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Data Assessment for the National Information Center for Health and Population, Egypt

July 1998

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Partnerships for Health Reform
PHR

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The Partnerships for Health Reform (PHR) Project seeks to improve people's health in low- and middle-income countries by supporting health sector reforms that ensure equitable access to efficient, sustainable, quality health care services. In partnership with local stakeholders, PHR promotes an integrated approach to health reform and builds capacity in the following key areas:

- *better informed and more participatory policy processes in health sector reform;*
- *more equitable and sustainable health financing systems;*
- *improved incentives within health systems to encourage agents to use and deliver efficient and quality health services; and*
- *enhanced organization and management of health care systems and institutions to support specific health sector reforms.*

PHR advances knowledge and methodologies to develop, implement, and monitor health reforms and their impact, and promotes the exchange of information on critical health reform issues.

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Abstract

This report contains results and recommendations from a study of the quality of data resources collected and archived by the National Information Center for Health and Population (NICHP). There are a number of documentable data quality problems, probably stemming from the fact that the data are not used very much. As a consequence, problems with completeness, consistency, and accuracy are not identified, and the process is not subject to improvement pressures of user feedback.

The report provides a taxonomy of data and information that might guide the NICHP as it extends the plan for data collection and archiving. The report proposes a changed NICHP data handling and quality control process, to help improve data quality. And the report proposes a five-point program for the director general of NICHP to adopt to promote more aggressive improvement of the Ministry of Health and Population data quality.

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Acronyms

HIC	Health Information Center
HIS	Health Information Systems
HM/HC	Healthy Mother/Healthy Child Project
MCH	Maternal and Child Health
MIS	Management Information System
MOHP	Ministry of Health and Population
NICHP	National Information Center for Health and Population
PHR	Partnerships for Health Reform
QA	Quality Assurance
QC	Quality Control
QIP	Quality Improvement Program
USAID	United States Agency for International Development

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Executive Summary

Data and Information Assessment and Related Recommendations

The purpose of this document is to convey results of a data assessment activity pertaining to the Ministry of Health and Population (MOHP) in Egypt. Ongoing activity to support the Ministry includes the support of a Management Information System (MIS) for the Ministry, support of a reorganized National Information Center for Health and Population (NICHP) within the Ministry, and technical assistance and support for the proposed Partnerships for Health Reform (PHR) policy reform demonstration in Alexandria. Pertinent to these objectives is the need to examine the systems and the data now being collected and used inside the Ministry and the nature of the sources and flows of such data. This work, conducted by Gary Gaumer, Brad Atkinson, and Bhavya Lal, was done over the period of May 17 to June 5, 1998. Companion products include a design document for a Monthly Health Indicator System for the MOHP and a design document for a Web site for the MOHP.

In preparing this document, the PHR research team was assisted by Les Fishbein, long-term advisor to the Minister of Health on Health Information Systems (HIS), Dr. Tayseer El Sawy, the Director General of the NICHP, several of his staff, Dr. Hala Safwat of the Healthy Mother/Healthy Child (HM/HC) project in the Ministry, and staff from the Alexandria Governorate, where the PHR team visited the Health Information Center (HIC) and several clinics. Luigi Jaramillo, a MIS advisor in the Ministry, also was of assistance. The PHR trip report, "Health Information Systems Planning," March 1998, by Gordon Cressman was also helpful in orienting this work.

The recommendations made in this report focus on two main concerns. First is a major concern about the completeness and consistency of data flowing to and through the NICHP. This is probably an old problem with many causes. While it is not clear exactly how flawed the data that is held by the NICHP really is, it is clear that there are completeness issues, process consistency problems, and problems of inaccuracy. More than some retraining is necessary. There are some serious problems with the data quality procedures, and there is a need for a renewed attention to codebook standards. It seems to be a good time for the director to mount a Data Quality Improvement Program (QIP), which is outlined in this report. That plan includes a recommendation for a new process flow of data within the NICHP and a plan for demonstrating district/unit deployment of the HIS system in order to support the governorates better. This pilot should be done in Alexandria as soon as possible to take advantage of the excellent experience at the Alexandria Governorate and to develop readiness for the unit level MIS requirements of the PHR pilot reform project in that region (which will most certainly require unit level enrollment capability).

Second, and not unrelated, is a concern about how to reorient the NICHP to become a more customer oriented organization and how to increase the general level of demand for quality data and information in the MOHP. In the past, data was essentially private property, to be treasured and sold. The objective of consolidating the various flows of data and providing shared access is clear, but the degree of leadership in achieving this objective would seem to us to depend directly on changing the NICHP to be a more customer oriented organization. This change should be one where the staff can add value to the raw data before distributing it to sectors and other customers. This is a more fundamental issue than others, since it relates to developing a better understanding of the nature of information needs inside the Ministry. This will require a much closer working partnership with the

sectors than exists now. Plans for achieving this need to be created now, as do plans for the QIP, the Alexandria district data pilot, and others. Much of this planning work will require short term consulting assistance.

The work documenting data sources and flows has focused primarily on the data flowing to the Ministry's NICHP from the governorates. Other data flows to the sectors of the Ministry from projects and other sources are documented, but not assessed for quality or availability. Data pertaining to health systems resources and outcomes from the private sector are not documented or assessed here. Both of these types of data sources are important to the future of the consolidation process. The process of consolidating codebooks and forming standards and sharing agreements for the data, or subsets that might be part of indicator systems for the Ministry seem well off, and need to be part of a larger consolidation planning process.

The outline for this document includes:

- Comments on Data Needs and a Framework for Thinking About Them
- Data Flows
- Data Quality Assessment
- Recommendations about Information Value Improvements (including data quality)
- Recommendations about Technical Assistance
- Recommendations about the Reform Pilot MIS Issues
- Annexes: Briefing Document, HIS File Layout, example standard encounter forms

1. Comments on Data Needs and a Framework for Evaluation Needs

This review of data and information needs was very limited. The Partnerships for Health Reform (PHR) research team did not interview the sectors or the technical staff at the governorate level. The relationship between the sectors and the National Information Center for Health and Population (NICHP) needs to be rebuilt and strengthened into a partnership, and in that process a joint assessment needs to be done of the adequacy of information to support policy, management and research. The recommendations in this report did not try to begin that process. It is a recommendation, as part of the five-point Quality Improvement Program (QIP), that this begin with the director general as soon as possible.

The discussions with Ministry of Health and Population (MOHP) staff in the Maternal and Child Health (MCH) program, NICHP officials, and other advisors suggest that a culture of evidence-based management has not yet been formed in the MOHP or the operation of facilities. While there appear to be considerable amounts of health care data collected in Egypt, much of it directly gathered through the public health and patient care units operated by the MOHP, the data is of little value in decision making (e.g., it is not consistent, accessible, timely, or directly relevant). We suspect that the Reform Pilot in Alexandria may create some incentives that will create demand for valuable information and represents an opportunity to demonstrate demand for management information system (MIS) functionality that, at least for the moment, may be considered a technology push elsewhere in Egypt.

