of the ICD-9-CM and CPT-4 in the context of the Migrant Health patient record design make possible the description of any disease or health condition. The Migrant Health Encounter History portion of the data base provides for the storage and retrieval of any condition describable by these codes sets. It is worthy of mention that patient and family history of diseases and conditions are part of the Migrant Health Encounter History. See page 26 & 27 for more details on patient and family history.

Step 2: Transforming medical descriptive data into school useable information.

Migrant Education already has a basic concept in place to carry out step 2. The concept is that of educational-health linkages (E-H linkages). This concept operates as follows. Selected MSRTS health condition codes have been identified as potentially affecting the child in the classroom (or in other elements of the school program such as physical education etc.) For each of these conditions, a special instruction has been created which will assist school personnel to take necessary steps to mitigate against the effects of each health condition.

In terms of E-H linkages, health conditions fall into two general categories: symptom specific and general.
Symptom specific conditions are those whose symptoms might actualize in the school setting (e.g. epilepsy, diabetic, coma, etc.) These conditions require that school personnel be able to recognize their overt manisfestation and to react quickly. To meet such emergencies, it is helpful for school personnel to know the history of a student with respect to the particular disease or condition. In this way, the school personnel can recognize the origin of the symptoms and react accordingly. Providing materials which inform the school personnel of the proper actions to take in the presence of such episodes (e.g. epileptic seizure) is a programmatic matter not a system task.

A second class of conditions requiring E-H linkages are those whose behavioral symptoms are more subtile and indirectly related the conditions themselves. Anemia, for example, may show up in the classroom as lethargy or inattentiveness. Thus, a teacher may not realize the source of the overt behavior. Such conditions require that E-H linkages provide guidance to school personnel which will enable them to moderate the effects of the conditions.

In many conditions, knowing the name of the disease or condition is not as important to school personnel as knowing what to do for individual students. A rigorous set of E-H linkages, developed by a team of medical and

educational providers can make E-H linkages meet Migrant Education purposes #5 and #6.

Section VII: Confidentiality and Privacy of Information

The meaning of these terms as used in this section are generally as follows.

Confidentiality has to do with the proper safeguarding of student (or patient) information that is part of the health and medical information system. Confidentiality, as a concern, begins with the creation of source data in the field and continues throughout the entire data handling process including data entry, data base security, output dissemination, and the safeguarding and disposal of printed displays in the field or clinic.

Privacy has to do with selecting items of information that are to become part of patient or student data in the system.

An in-depth analysis of these two issues, privacy and confidentiality, lies far beyond the scope and intent of this document. The specific intent of this document is to identify and discuss some key and unique problems that arise form the sharing of patient data by Migrant Education and Migrant Health.

Largely, these problems stem from differences between Migrant Education and Migrant Health that have to do with their respective policies and operating environments. Each of these factors and their impact on the sharing of data will be discussed.

As will be seen, the operating environment principally affects confidentiality and policy affects privacy; although certain interactive effects are noted.

Confidentiality and Operating Environments

1 - Migrant Education Operating Environment

a) Input

Patient or student health data may originate from many sources such as a county health screening unit or clinic, a school nurse, a private physician, a health services contractor, etc. From these points of origin, the health input data may then pass through a records clerk who may be located at a school plant or a regional Migrant Education field component. The clerk may transfer data from a "standard" medical data recording form to an "input" document (e.g. the MSRTS Medical Record). The data then goes (by mail, courier or telephone) to a terminal operator station. The terminal station usually is co-located with other Migrant Education administrative facilities. The terminal operator station serves many different schools and may be located in the same town as the data origin point or it may be located many miles away. Normally, files of input data are maintained at the terminal sites.

As the reader has undoubtedly concluded, health data may pass through many hands distributed over a large area under many different organizations before it is captured by the computer.

b) Output
There are three methods for getting data from the computer to the user in the Migrant Education Communication network. A discussion of one of these methods is sufficient at this time since it is used in the vast majority of cases.

