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WORKSHOP IN HEALTH ADMINISTRATION STUDIES

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"HMO Enrollment for Urban Medicaid Recipients: A Case Study of  
Perinatal Outcomes for Infants and Mothers"

WORKSHOP PAPER

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Excerpt from the Preliminary Report on

MEDICAID ENROLLEES IN HMOS:  
A COMPARATIVE ANALYSIS OF PERINATAL OUTCOMES FOR  
MOTHERS AND NEWBORNS IN A LARGE CHICAGO HMO

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MEDICAID ENROLLEES IN HMOS:  
A COMPARATIVE ANALYSIS OF PERINATAL OUTCOMES FOR  
MOTHERS AND NEWBORNS IN A LARGE CHICAGO HMO

ABSTRACT

Perinatal outcomes of women and their newborns were analyzed in order to evaluate health care to Medicaid recipients enrolled in a large Chicago HMO. The outcomes for the HMO enrollees were compared with those of other public aid recipients and groups with similar demographic characteristics including: mothers and newborns from inner city areas where 75% of the HMO's Medicaid enrollees live, the Medicaid population who gave birth in four geographically relevant perinatal networks, and national Medicaid HMO demonstration projects. The study compares types of delivery, incidence of low birth weight, and neonatal mortality. The HMO recipients in the majority of direct comparisons, while having a higher incidence of low birth weight, appeared to have lower morbidity and neonatal mortality. However, the differences between Chicago HMO and the comparison groups were generally not significant by commonly employed levels of statistical confidence due to the small numbers of infant deaths. Several different types of comparisons were made to increase our substantive understanding of the results. The findings do not support the hypothesis that Medicaid HMO recipients would have higher perinatal morbidity and mortality than Medicaid clients receiving fee-for-service care.

## II. THE STUDY:

### HEALTH CARE FOR POOR MOTHERS AND INFANTS IN CHICAGO HMO

#### A. INTRODUCTION

The late 1980s saw a heightened concern throughout the nation about both 1) perinatal outcomes -- particularly among the poor and black population -- and 2) about the quality of prepaid care in health maintenance organizations. In Illinois an additional concern was the fragmentation and politicization of health care initiatives. It seemed important to begin to evaluate prepaid care for the poor in Chicago in a systematic way. Chicago HMO (CHMO), the largest provider of prepaid care to public aid recipients in Illinois, was also interested in having an external evaluator assess the service they were delivering under their contract with the state of Illinois. Thus, the Center for Health Administration Studies with the cooperation and support of Chicago HMO developed a plan for evaluating care for Medicaid recipients in CHMO. While there is interest in all of the care provided for the Medicaid population, the focus of our first efforts was necessarily on perinatal care and outcomes because of the intense general concern fueled by anecdotal reports referred to above.

The immediately relevant question was a comparative one: How did care for Medicaid enrollees in CHMO compare to care for Medicaid recipients using their green cards in the fee-for-service system? Was the limitation to an HMO in fact resulting in the poorer care for Medicaid recipients, as alleged?

#### CHICAGO HMO

While many managed care delivery systems are new -- formed only recently, explicitly to respond to government Medicare and Medicaid contracts, (see Table 2) Chicago HMO evolved from the earlier Roosevelt Health Plan which in 1976 became a prepaid capitated health plan and contracted with the state to serve public aid clients. Many of the staff and senior administration have continued with the plan since the mid-1970s. While the city of Chicago was slow to get into the HMO market, it experienced very strong interest and growth in the mid-1980s (Anderson et al 1985). CHMO grew with the market, responding to the state of Illinois' interest in prepaid contracts and growing to be the largest single provider for Medicaid enrollees (from 2000 in 1982 to over 70,000 in 1987). At the same time, they have developed their share of the private market and in 1987 had approximately equal numbers of public and private members distributed throughout the metropolitan area.

**B. METHODOLOGY**

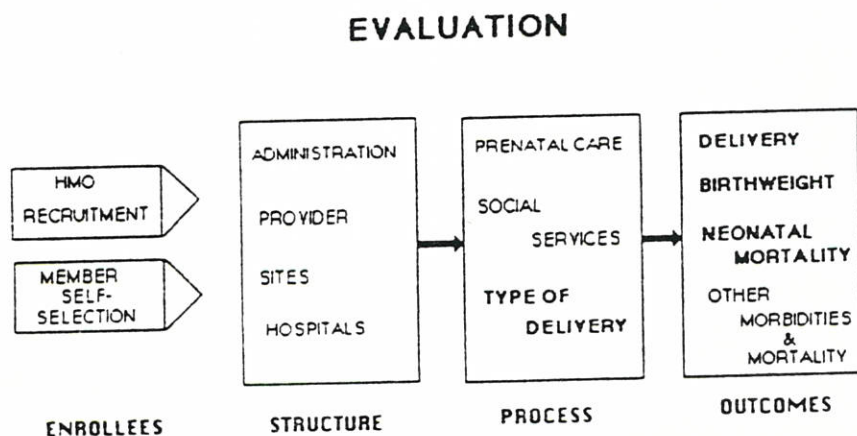
The study of the HMO and its outcomes has two aspects: the first is an evaluation of the structure, process and outcomes of the HMO itself. The second compares outcomes in the HMO with those of similar populations in the fee-for-service Medicaid system.