From reviewing the existing data and data utilization, five main conclusions about health information in Egypt have been outlined:

- NICHP supplied data is not widely or routinely used, though this data is collected by governorates who also supply it in somewhat different forms to the line sectors of the Ministry (Curative, Preventative, etc.)
- The demand for information about health and health care is not high, particularly in the MOHP. “Doing without” has been something of a necessity, even though the Ministry operated a rather large and mainly manual system of data capture and reporting. Demand for information is substantially higher in the private sector (for management purposes) and on special projects, where the vast majority of MOHP data capture occurs.
- The quality of data captured by the MOHP from its own units is not high. Reporting completeness is a big problem. In addition, consistency and accuracy in reporting is a problem.
- Special projects (still within the Ministry, though largely donor funded) produce the best data and have the best systems for reporting. These systems are quite fragmented and tend to be quite narrowly focused on a single policy intervention.
- The use value of data flowing to the MOHP about its own delivery system is seriously hampered by the fragmentation of the health care delivery and financing systems in Egypt.

The MOHP system of hospitals and clinics serve as a safety net and are available to all that need them. This makes it impossible to know how many persons are really using the system, which makes the search for denominators always a challenge when trying to develop meaningful and consistent measures of utilization over time and across regions.

1.1 Framework of Information Needs

To help begin the process of assessing the true "need" for information, the research team developed a theoretical framework. It is attached below. This framework attempts to show the areas where information is needed by MOHP executives to monitor health, assess policy effectiveness, and manage operations. A thorough needs assessment for information might begin with sectors reviewing/revising this draft and then determining exactly which kinds of information are already available within the Ministry, and in what form and periodicity. Unmet needs can then be prioritized. The plan for data consolidation within the purview of the NICHP can also bring sources together onto a single, accessible platform.[1]

[1]Developing a data consolidation plan is a critical medium term need for the NICHP. This is the driver for the future of the NICHP within the MOHP. Clearly, relationships with sectors, more consistent and reliable flows of data into and through the NICHP, and a plan for the Alexandria MIS pilot are more pressing in the short term. But, the consolidation issues, which might begin with a kernel of HIS, are essential to plan soon. We understand that the vision for "consolidation" may be conventional data architecture of a centralized database. The data architecture of sharable and accessible, but privately held data might be a good option to the centralized concept. This would require standards for content and communications, but might allay problems of moving entire data functions to a centralized location—a concept that may be a non-starter approach to consolidation in this political environment.

2. Data Sources and Flows

2.1 Ministry Data Flowing from Its Own Units

The MOHP operates facilities that serve as a safety net program of services for all Egyptians. These facilities include general (multi-specialty), district, and rural integrated hospitals/clinics. Health centers are also operated in urban and rural areas. Public health offices which are responsible for tracking vital events and for performing (and tracking) some basic clinical functions like vaccinations are also part of the MOHP network. The MOHP activities (including data gathering) are directed from the governorate level with 27 offices and with support from the district level offices (233). The line sectors of the MOHP have, over the years, established data collection requirements from the delivery units. There, requirements are represented in a set of manual forms. The data are gathered primarily from manual registries kept by units and aggregated as required by the instructions on the form. The current requirements forms received by the NICHP are shown in Annex D, available in hard copy from the PHR Resource Center.

Table 1 and Figure 1 illustrate the flow of data to the NICHP. Basically, the governorates are responsible for collecting and verifying all data. Data flows to the technical office of each governorate, which is composed of sector employees who review and approve the content, passing it on to the health information center (HIC) of the governorate. Some data is automated at this point (but only in three or four governorates and only for certain forms). The data are carried, by hand, once a month to the NICHP. Here, the unit head (one per form) reviews the data, returning incomplete or questionable items) to the governorate on the occasion of the next monthly visit by governorate staff. When the unit head determines that data on the form is complete and accurate, it is keypunched and entered onto the NICHP database. Statistical estimates are made for items that remain incomplete. (While records are flagged for this procedure, there is no knowledge of how frequently this actually occurs.)

2.2 Other Ministry Sources

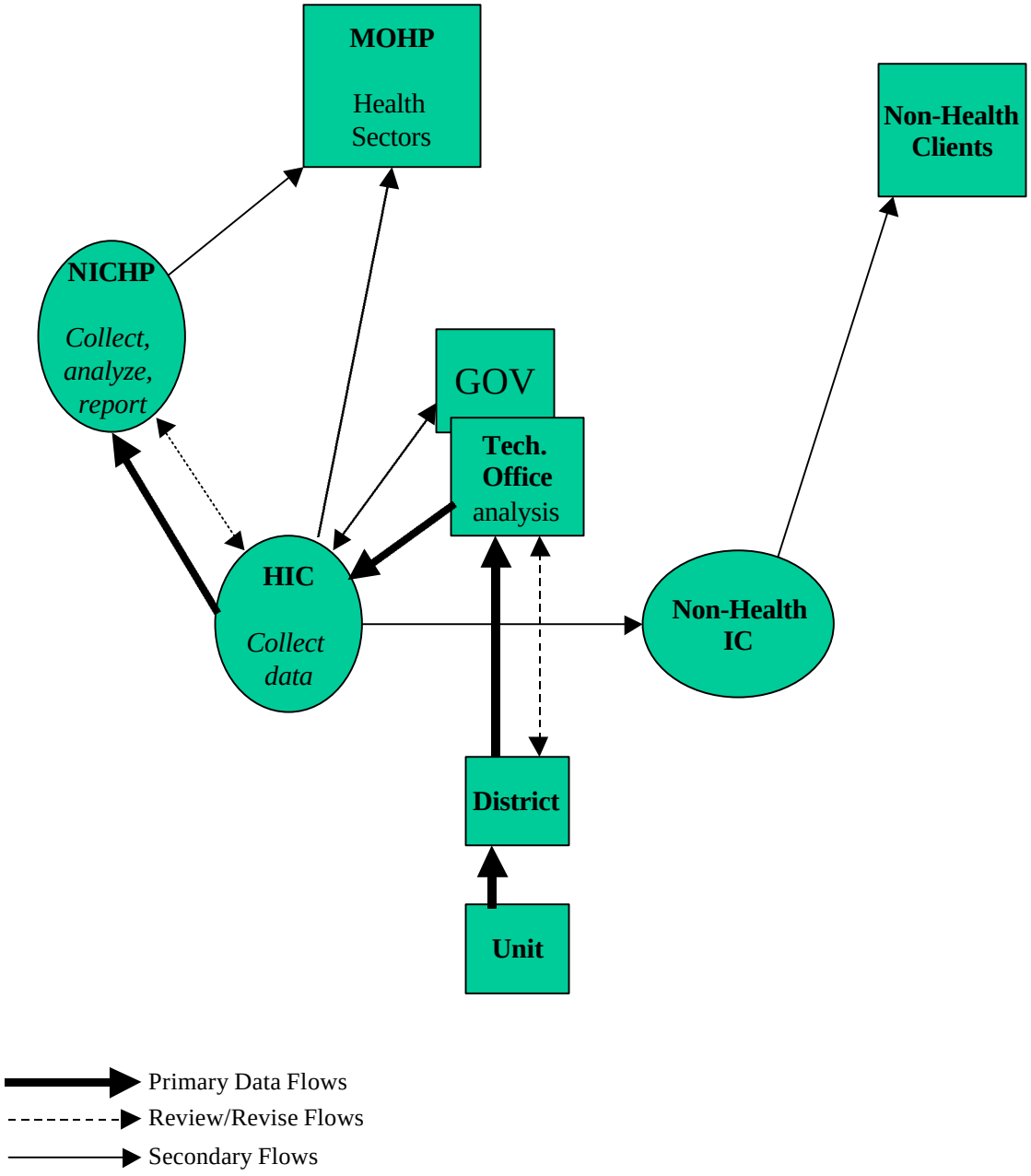
The system, maintained by the MCH program office, has been extended to contain fields that represent most of the items captured by the forms used to report data to the MOHP from the governorates. It is essentially the only data system identified where consolidation of data has been pursued effectively. The health information system (HIS) uses FoxPro (soon to be Access, though no one seems to know when this is going to be completed) to extend the MCH measures in order to consolidate the data items set contained in the MOHP capture system, the DDM system, as well as population and contraceptive items.