Each time a migrant student enrolls in a Migrant Education field program (e.g. a school operating a Migrant Education program, a special field unit operating a migrant program, etc.) an enrollment transaction is sent via terminal to the MSRTS computer. The enrollment transaction initiates a series of responses by the computer. One such response is the printing of a migrant student Medical Record. The medical record is then mailed back to a Medical Record Addressee representing the school into which the migrant student was enrolled. The Medical Record Addressee is a person, organization or agency designated by the Local Education Agency (LEA) as being "authorized" to handle student medical records.

Ideally, the Medical Record Addressee would be a school nurse or some other professional health provider. However, there are indications that non-health personnel are sometimes designated as the recipients of medical records (e.g. school vice-principals, LEA administrative offices, and even school clerks).

2 - The Migrant Health Operating Environment

Migrant Health programs operate in Migrant Health clinics. All personnel serving patients and handling patient records are physically located in the same physical clinics. Patient records are maintained in conventional medical files and are accorded the same security as is normally accorded to patient records in a hospital or private physician's office.

a) Input
Source data always originates with a medical doctor or nurse. All data related to each patient encounter is entered on a numbered encounter form. Ancillary documentation is stapled to or otherwise affixed to a patient "jacket" which contains all patient data. A trained medical records clerk makes entries (e.g. assigning or checking ICD codes) that are required during data preparation. From that point, there are three channels for communicating input data.

i) The data may be entered directly from the clinic's on-site terminal located in the patient record department.

ii) For clinics not having terminals, certain urgent data may be telephoned to the Austin, Texas Data Communication station. The Austin Data Communicators are full time

staff members who are trained in medical record keeping and in terminal operations. The Austin terminals are CRT interactive terminals used for input and output of data for those clinics possessing no terminals. All telephone communications into and out of the Austin Data Station use a password or a call back procedure. A log is maintained of all communications with clinics.

iii) The third channel is similar to the preceeding one except that source documents are mailed from the clinics to the Austin Data Station. The Austin Data Communicators then make data entry based on the source documents. All patient medical records are kept in locked files which are accessible only by the Data Communicators. The physical facilities housing the terminals are kept locked and are restricted to all but authorized staff.

b) Output
There are primarily only two channels used for output.

i) Direct computer to clinic terminal communication.

ii) For a clinic not possessing a terminal, output is handled by the following steps (all of which occur during a single telephone call).
- The clinic calls the Austin Data Station (using either a password or a call back procedure) with a patient number or key data
- Using the interactive terminals, an Austin Data Communicator accesses the patient record in the form of a Health Exception Report. The Health Exception Report data is "read" to the clinic.

Logs of all clinic to Data Station communications are maintained.

The only release of output by a clinic is to a hospital or conferring physician. Such release of information is always preceeded by a patient's "consent to release" and always follows procedures accepted by and in the medical community.

Certain Volume I ICD codes describe conditions which call for subjective conclusions and have legal implications. These codes describe conditions such as "Mental Disorders" (see codes 290-319) or "Child Abuse" etc. Migrant Health is developing stringent "special handling" procedures so that such information goes only to physicians.

Several conclusions may be drawn regarding the Migrant Health operating environment as follows:
- Physicians or nurses are the source of all patient medical data
- Only health professionals (including trained medical records personnel) have anything to do with migrant health patient data
- At each point of communications, all persons handling patient data are under the direct supervision of either the clinic or the Austin Data Station.

- Facilities housing patient data (e.g. files, offices, etc.) were set up for that purpose and only for that purpose.

Discussion

The operating environment of a program has greater effect on confidentiality than on privacy. For this reason, the bulk of this discussion concentrates on confidentiality.

Migrant Education is confronted with a much more difficult operating environment (than Migrant Health) with respect to confidentiality. Many confidentiality factors lie outside the control of the Migrant Education data system and in many cases, outside the control of the Migrant Education program itself. The Migrant Health system is far easier to control simply because there are much fewer people, organizations and variable processes in the communications links.