The HIS system has been recommended by Cressman as the kernel around which to build a consolidated MIS for the MOHP. The PHR team strongly concurs. The HIS is being used by others now as the kernel of district and unit reporting (Social Fund, IDSC pilots) and the NICHP needs to embrace HIS as its own if it intends to be a leader in establishing standards (since the HIS is the effective standard now).

Table 1: Forms Processed by the National Health Information Center

Form	Content	Level of Aggregation Reported to NHIC	Frequency	Source	Automation	Known Quality Issues
1	Births-Deaths	District	monthly	HIC	varies up to 4	Maternal mortality and undercount rural inf. deaths
2	Contraceptives Distribution	Sector within district	monthly	HIC	none-not in HIS	Allocation by sector
3	Maternal-Child Activity	Sector within district	monthly	HIC	varies up to 4	
4	Laboratory Activity	Governorate	monthly	HIC	varies up to 4	allocation by test type
5	Blood Banking Activity	Governorate	monthly	HIC	varies up to 4	
6	Vaccinations	Sector within district	monthly	HIC	varies up to 4	MCH data is duplicative
7	Curative Activity-Rural	Type facility w/i district	monthly	HIC	varies up to 4	Census (bed days) Admissions Undercounted
8	Dental Utilization	Governorate	monthly	HIC	varies up to 4	
9	Water/Food Testing	Governorate	monthly	HIC	varies up to 4	
10	Curative Activity-Hospital	Hospital	monthly	HIC	varies up to 4	Census Admission Undercounts
11	Discharge Summary	Patient (10% sample)	monthly	HIC	varies up to 4	
12	Operations Summary	Px Category w/i hospital	monthly	HIC	varies up to 4	
13	Infectious Disease	Person (w/notifiable Dx)	monthly	HIC	varies up to 4	
14	Acute Respir Disease	Governorate	monthly	HIC	varies up to 4	
no #	Manpower Statistics	Governorate-by discipline	yearly	HIC	none	
No #	Training Statistics	Special requests	as needed			

Figure 1. Current Data Flow



The HIS is built on a higher dependence for unit (health office, hospital, and clinic) data than the forms now being used by the NICHP. These HIS data can, of course, be aggregated to produce reports or forms of aggregate data by district or governorate. Data entry is currently done at the governorate level, though pilots in 65 districts in Upper Egypt in the next couple years are part of the responsible office—the eight-person Health Information Unit of the Healthy Mother/Healthy Child (HM/HC) project headed by Dr. Hala Safwat. The English/Arabic file layout for HIS is available in hard copy from the PHR Resource Center.

The HIS is not yet well populated with data items extending beyond MCH, making it less useful in the short run as a source of actual data. Beyond the units participating in the HM/HC program, the compliance of unit reporting for HIS (to the governorate HICs) is not yet very good. The best data (Unit Characteristics and Acute Respiratory Disease) are available for all of 1997. MCH data is available in complete form for only April 1997 onward. Hospital utilization data (discharge abstracts, facility level utilization statistics, use of ancillaries, occupancy, etc.) is particularly weak, with only 15 governorates submitting data to HIS in 1997, with the most complete of these having only 88 percent of facilities reporting.

3. NICHP Data Quality Assessment

The PHR research team examined data flows, looked at real data from selected forms, and had repeated discussions with NICHP, with Alexandria HIC staff, and with MCH/HIS staff about data quality. Overall, data quality is not consistent across forms or across governorates. For the amount of effort currently involved (which is considerable) the data should be more reliable and more quickly prepared. There are organizational and process improvements available within the current technology available that would improve the consistency and accuracy of the NICHP data. The following is an enumeration of key findings.

3.1 Data Consistency and Reliability (Standardization) Is Not As Good As It Should Be

The flows of data are not the same in all governorates, and data automation is not uniformly practiced by the HICs in the governorates. While there is a standard data dictionary available in all sites, errors are common in some fields, and (based upon the experience below) there appears to be no successful process of verification of questionable data received by the NICHP.