The operating environment of Migrant Education is an area of concern to Migrant Health. There are substantial legal and ethical questions that need clarification. For example, what is the liability of a Migrant Health clinic which places data into a patient record should the confidentiality of that patient's record be violated by a Migrant Education field component. The reverse of this situation should not be a problem to Migrant Education because patient data always goes DIRECTLY to a clinic except when it must pass through the Austin Data Station. These and other questions regarding confidentiality need full discussion prior to sharing patient data to any great extent--especially the level of data that will become available as the new Migrant Health patient record is implemented.

Policy and Privacy

1. Migrant Education policy regarding privacy

   It has, in the past, been the policy of Migrant Education to restrict certain kinds of health data from being included in the student data base. The excluded data consists of items which might embarrass, stereotype or cause anguish for a student. Examples of such data are: pregnancy, abortion, venereal disease, and a variety of so called "behavioral disorders". This is a wise and prudent policy especially in view of an operating environment which makes the likelihood of confidentiality violation somewhat high.

2. Migrant Health policy regarding privacy

   A medical task force has examined the issue of privacy in the context of the proposed Migrant Health patient information system application. The gist of their deliberations is presented below. The reader should bear in mind that issues of confidentiality do not influence Migrant Health's consideration of privacy to any great extent. Because of the operating environment of the Migrant

Health program, the protection of confidentiality is seen as a problem that can and will be dealt with satisfactorily in the design, implementation and operation of the Migrant Health system. Deliberations regarding privacy were carried out in the context of a clinic to data base to clinic communications link.

Law and medical ethics pose a dilemma for Migrant Health as regards privacy of information. The two sides of the dilemma are as follows:

Side 1: Migrant Health is obligated to protect the privacy of patients. Therefore, information which might cause anguish or embarrassment to a patient should be excluded from the data base.

Side 2: part (a)
An attempt to exclude health items which might embarrass or cause anguish to patients is doomed to failure because any health information may fall into those categories. For example, diagnoses of heart conditions may affect employment opportunity or insurability. There is simply no way to have a data base restricted only to items which will never pose a potential for embarrassment if confidentiality is violated--legally or otherwise.

part (b)
Withholding patient information from a subsequent provider is an action fraught with potential consequences which are serious from a legal viewpoint and grave from a patient's viewpoint. Should the system exclude medical information which affects the well being of a patient then it is violating basic medical ethics as well as its raison d'etre!

The above dilemma is not new to medical practitioners. They must make judgements each day concerning the recording of patient data. Although there are legal and ethical principles, there are no hard and fast rules to follow that cover all situations. There is only the consideration of the circumstances, the patients condition and a host of other factors to fall back on. Each physician must act in accordance with his or her understanding of all the relevant factors in deciding what information to record and to release to others.

These realities were in fact the key to unlocking the dilemma. Essentially, the solution to the dilemma was to recognize that no computer system is equipped to weigh all the factors underlying the delicate balance between patient privacy and well being. Such decision making is best left to a human being.

Therefore, no rules of data exclusion will be built into the system. Data exclusion, when exercised, will be exercised by individual physicians caring for individual patients in individual circumstances. Such is the policy of Migrant Health regarding privacy of patient information.

Discussion

Migrant Health may place information in a school-age patient's data base record which Migrant Education feels should not be released as part of a school medical record. This circumstance poses no real problem to data sharing between Migrant Health and Migrant Education if Migrant Education will undertake one of the two following alternatives.

Alternative 1

step a) Through its own medical and educational task force, Migrant Education may identify those diagnoses, procedures, prescriptions and screening exam data that it feels should not be included in a patient's printed school medical record.

step b) Computer programs may then be written to exclude items (Identified under a) above) from students' printed records--but not excluded from their data base record.

Alternative 1 will permit any (legitimate) medical data to be placed into a students data base record. Thus, a student who becomes a patient of a Migrant Health Clinic or private physician or a hospital will have complete medical data available for his or her care. Alternative 1 also insures that Migrant Education may input all pertinent medical data into a student's data base record without having to conduct a massive training program to teach its health providers all the exclusions to ICD-9-CM.

Alternative 2

step a) Create a student medical record that is for providers only (including school nurses). This record would either contain all available medical data on each student or would consist of a Health Exception Report such as that used by Migrant Health. Where a school has no R.N. readily available to receive and review such records, the school could either contract with a local physician or, if available, a nearby Migrant Health Clinic.

step b) Create a student health record that is suitable for teachers and other appropriate program personnel--this record would rely upon educational-health linkages largely for its content.

step c) Create a student administrative health record that is especially designed to help insure that a student were "up to date" in receiving immunizations and various screening exams.

step d) Establish the necessary safeguards to insure the proper records go to the proper parties and that the records are properly secured while in the LEA.

APPENDIX A

Decision Needed Concerning the Content of Lab Results and Screening Exam Outcomes

Volume 3 of ICD·9·CM and certain CPT Codes identify procedures used in the process of diagnosing diseases and conditions. However, the level of definition provided by those codes do not permit detailed descriptions of lab tests and their outcomes (results). For example, neither Volume 3 (ICD) nor CPT Codes provide definition of a lab test performed for the purpose of detecting Albumin, Bilirubin, etc. in a urine sample. The reporting of detailed screening exam occurences and results will require the creation and maintenance of Codes outside the intent and scope of the ICD and CPT Codes. A decision must be made as to whether to create and use such codes. Because this decision is one which affects the kind and amount of information available to providers for patient care, it should be made by health providers. The creation of codes for describing (in detail) screening exams and outcomes impacts the system from a human factor's aspect (as will be discussed) and not from a hardware/software aspect. The decision should, therefore, reflect the total medical management of clinic operations and de-emphasize "computer" considerations.

The section, THE PROBLEM, discusses the problem in more depth.

The section, ALTERNATIVES, presents three different solutions.

The section, RECAP, reiterates the decision to be made, the problem, and the alternatives.

The Problem

Using "V" Codes of ICD, Volume 1, one may specify that a patient is encountering a health facility for the purposes of being screened for particular diseases or conditions (see V73-V82). Volume 1 does not, however, permit description of either a particular lab test (by type) or of the chemical agent (bio or otherwise) or pathogen which might be involved in a disease or condition. For example, no "V" Code exists to indicate a test for presence of Albumin, Bilirubin, etc. in urine or blood. Likewise, there are not codes from Volume 3 of ICD·9·CM by which to describe specific lab tests or outcomes of lab tests. As an example, code sets 90 and 91 (of Volume 3) permit description of MICROSCOPIC examination of specimens from specific systems (e.g. "90.0 .... specimen from nervous system and of spinal fluid") or organs (e.g. "91.0 ... specimen from liver, biliary tract, and pancreas"). As in the case of Volume 1, however, these Volume 3 Codes do not permit identification of either specific lab tests or of specific agents or pathogens whose detection is being sought. This dearth of descriptive capability does not represent a weakness of ICD·9·CM but rather a philosophy and the operational environment, in which it will be used.

The philosophy is simply that ICD·9·CM was created by and for professional health providers. A general description of diagnostic procedures is sufficient to ICD·9·CM users because

the results of the diagnostic procedures will always lead to either a diagnosis (expressable by a Volume 1 Code) or, by default, to an absence of a diagnosis. In either case, ICD·9·CM relies upon medical judgement as the outcome generator.

The operational environment (influencing the design and content of ICD·9·CM) is primarily one in which a patient's medical records are to remain resident in the facility performing the diagnostic procedure. Such records would include detailed data relating to lab work in addition to ICD Codes. Referral, in such an environment, normally consists of "across town" communication of medical information with another provider or health care facility under certain conditions (e.g. referral to a specialist, planned hospitalization under the attending physician's care, emergencies, etc.) Such communications easily accommodate discussion of specific lab and other diagnostic procedure outcomes as needed. ICD·9·CM was created around the typical medical practice operational environment rather than a migratory patient environment.

Despite the problem of the migrating patient, ICD·9·CM still serves well even for the current application. Its use simply requires a system design decision to be made. The required decision is whether to enrich the code set (using Extra ICD or CPT-4 Codes) to permit specifiction of lab tests and other screening exams and their specific outcomes.