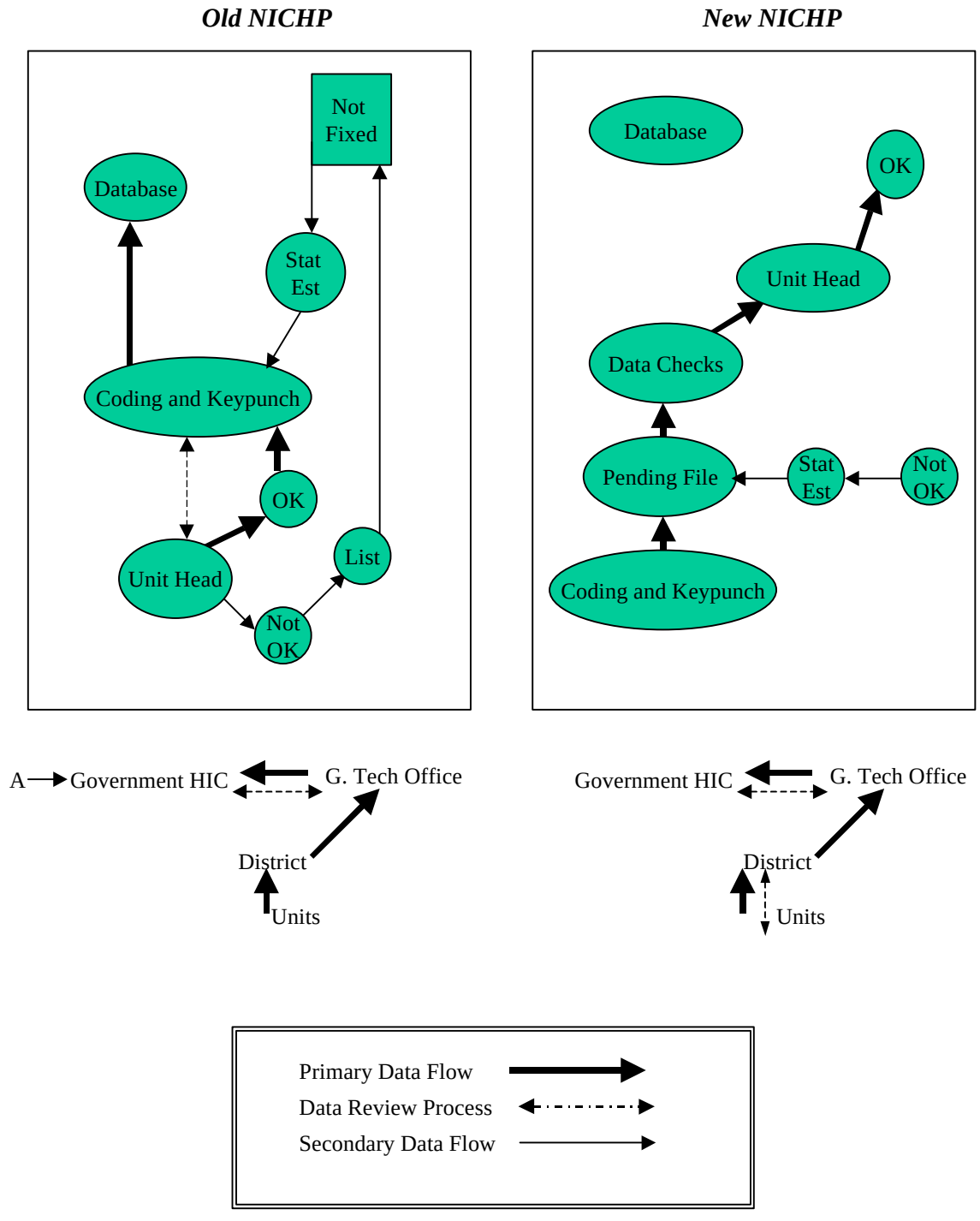
Within the NICHP the process works as follows. Hard copy forms[2] are submitted monthly to the NICHP by the HICs (of the governorates). The head of the team assigned to deal with that form reviews them. Data are reviewed for completeness and for accuracy.[3] Forms containing omissions or possible errors are returned to the HIC in the governorate and not entered into the database at the NICHP. The forms that pass inspection are keypunched into Access. The unit manager reviews the keypunching results manually. (There are no computerized logic checking algorithms.) (See Figure 2.)

A listing is kept of the possible errors and omissions by form by month. Each month, when the HIC staff person comes to Cairo to deliver the monthly data and resubmitted data, these lists are reviewed. For forms that are not repaired or resubmitted, estimation is done to eliminate missing values (except for the Vital Statistics items on Form 1). For estimated data, a flag is maintained in the database to note the source of these estimated data. Data from the NICHP and experiences with the quality review process are included on these forms.

[2] Several (four of 27) of the governorates are using the HIS system (in FoxPro) to automate data and then submit it to the NICHP (and other clients) on diskette. In two governorates there is an ongoing pilot by the Social Fund to populate an extended HIS database at the district level, though without support from HIS staff. In 1998 the HIS/MCH staff will begin to use district level HIS data entry in 65 districts in Upper Egypt. At the unit level, throughout Egypt only one facility seems to be doing direct HIS data entry (the Infectious Disease Hospital in Alexandria).

[3] This is done by comparisons with manual data from the same period last year and with submitted data from the most recent months.

Figure 2. NICHP Data Quality Review Process



Summary spreadsheets on urban hospital data (form 10), rural facility data (form 7), and vital events such as births and deaths (form 1) were requested for CY1997 and for each of the last three months of that year. These data were selected to "test" the ability of extant data sources to support preparation of prototypical data displays that might be part of the indicator system. This data, in somewhat different forms, was requested from three sources: (1) the NICHP; (2) the similar data held in a unit level database by the HIC of the Maternal and Child project (the HIS system); and (3) the Alexandria HIC (probably the best equipped and skilled HIC of all the 27 governorates). The results of this request were examined with the following results:

- The Excel spreadsheets were delivered in an English version from the NICHP without evidence of much difficulty for Forms 1 and 7. (The research team actually received data for particular months, not just 1997 summary data as discussed below.)

- The similar request from the MCH/HIS office was not able to be generated due to high levels of missing unit level data (facility, clinic, and office).

- While vital event data seems to be complete and available to the NICHP within a month or so (subject to the caveat that even after six months some items are not consistently complete or reported consistently), the hospital utilization measures are still incompletely reported through five or six months.

- Missing values were reported as zero in the data we received, apparently as a result of requirements of the HIS database software.

- Maternal mortality data is inconsistently reported (likely a problem with cause of death data for women in general—e.g., postpartum deaths of new mothers may be reported as heart failure or pneumonia and not reported as a consequence of childbirth).

- In the aggregate, dead births are occurring at rate far lower than in urban areas—clearly a product of missing data in many areas. Failure to report stillborn births is a second, but smaller problem here (failure to record the birth, failure to report the death).

- Occupancy rates, particularly in rural facilities, cannot be computed due to obvious and common errors and inconsistencies in counting beds and days. Days are widely perceived as a reporting issue due to inconsistent understanding of unit staff on the definition in the codebook (in spite of training). Bed values are routinely taken from a special facility file and values are not taken from forms. The data request for this report obviously did not follow this rule.

Data requests were also made for annual values (for 1997) for the district of Montazah and the Governorate of Alexandria for each of the indicators we describe below, which range across the entire set of indicator candidates (e.g., public health, curative, primary care, vital statistics, etc.). The request of the NICHP and HIS staffs has not yielded this data as yet.

3.2 Timeliness of the Data Resulting from the Flow Is Not As Good As It Could Be

Dr. Botrous, Chief Statistician in the NICHP, prepared a summary of form completion timeliness (Table 2). Of the 1,474 forms of October data, required to be submitted by governorates, 1,127 were received by December, of which 306 forms needed to be returned (incomplete or unreliable). Thus, about 56 percent were complete and presumptively accurate and held by the NICHP as of two months after the close of the month. At this point the incomplete data (44 percent of the total) is composed about equally of late submissions (24 percent) and returned-to-be redone (20 percent of the total and about 27 percent of the submitted forms).

One month later (by January) the October data is more complete: an additional 15 percent of the forms are complete and in the hands of the NICHP. Thus, by three months following the close of the month the NICHP has 1,070 (73 percent) of the forms complete and presumptively accurate. At the end of May, Dr. Botrous reports that 100 percent of the data are complete and returned from the governorates.

These statistics suggest that significant time is being wasted due to data submission activities at the governorate level. Much tardiness and rework of submitted forms are hampering the timeliness of the completion of the data. Many hours of NICHP staff time are being required to review, and re-review, the submissions. Automated data entry with embedded logic checks would contribute in saving time in this process.

In summary, the data being held within the NICHP is being gathered and automated. But, it is inconsistently and incompletely reported, and the treatment of missing values makes separation of these two data problems impossible to assess by inspection of the data. The quality of the data held by NICHP certainly appears much better for vital events than for hospital and clinic statistics. The MCH data also seems much better than the other, probably owing directly to the considerable effort by the MCH project to standardize data reporting and to automate data capture at the governorate level.

So what are the problems with quality? Three important conclusions seem obvious.

- Data on items like bed days (and other unit level data items) in inpatient facilities is not remediated by the NICHP data quality control process. There does appear to be a written codebook of definitions for each of the items on each of the forms. This codebook is apparently used to train all health statistics technicians in their two-year university course. NICHP used it in training governorate HIC staff. **It does not appear that the training is successful in getting accurate, consistent data from the units.**

- It appears that the quality control loop between the NICHP and the governorate HIC is not effectual and certainly not very quick. This is most likely because the source of the erroneous data is not involved in the quality loop. Indeed, the source of all data is the unit (hospital, clinic) and the data quality control activity is occurring at two levels of reporting above the unit—units report to districts, districts report to governorates.

- The internal NICHP process of data entry and quality review also could be revised to improve quality as well as staff productivity. Part of this remedy may be to create a function for a Quality Control (QC) manager—to separate the duties (and conflict) of QC and manage the operational processes of data entry, verification, revision, and analytic reporting.

Table 2: Pilot Compliance Check: Summary of October 1997 Data Form Completion

Potential Number	Received by December 1997	Returned to Gov. for Correction	Correct by January 1998	Correct by June 1998	December 1997 % Correct	January 1998 % Correct
233	180	30	163	233	0.643777	0.699571
233	200	21	195	233	0.76824	0.83691
233	190	85	185	233	0.450644	0.793991
27	20	6	20	27	0.518519	0.740741
27	20	6	20	27	0.518519	0.740741
233	160	61	150	233	0.424893	0.643777
27	15	6	13	27	0.333333	0.481481
27	23	0	23	27	0.851852	0.851852
27	19	9	19	27	0.37037	0.703704
407	300	85	282	407	0.528256	0.692875
TOTALS 1474	1127	309	1070	1474	0.554953	0.725916

4. Recommendations for Improving the Value of NICHP-Provided Information

4.1 Recommendations on a Strategy for Improving Data Quality

A strategy for improving data quality needs to be adopted by the director general. Quality is a multidimensional concept, and no single intervention or organizational structure change is going to achieve the outcome. Recommendation for the components of a strategy would include:

- Consolidate data and data standards on HIS.
- Make sectors partners develop/execute explicit plans for QC and Quality Assurance (QA) and their reporting.
- Automate as early in data flow as possible so to enable automated error checking.
- Make/Take opportunities for products that increase data value for customers.

4.2 The Concept of Quality and Value Needs Some Clarification

Quality is a term that usually pertains to data and has attributes like consistency and accuracy. Information, on the other hand, depends on having data of high quality, but also depends on accessibility, timeliness, and relevance for decision support. These concepts are shown in Figure 2. The figure suggests that there is a hierarchy of value drivers for information. At the lowest level are investments in standards for data definition and organization/flow that will create consistent data across regions and over time, and improve the reliability or accuracy of data collected. At the second level, investments in technology may also increase the value of information. This could be done by improving the accessibility of information held across a wide set of systems (through consolidation of data architecture) and improvements in the timeliness of that access (by automation of input and reporting functions). At the highest level of value additions to information are those that stem from adding human knowledge to the information to make it more relevant to decision makers and other users. Here, the report information must be precisely focused on the information needs of the users, and the data must be converted into summary statistical measures (not just raw data). This is the reason that having a partnership relationship with the sectors is critical to the mission of NICHP.

These elements in the chain of activities must be considered in producing high value information. The director general should take steps to begin to make a set of investments in the interest of achieving the objective of NICHP—to improve the value of information being supplied by that organization.

Table 3. Information Value Drivers

Attribute	Critical Factor	Activity	Need Plan?
Relevance		Value-added Activities	*Yes*
		Models	*Yes*
	Human Capital Dependent	Customer Orientation	*Yes*
Timeliness		Monthly Indicators	*Done*
	Technology Dependent		
Accessibility		Consolidation Using HIS	*Yes*
		Distribution Channels	*Yes*
Accuracy		Reorg Flows Using QIP	*Done*
	Process Dependent		
Consistency		Standards	*Yes*

4.3 Recommendations on Partnering for Accountability on Quality Issues with the Sectors

As noted above, there are data quality issues to be resolved with the sector. The NICHP must collect and report the data, but the needs of the sectors must dictate data requirements. The sectors are also the source of the data in the first place. The NICHP and the sectors should try to work though the following items together in drafting a plan that allows the director general to provide valuable information, even though he has no direct control over the data capture processes.

- Sector—responsible for producing data and verifying its completeness and accuracy
- NICHP—responsible for collecting and reporting information of known reliability and consistency
- Agree on standards/criteria for QA/QC/reporting
- Computerize data as soon as possible—automated standard report to sector and to Governorate Technical Office
- Quarterly Standard Report on Completeness and Consistency to Sector/Minister/Governorate Technical Office

4.4 Recommendations on Internal NICHP Data Flows and Data Checking

PHR recommends that an internal (to NICHP) quality improvement plan be developed immediately for the NICHP using a small working group for ideas and information (Hala, Botrous, Hala, Magda, and another governorate or district person). The plan would set objectives, changes in process at the NICHP and their sources, and define actions. The plan would probably include that a data checking routine be established for each form and applied as it is entered into the NICHP database. That routine might:

- enter data as submitted into a pending file and conduct all inspection of quality using automated processes that can themselves be verified,
- have an automated routine that checks cells against prior period (or some benchmark),
- have an automated logic check within the form being entered,
- output an exception report (that must be verified before the data is used),
- establish procedures for estimation so that estimates do not become part of data quality checking algorithms, and
- appoint a person to the function of director of QC. (This person would not be, as is now the case, also responsible for operational functions of data entry, verification, and reporting).