Alternatives

Alternatives A, B and C following examine alternative solutions.

ALTERNATIVE A: Enrich the ICD/CPT codes to permit detailed description of screening exams and outcomes.

A coding system appropriate to such detailed identification of screening exams and outcomes is presented on pages 7 and 8. The coding strategy is straight forward:

a) A Volume 1 "V" code is used to identify the reason for the screening exam. This "V" code appears under the Diagnositc Code column.

b) A Volume 3 procedure code has been selected as a "standard" diagnostic procedure code. In the case of lab tests, no Volume 3 code would be used unless the lab test was a microscopic examination of a specimen such as that provided for by Volume 3 codes 90.0-90.0 and 91.0-91.9.

c) Outcome would include specification of:

i) the particular agent being screened, (e.g. Bilirubin, Albumin, etc.), and

ii) the specific outcome of each lab test. As is shown on the pages 7 and 8, each particular screening exam (or aspects thereof) is given a two character name. The two character screening exam name is used together with special codes provided to record outcome values of screening exams.

Advantages of Alternative A:

Immediate access, via terminal, to detailed screening exam detail.

Disadvantages of Alternative A:

Human Factors Problems

a) The two character names of screening exams shown on pages 7 and 8 must be taught to all personnel involved in putting data into the system.

Human Factors b) Problem

As the field user wishes to place data into the system regarding screening exams for which no two character codes have been specified, the field user will have to call the system office to obtain such a code.

Human Factors c) Problem

A list of newly created screening exam codes will have to be generated periodically and sent to field users who must then keep their code lists updated.

d) There is no convenient vehicle (e.g. representative organization, methodology, established documentation, etc) by which to standardize the reporting of screening exam results. Results of identical lab tests, for example, may be reported as percentages, a point on a gradient, raw data values, etc, depending on the established practice of the facility performing the test. It may or may not be possible for a medical records clerk or terminal operator to convert from one score type to a "standard" score type.

SCREENING EXAMS CODES

(In all cases, JU means judgement)

	DIAG. CODE	PROCEDURE CODE	OUTCOME
	V72.0 or V80.0 V80.2	95.01	RG = 000-999 LG = 000-999 RV = 000-999 LV = 000-999 JU = NOR/ABN
HEARING	V72.1 or V80.3	95.41	R1 = R2 = R3 = R4 = R5 = L1 = L2 = L3 = L4 = L5 = RI means Right hearing @ 1,000 HZ, R2 @ 2,000 HZ, etc. the outcome is stated as the threshold DB level at which of signal detection occurred. JU = NOR/ABN
BLOOD PRESSURE	V70 or V20.2 or V70.5 or V 81.0 -V81.2	89.61	BP = ___/___ Ex: BP=110/70
GROWTH	V21- V21.0-V21.9, or V79.3	93.07	HC = 000-999 1N or 000-999CM HT = 000-999 IN or 000-999CM WT = 000-999 LB+00-99 oz JU = NOR/ABN

	DIAG CODE	PROCEDURE CODE
GENERAL PHYSICAL	V70 or V70.0 - V70.9 V20.2 or V793 or specify condition	89.7
LAB	V70 or V70.0-V70.9 V20.2 or V72.6 or specify condition	90.0-90.9 91.0-91.9 or none if not microscopic
See V73-V82	V75.8 V82.5 V78.2	
TB-PPD	V74.1	-

OUTCOME	
General appearance, posture	AP = NOR/ABN
Gait	GA = NOR/ABN
Speech	SP = NOR/ABN
Skin	SK = NOR/ABN
Eyes: External	EE = NOR/ABN
Optic Fundi	OF = NOR/ABN
Ears: External and Canals	EC = NOR/ABN
Tympanic Membranes	TM = NOR/ABN
Nose, mouth, pharynx	NM = NOR/ABN
Teeth	TE = NOR/ABN
Heart	HE = NOR/ABN
Kidneys	KI = NOR/ABN
Lungs	LU = NOR/ABN
Abdomen (include hernias)	AB = NOR/ABN
Genitalia	GE = NOR/ABN
Bones, joints, muscles, scoliosis	BJ = NOR/ABN
Neurologic exam	NE = NOR/ABN
Rectal	RE = NOR/ABN
Pelvic	PE = NOR/ABN
Other	NOR/ABN
DEVELOPMENTAL SCREENING	
Gross motor function	GM = NOR/ABN
Fine motor and manipulative functions	FM = NOR/ABN
Adaptive function	AF = NOR/ABN
Language function	LF = NOR/ABN
Personal-social function	PF = NOR/ABN