4.5 Recommendation to Announce a Quality Improvement Initiative

The situation in the NICHP is ideal for announcing a plan for improving the level of data quality and value of the information coming from the NICHP. The existing data is of spotty quality, owing to organizational limitations, technology constraints, and lack of customer orientation. To seize this opportunity, the new director general should announce a five-point program, beginning at once, to get the process turned around. That plan might be to:

- Reorganize and reorient the NICHP to better support the activities of the sectors and the activities of the governorates and the MOHP's organizational needs for information by integrating technology, information management, training and support, and customer service. To eventually achieve consolidation of data, the orientation of the organization will need to be more oriented to needs of its customers (sectors, governorates, units, providers, project partners, as well as the Minister's office).
- Spend more resources on and get accountability for data quality. Someone must be put in charge of data quality within the organization and increase the resources dedicated to creating data of the highest consistency and reliability. This would be done by creating and supporting a dedicated manager of health data reporting at the district level. This person's job would involve working with and training unit level clerks and staff to achieve complete and accurate reporting.
    - Create and support district HIC offices to get better data from units
    - Add a QC director to the NICHP organization

- Reduce the distance between the point of care and the point of automated data entry. This would tend to increase quality directly by bringing automation of reporting to lower levels in the organization and closer to the point of service. Initiating a pilot program in one governorate would do this, where districts would assist with technology, training, and staffing to demonstrate improvements in completeness and reporting quality.
    - Establish pilot of district HIS data entry in Alexandria
- Reduce variability and redundancy by consolidating data architecture. This would involve standardizing and consolidating around a single data architecture and a single nomenclature and codebook. Initially, the HIS system developed and supported by the MCH sector would be used to build from.
    - Consolidate around HIS data architecture for now
    - Develop a plan for longer term consolidation to get access to special project/special system data
    - Do a new codebook and retrain
- Increase the value of NICHP information products. This would increase the value of NICHP activities and products by two means: by bringing performance indicator data to executives in a more timely and useful fashion and by developing better measures, analyses, and benchmarks from the MOHP data that add value to the raw data.
    - Implement the indicator system (see separate report for a design of this)
    - Create IM/analytical unit in the NICHP

5. Recommendations for Additional Technical Assistance

There are many training and technical assistance needs here. In addition to the assistance recommended to implement the Indicators Reporting System (reported separately), the most apparent and urgent needs are:

- Extensive QIP training needs and the need for both planning these activities and conducting them
- Support partner/customer/stakeholder strategy planning and implementation plan
- Support sector/NICHP planning for standards, processes, QA/QC procedures
- Develop program of data analytic workshops to be sponsored by NICHP
- Develop a plan for a modeling library for NICHP and implementation
- Support development of plans for Alexandria pilots

6. Recommendations for the Reform Pilot in Alexandria

The information planning to support the work of the NICHP and the planning to support the Alexandria reform pilot are related and reinforcing. In regard to the pilot plans and the NICHP situation, these recommendations are based on obvious conclusions:

- The pilot will require two aspects of MIS functionality that need to be demonstrated beyond simply registry computerization. First, it will require unit level enrollment capability. This function is not supportable now in terms of training or technology. Second, the MIS for the pilot will need to be able to link data for persons across settings (patient-based architecture). This will require an identifier or card, as well a database strategy that can support it.

- The national MIS project needs to standardize data collection, storage, and reporting functions on the HIS system. Improvements in data quality also require establishing effective governorate support units for this system in the districts and at the unit level. The national effort needs to catch up in this regard with activities underway at the MCH/HIS and Social Fund to install HIS at the district and unit levels. Those activities are located in Upper Egypt. Adding two or more persons in each of a number of pilot districts is needed to demonstrate the improvements in data quality, which is not the explicit purpose of the other pilots. This sort of data quality pilot could occur in Alexandria, supported by the excellent capabilities at that HIC and focused, in part, on the district and key facilities in the Montazah district. This would help set infrastructure in place, and training for the pilot would directly benefit the Reform Pilot work, even thought the HIS may not be the final solution for the pilot.

- A major gap in the HIS system, one that will need to be attacked at some level in a national MIS system design, involves a patient-based architecture and the system limits it poses. The options for this piloting work could be done in Alexandria, as part of the Reform Pilot itself (if this is designed into the pilot). **That is, the reform interventions might be constructed to test MIS options—rather than thinking of MIS only as a form of support-for-the-pilot activity**. For example, one could run some sites on paper systems (folders that are carried around—which might be keypunched at some point for the evaluation), while other unit locations might be automated. A third option might be a smart card (with read and write capability). The presumption is that a choice must be made—when in fact it may be an opportunity to study the implications, data quality, burden, and acceptability of alternative patient-based systems as part of the pilot. The standard, person level encounter forms used in the US for reference (SF 1500 for outpatient and clinic encounters and the UB 92-hospital stays) can be found in Annex C.

The MIS piloting design and implementation work in Alexandria, however broad in scope, will need to be supported with technical assistance to assist in planning, support implementation, and coordinate with the Reform Pilot work.

Annex A: Briefing Document

NICHP Data Quality Findings

- vital event data seems to be complete and available to the NHIC within a month or so
- the hospital utilization measures are still incompletely reported through 5-6 months.
- missing values were reported as zero throughout the data we received, apparently as a result of requirements of the data base

1

- maternal mortality data seems very inconsistently
- rural dead births are occurring at rate far lower than in urban areas---clearly a product of missing data in many areas.
- occupancy rates, particularly in rural facilities, cannot be computed due to inconsistencies in counting beds and days.
- utilization of outpatient units is no problem

2

Diagnosis of Quality Problems

- Uneven completeness and reliability of data
- Data quality checking is too remote from the point of care--no real verification occurs
- training/codebook not effective at creating item or process consistency
- No evidence of investment in managing quality-no QC manager. Who's job is it?
- Data flow and db practices in NICHP need improvement

3

Data Quality Strategy

- Make Sectors Partners---Develop/Execute explicit plans for QC & QA and reporting
- Consolidate data and data standards on HIS
- Automate as early in data flow as possible so to enable automated error checking
- Make/Take opportunities for products that increase data **value** for customers

4

5 Point Data Quality Attack Plan

- **Reduce Inconsistency** -- *consolidate on HIS* and Develop/Use *Standards & Codebook* and Invest heavily in *training*
- **Reorganize NICHP** into a Customer oriented Organization Aimed at Developing Higher Value Data Products---get *relationships* with customers (sectors, and others)---*reorganize data flows* inside NICHP
- **Add Resources to Improve Quality**---Put Someone in Charge of Data Quality --at both the *District Level to support Governorates* and at the NICHP level as the *Director of Data Quality Control*
- **Push Data Entry down to the District level**--closer to the point of service---do a *district pilot* in Alex districts using HIS at district/unit
- **Create higher value products** to elevate demand for the NICHP---develop an *indicator* system--develop *models*

5

Recommendations

- Announce/Implement a 5 point QIP
- Revise inside data flows and data handling practices including a QC function
- With sectors, develop strategy and plans for
  - content consolidation and sharing of data
  - standards and codebook development and standards for the QC/QA processes
- Do a detailed work plan for the QIP

6

Data Quality Accountability

- Sector--responsible for producing data and verifying as to completeness and accuracy
- NICHP--responsible for collecting and reporting information of known reliability and consistency
- Agree on Standards/Criteria for QA/QC /reporting
- Key Data ASAP--automated standard report to Sector and to Governorate Technical Office
- Quarterly Standard Report on Completeness and Consistency to Sector/Minister/Govern-technical

7

Internal Data Flow Recommendations

- Enter data as submitted into a pending file
- automated logic checks for each form
- output an exception report (that must be verified before the data is used)
- create an independent quality control office (officer) who is not also responsible for managing production of files
- establish procedures for estimation

8

Technical Assistance Recommended

- Extensive QIP training needs
- Support partner/customer/stakeholder strategy and implementation plan
- Support joint Sector/NICHP plan for Standards, processes, QA/QC procedures
- Develop program of data analytic workshops sponsored by NICHP
- develop a plan for models/implementation

9

Annex B: HIS File Layout Structure

Available in hard copy from the PHR Resource Center.