ALBUMEN	AL=0,1,2,3,4
SUGAR	SU=0,1,2,3,4
BILIRUBIN	BI=NOR/ABN
PH	PH=LITERAL
KETONES	KE=NOR/ABN
BLOOD	BL=NOR/ABN
PARASITIC	PA=NOR/ABN
LEAD	LE=NOR/ABN
SICKLE	SI=PF/NP
HEMATOCRIT	HE=LITERAL & JU=NOR/ABN
PD=NEG OR 00-99MM	

ALTERNATIVE B: Use existing ICD & CPT codes only for screening exams.

This alternative involves the following approach.

a) use Volume 1 "V" code to identify the reason for the screening exam under the diagnostic code column.

b) use Volume 3 code to identify the procedure (screening exam) as nearly as possible under the procedure code column.

c) if the diagnostic procedure (screening exam) reveals a disease or condition, enter the proper diagnostic code under the diagnostic code column, and enter AB (abnormal) under the outcome column. If the diagnostic procedure does not reveal a disease or condition, enter NA (for No abnormality) under the outcome column.

The rationale underlying this approach is that there are two important items of information regarding screening exams:

Item I) the fact that a patient was screened for a certain condition or, disease (within a certain time period) and

Item 2) the diagnosis (or judgement of no abnormality) arising from the screening exam.

The actual screening exam values are simply part of the data used by a professional provider in arriving at a decision (i.e. a diagnosis or a judgement of no abnormality) and are not necessary except as back up detail to be obtained by telephone contact with the facility housing the exam results.

Advantages of Alternative B:

A coding system that operates within the provisions of ICD·9·CM and CPT 4. No need for maintaining and teaching special code sets such as two character names for screening exams.

Disadvantages of Alternative B:

Loss of terminal access to screening exam detailed outcomes.

Alternative C: Identify a (relatively) small set of screening exams for detailed reporting (as described in ALTERNATIVE A); and, report other exam results as described in ALTERNATIVE B.

The efficacy of this hybrid approach depends upon whether a small pre-defined set of screening exams covers a high enough proportion of exams (+70%?) to make it worthwhile to carry them in the data base.

This alternative would not permit the expansion of outcome codes for screening exams not included in the original sub-set represented on pages 7 and 8.

RECAP

In storing and reporting screening exam results, a problem arises in that detailed reporting is not possible using ICD·9·CM and/or CPT-4 codes.

Three alternatives for dealing with screening exam reporting were discussed:

ALTERNATIVE A: Create the codes necessary to use in reporting screening exams and their outcomes.

ALTERNATIVE B: Rely upon provider judgement, in the form of diagnoses, as a form of reporting screening exams and their outcomes.

ALTERNATIVE C: A hybrid of A and B above.

Medical providers are the appropriate group to choose among the alternatives or to propose some other solution.

APPENDIX B

The Migrant Health System's

TERMINAL - OPERATOR INTERFACE

Present plans call for a design in which all M.H. data is input using a fixed format technique. This design is dependent upon certain hardware capabilities being present at the terminal site. Should it prove unfeasible (either technically or economically) to have such capability at every site, some users will use a "free format" technique. Both techniques will be described.

THE FIXED FORMAT TECHNIQUE

On either a TTY terminal (Example: the Texas Instruments 700 series, with a "down loading" support TI host micro) or a CRT terminal (Example: IBM 3276), the system will provide labels and spatial locations for input data. These format parameters will be provided either through interaction with the host or by stored program indigenous to the terminal. Functionally the format will appear as shown in the figure following. Everything shown on that figure is supplied by the system. The terminal operator need enter data only.

FIGURE I

DATE	CLINIC	TERM	BATCH
030480	BCTX	1	

PATIENT NUMBER	ENCTR NO	PROV NO	PROB NO	DIAG CODE	PROB TYPE	PROB STAT	PROC CODE	OUTCOME ID =	NDC (CODE)

No matter what the occasion of the encounter (e.g. immunization, physical exam, condition diagnosis and treatment, screening exam, etc.), it may be reported using the format as shown. The inherent simplicity of using one format to report all data yields enormous advantages. Among these advantages are:

a) minimization of training documentation, operator instructions, and training time

b) potential for extremely efficient input processing by the computer system

Whereas Figure I shows a fixed format to be used in inputting "new data" into a patient's record, the same format may be used to update existing encounter data. This is accomplished on the CRT by requesting display of a particular encounter for the patient number. Updating may then proceed by changing or adding data on the encounter screen as appropriate.

Since there may be several lines of data in an encounter, updating via TTY will proceed as follows. As in the case of CRT, an inquiry will be made using patient number and encounter number. The display will number each line of data within the display. The terminal operator may then enter the update data by citing the appropriate line number. This technique makes the TTY exhibit the functional characteristics, efficiency and convenience of CRT screen updating.

The following example illustrates. Shown below (through lines 1, 2, 3) is the display the operator would receive after making inquiry on encounter number 39724 for patient number 694123.

	DATE	CLINIC	TERM	BATCH						
	030480	BCXT	1							
	LINE NO.	PATIENT NUMBER	ENCTR NO	PROV NO	PROB NO	DIAG CODE	PROB TYPE	PROB STAT	PROC CODE	OUTCOME ID =	NDC (CODE)
RESULT OF INQUIRY	1	694123DGH	39724	7	3	V17.2	ACUTE	ACT	90.1		
	2			3	4	402.1	ACUTE	ACT	18.3		57643
	3			7	5	V23.8	CHRON	DOR	90.4		
UPDATE DATE	2					42.1	X			ABN	14782
	3										

The operator has taken the following update actions.

a) changed the diagnostic code of line 2 from 402.1 to 42.1 (error correction)

b) deleted Problem Type from line 2

c) added "ABN" to outcome of line 2

d) added an NDC RX Code to Line 3

Additional details are covered in the M.H. Specifications.

Note that even though a "line ID" was used in the transaction sequence, the line ID is of transient Value only and does not become resident in either the data base or on other display copy.

Although an inquiry must preceed an update to an existing line of data no significant penalty is incurred because:-

1) the updating of existing lines of data will be infrequent in the M.H. operation, and

2) the pre-inquiry permits the operator to check the data in the patient record prior to updating it. This is a highly desirable action.

THE FREE - FORMAT TECHNIQUE

This technique will be developed and used IF AND ONLY IF all terminals cannot be made to operate in the Fixed-Format environment described in the preceeding. This approach is described below and will apply to non-CRT terminals.

a) the free format will use a position dependent header:

Date

Clinic ID

Terminal ID

Batch Number

Transaction Type

b) data will be identified by conventional two letter names followed by "==", followed by data values. The names are illustrated below:

PN (Patient number)

EN (Encounter Number)

PV (Provider Number)

PR (Problem Number)

DC (Diagnostic Code)

PT (Problem Type)

PS (Problem Status)

PC (Procedure Code)

OC (Outcome)