Annex C: Standard Encounter Forms SF 1500, UB 92

Available in hard copy from the PHR Resource Center.

Annex D: NICHP Standard Forms

Available in hard copy from the PHR Resource Center.

Annex E: Technical Support for the NICHP

Technical Support for the NICHP

Support for the Indicator Reporting and Integration of HIS into NICHP

Several tasks were accomplished to aid the PHR Advisor to develop reports from the NICHP in the quickest possible fashion.

- **HIS Integration.** The conformance of the HIS system with the NICHP reporting forms was examined. A method was designed to review the two sets of data to determine where the HIS system (to which the data system will be migrating) is deficient in capturing/storing measures that are now being captured on the 14 NICHP forms. Two meetings were held with Drs Hala and Botrous to identify measures on NICHP forms not also on HIS. Attached is a worksheet that identifies these items.

Overall, there are very few items on NICHP forms which are not on HIS. The key issues relate to the NICHP patient level data from hospitals (forms 11,12).

Follow up should involve two forms. First, Dr. Tayseer should consider these items and bring them to the attention of the HIS+ development group in order to determine whether HIS needs to be modified to accommodate these areas of deficiency.

Second, Dr. Hala asked Dr. Botrous to attend the next meeting of the Governorate HIC staff when they come next month to Cairo to deliver diskettes with the HIS data. Dr. Hala asked Dr. Botrous to ask the G/HIC staff to begin to deliver the data for the 14 NICHP forms in computerized form using the HIS system. She also asked Dr. Botrous to review the NICHP form generating utility of HIS to make certain if it produces exactly what the NICHP needs in the way of data items; HIS staff will revise the program to meet Dr. Botrous' requirements.

This is an excellent way to begin to integrate HIS into the NICHP. If governorates are told by NICHP to begin to automate their submission of the data for the 14 forms, then it will (1) eliminate many errors; (2) speed construction of databases considerably (and speed delivery of indicators too); and (3) allow HIS to be integrated quickly and quietly into the NICHP operation. Possibly Dr. Tayseer might also want to attend the meeting with the governorate staff next month (probably around the 15th of August).

This quick integration will require some HIS training of NICHP staff. It became evident during this discussion that the NICHP reorganization seems to have put database programmers somewhere other than the Botrous unit. Dr. Gaumer does not believe, nor does Dr. Hala or Dr. Botrous, that the HIS unit can function without direct access to these database experts.

- **Data Typology Enhancements.** The Health Care Data Typology PHR prepared before for the MOHP was revised. It is attached. New categories of data items were added (mainly special MCH items).

The content of HIS and NICHP forms were also mapped onto the typology to identify where data gaps exist. This information is shown on the attachment as well.

Organization of the NICHP Data Analytic Functions

The NICHP must plan for the upgrading of technical functionality to go beyond simple data entry to a more traditional role of a statistical center. This role advancement for NICHP seems necessary for achieving two main objectives:

- **To be more useful and visible to the minister and others.** Providing more than just raw data is essential. More valuable information needs to be created by NICHP in the form of analytic reports, quick indicator EIS-type data products, special studies, and the like. Elevating the value of the NICHP to decision-makers and to the policy process can be done by speeding the delivery of partially analyzed data to the points of need within the MOHP.

- **To establish higher levels of data quality in NICHP operations.** NICHP needs to become a user of its own data to begin to understand better the real data quality issues and begin to fix those issues. Data flow design and sophisticated administrative sign-off procedures, however sophisticated and well intended, will absolutely fail to detect improvable situations in the data flow process; the NICHP must become the first and most demanding user of its own data.

NICHP must not err in trying to supersede the sectors, but it must keep a vigilant watch for opportunities to meet unmet data analytic needs that can be met directly with data being fed to the NICHP/governorate operations. It must become a more product-oriented organization. This orientation needs to balance the current emerging orientation(s) as a technology organization and as a data organization. Technology and data are the current assets of the organization. The strategic long-term success will depend on how well the director general invests those assets in creating unique and high value products on which the Minister, the sectors, and others will need to depend upon over and over again in their search for information. What kinds of information products might there be?

- Monthly indicator systems

- Special reports for the Minister, the Assembly, the sectors, the donors

- Standard and periodic reports (Annual Report on Preventable Hospitalizations, Annual Hospital Mortality Exceptions Study, etc.)

- Development and maintenance of analytic models (Bed or MD requirements, etc)

- Data products such as diskettes and documentation for often used data (hospital utilization data, etc) or high quality raw data sets or sample files for users in the sectors or governorates

- High level data products involving linked data files (linked by hospital, by district, or linked across sectors, etc) that would simply be unavailable to any other organization in Egypt.

The NICHP should not, of course, seek to replicate or outdo the sectors. It needs to make the work of the sectors easier, faster, and more data-driven whenever possible. The problem here for NICHP is not trying to fit into a crowded field of data analytic products produced within the MOHP by the sectors and others. Quite the contrary, it is simply developing a stream of good options for

producing useful summary-type descriptive analyses using data at hand. More sophisticated analyses, involving hypothesis testing and/or policy analysis, could be done by NICHP but only if commissioned. This is more directly the role of the sectors themselves in as much as they are more familiar with the policy issues than NICHP who is more familiar with the data and the circumstances under which it was collected.

The NICHP must not only become strategic in its search for good opportunities to be of service at higher and higher levels in the policy hierarchy, but it must also at the same time seek to elevate its own capability so as to become more aware and sensitive to the issues being confronted by the Minister and the sectors.

Being more product-oriented and being more aware are essentially the same issue—one that is rooted in the way the NICHP is organized. The HIS division within the NICHP needs an organization that supports the chores of reporting, data collection and entry, quality control, and new product development. This set of activities combines required expertise in scientific methods, but also in process control and business management. There is no indication today that this breadth of responsibilities and skills are present in the unit.

The accompanying organization chart depicts a possible model of organization of the HIS unit. The HIS director (Dr. Botrous) would have four persons reporting to her:

- The Chief of the Data Operations Branch—the branch that deals with the governorates to capture, enter, archive and evaluate the raw data as submitted. This chief, unlike the others, would have a large staff.

- The Chief of the Analysis Branch—the branch housing the vertical data analysts—one for each of the major types of data. These responsibilities would be aligned more or less like the sectors in the MOHP to make it easier to develop and keep suitable relationships with counterpart sector officials, and to allow the data analysts to focus their work on areas of MOHP program so they learn about the pertinent services, the units, the data production environment, the policy issues, and how the NICHP data fits into the range of other data resources available to the sector.

- The Associate Director of Products and Reports and Related Planning. This person would be responsible for planning and delivering the products. This is a job for an excellent manager, one who has the necessary process skills to compliment the analysts and database staff in the HIS unit. Each regular product (indicators, annual epi report, etc) would have a product manager who works for this person and who would manage or co-manage a small team of technical staff who has roles in product preparation.

- The Associate Director of Data Quality. This person would operate independently of the actual data operations unit and support the HIS director by auditing data quality, reporting on data quality, planning for its improvement, and participating on training activities involving governorate and district staff. This person could also be a senior technical resource for special products and assignments.

This plan has nothing to directly to say about the HM/HC HIS unit. The existence of that unit does not, in and of itself, solve the issues raised here nor does anything suggested here help resolve the function of that group. Obviously, the group members have considerable analytic experience. They could be “split” into pieces and the persons assigned to particular “analytic” areas (MCH, Pop, Prev/Promo, Curative, Vitals, etc). One of the group could be nominated to head the Analytic Branch.

For these persons to be effective in these roles, it would need to be very well understood, however, that the data most likely to be used most often in the near term would be the NICHP data, which is more complete than HIS.

Domain	Concept for Measurement	NICHP Form	HIS Variable # (000)
A. Public Health			
1	Communicable disease incidence	13 ,14	25, 38-43, 45-48
2	Accessibility of clean water		36, 58
3	Access to adequate sewage treatment		59
4	Access to clean air		
5	Incidence of endemic diseases	4,7	27, 52-57
6	Expenditures		
7	Safety of food	9	31
8	International quarantine activity		101-110
B. Management Resources			
10	Budget		
11	Data and information resources		70-84
12	Expenditures and cost recovery		111
13	Staff resources (admin, clinical, MD)		
14	Effectiveness of policy and regulation		
15	Capital resources and capacity utilization		4, 5, 7, 13-15
16	Administrative efficiency		
17	Communication effectiveness		
18	National health accounts		
C. Health Manpower			
20	Training programs		18, 19
21	Lifetime competency and CME activity		
22	Workforce size by specialty and occupation		17
23	Private practice statistics		
24	Productivity and work patterns		
25	Training expenditures		
26	Incomes and demographics of occupations		
27	MD requirements model		
D. Primary Care			
30	Utilization of services and professionals		
31	Access to services		
32	Screening program utilization/yield		
33	Occupational health program statistics		
34	Vaccination rates/incidence of disease	6	32-34, 62
35	School health program statistics		
36	Malnutrition and food access		
37	Indicators of continuity of care		

Domain	Concept for Measurement	NICHP Form	HIS Variable # (000)
38	Indicators of risk factors (lifestyle, occupation, environment)		
39	Service quality		
40	Expenditures		
E. Research			
50	Research output (clinical, policy, behavior)		
51	Research productivity		
52	Communication effectiveness		
53	Expenditures		
F. Curative Care			
60	Utilization of specific inpatient and outpatient services	7, 10	20-23
61	Access to diagnostic and evaluative services		113
62	Access to specialty services		21, 24, 112
63	Access to trauma and urgent care		101, 102
64	Blood utilization (whole versus component utilization)	5	28
65	Blood supply adequacy		
66	Ancillary and pharmaceutical intensity of use	10	
67	Capacity utilization	7, 10	
68	Severity of treated patients	11, 12	22, 23
69	Expenditures per service unit		
70	Service quality		
71	Utilization measures for all private facilities and patients		
72	Bed need model		
G. Dental Care			
80	Utilization of specific services	8	26
81	Access to service and equity		
82	Dental health and prevalence rates		
83	Expenditures		
84	Service quality		
H. Population			
90	Size of populations enrolled/eligible for care		
91	Contraception utilization	2	188
92	Access to professional services		
93	Birth rates and fertility rates	1	29
94	Expenditures		
95	Service quality		
96	Population estimation and forecasting model		

Domain	Concept for Measurement	NICHP Form	HIS Variable # (000)
I. Disease Practice Patterns			
100	Utilization of alternative treatments		
101	Treatment pattern variations		
102	Disease costs		
103			
J. Health Indicators			
104	Risk factors (lifestyle, environment, occupation)		
105	Births & deaths	1	29
106	Causes of death		30
107	Acute incidence		50, 51
108	Chronic prevalence		
109	Disability and functional status		
110	Quality of life		
K. Quality of Care			
120	Compliance with process benchmarks		
121	Dental care outcomes		
123	Curative care outcomes		
124	Preventable disease incidence		
125	Preventable mortality indicators		
126	Latrogenic and drug/device side effects and polypharmacy		
L. Public Knowledge			
130	Knowledge of provider quality		
131	Knowledge of health & nutrition		
132	Satisfaction & service quality		
133	Perceived health status		
M. Pharmaceutical & Device			
140	Utilization by category and disease		8-12
141	Use of generics and essential drugs		
142	Access to pharmaceuticals (economic and geographic)		
143	Supply of pharmacists and locations		
144	Pharmaceutical practices pattern (physicians and pharmacists)		
145	Frequency and duration of stock outs in clinics		
146	Expenditures (and cost recovery)		
147	Post marketing adverse event tracking (registry)		
N. Maternal and Obstetric			
150	Use of prenatal care	3	115-116

Domain	Concept for Measurement	NICHP Form	HIS Variable # (000)
151	Incidence of complications and maternal morbidity		
152	Use of post natal care	3	118
153	Birthing utilization	3	117
154	Birth outcomes	1, 3	117
155	Maternal outcomes	1	117
156	Expenditures		
157	Risk management indicators		

TABLE: NICHP FORMS and Data Quality Indicators

Issues Associated with HIS Bearing on the Ability to Replicate NICHP Measures

Form	Content	Level of Aggregation Reported to NICHP	Issue #1	Issue #2	Issue #3	Comments
1.	Births-Deaths	Unit	no birth date on deaths	no nationality on births or deaths	no count of multiple births	has age at death
2.	Contraceptives Distrib	Sector within district	no issues			
3.	Maternal-Child Activity	Sector within district	no separate frequencies of normal/abnormal births outside hospitals	no home visit utilization	no counts of multiple births	sector wants change in NICHP Form
4.	Laboratory Activity	Governorate	no issues			
5.	Blood Banking Activity	Governorate	no issues			
6.	Vaccinations	Sector within district	no issues			
7.	Curative Activity-Rural	Type facility w/i district	no count of opd visits in health units (if form 10 were used this is not a problem)			
8.	Dental Utilization	Governorate	no issues			
9.	Water/Food Testing	Governorate	no issues			
10.	Curative Activity-Hosp	Hospital	no issues			
11.	Discharge Summary	Patient (10% sample)	no patient discharge data in HIS			summary measures by diagnosis
12.	Operations Summary	Px Category w/i hospital	no patient discharge data in HIS			summary measures by diagnosis
13.	Infectious Disease	Person (w/notifiable Dx)	no issues			