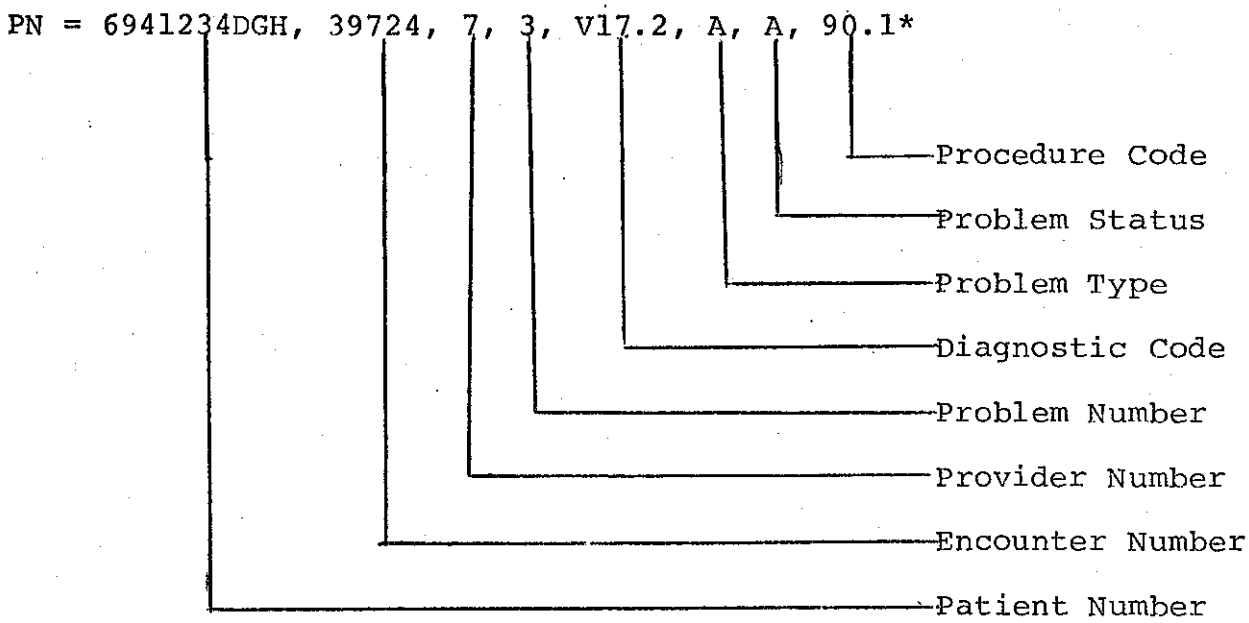
RX (Medication)

LN (Line Number)

An alternative to a two letter name is to use delimiters as position markers as is now done in the MSRTS.

Example of 2 Free Format transactions (For convenience, the Header is omitted).

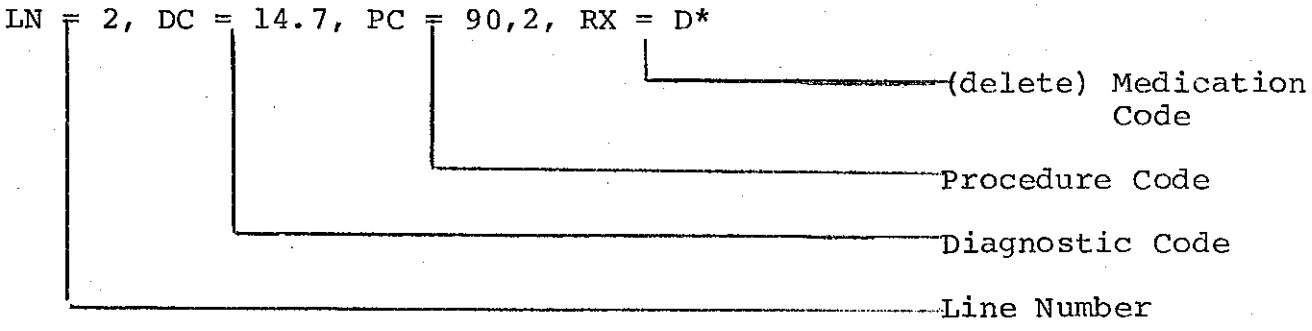
1. to add a new line of data:



2. to add (or change) data to an existing line of data:

As in the case of Fixed-Format updating, this transaction must be preceeded by an inquiry to obtain a line number.

In this case the operator wishes to change a previous diagnostic code, add a procedure code and delete a medication code.



Additional details of Free Formatting will be developed if the need to use free formatting arises.

Notice, however, that even if free formatting is employed, the technique uses a very small number of data names (approx. 11), and these names may be entered in any sequence unless deliminiters are used to "skip fields".