**1. AN EVALUATION MODEL**

A comprehensive model for the evaluation of an organization considers the Structure, Process, and Outcomes of a system. (See Figure 1) While neither the time frame nor the available data in this study permitted a complete examination of such a model, we used it as a frame both for understanding the immediate issues and available data, as well as for looking ahead toward more complete data gathering and analysis in the future. The evaluation model for this purpose was modified to reflect the importance of the enrollment population in its interaction with the structure and function as well as the outcomes. (This will be discussed below.)

For this limited initial study we chose to gather data that first, was at the central offices and in the information system of CHMO and second, could be gathered and completed within a one-year study. Thus we studied 1) the methods of delivery, i.e., caesarean section (c-section), normal spontaneous vaginal delivery (NSV), and complicated vaginal delivery (NSC); 2) distribution of birth weights; and 3) neonatal mortality rate (NNM) (infant death within the first 28 days). These outcome measures are highlighted in Figure 1. Other elements of the

Figure 1. Evaluation Model



model are described from our observations and interactions at CHMO and are intended to develop a better sense of the organization and its issues than can be inferred from the three measures of morbidity and mortality alone.

The time period from which we gathered data was chosen because it is the most recent period for which there are both external comparisons and good internal data. This was an important consideration because of changes in the HMO's information system (MIS) early in 1987. Thus we focused on the HMO data from July 1987 through June 1988.

## 2. COMPARISONS

We hoped to compare CHMO Medicaid recipients with a matched group of Chicago residents with fee-for-service Medicaid benefits. However, such data are not available. In 1985, the Department of Health and Human Services' Perinatal Consulting Team, while analyzing the problem of infant mortality in Chicago, explicitly discussed the problem of absence of perinatal data for Medicaid recipients. They noted that what data there were, both on AFDC recipients, prenatal care, and perinatal outcomes, had not been linked. They strongly recommended that an item be added to the birth certificates (and infant death certificates) "indicating whether the mother was eligible for Medicaid during her pregnancy and at delivery." (p. 23) Absence of data has remained a problem, and made this ideal comparison impossible.

We then sought to find other groups with characteristics sufficiently similar that their health care outcomes could be appropriately compared to those of the CHMO enrolled population. In THE FINDINGS we report comparisons 1) with the one national study of outcomes for public aid recipients in HMOs, 2) with certain figures available from IDPA and IDPH, 3) with selected perinatal network and hospital populations, and finally 4) comparisons with the community area data from the ten communities targeted by the Families with a Future program where the majority of the public aid recipients in the HMO live.

## 3. SOURCES OF INFORMATION AND DATA

Because infant mortality is a subject of widespread concern in the Chicago community there are many research and service projects which have collected or are continuing to collect data. We attempted to consult as fully as possible with others who might be working in the field and to use our efforts collaboratively. Both data and discussion came from the following organizations: Illinois Department of Public Aid; Illinois Department of Public Health; Chicago Department of Health; University of Illinois: Center for Health Services

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Research and Perinatal Network; University of Chicago: The Center for Urban Research and Policy Studies, Department of Pediatrics and the Perinatal Network; Mt. Sinai Hospital, Departments of Pediatrics and Obstetrics/Gynecology; and National Opinion Research Center.

## C. FINDINGS

### 1. WITHIN CHMO

#### a. SELECTION: HOW ENROLLEES AND CHMO CHOOSE ONE ANOTHER

##### i. Selection Theories: Methodological Issues

The literature does not provide a clear picture of whether public aid mothers who join HMOs voluntarily would be more or less likely to be ill themselves, or to have infant morbidity or mortality. In fact, there are equally credible theories to suggest selection into HMOs of both more and less problematic mothers and infants.

Those who choose to enroll in HMOs from working populations tend to be younger and healthier. Such persons often do not have prior long term relationships with physicians which they would need to terminate to join an HMO. For instance, Buchanan and Cretin (1986), in a study of 30,000 aerospace employees, found that the workers that elected to join the HMO were younger, were more likely to be single or have young children and had lower annual claimed expenditures. Even controlling for these differences in family composition, age, race, sex and income, the enrollees in the HMO had fewer claimed expenditures.

Others argue, however, that younger populations include the childbearing years which are always somewhat costly; especially so when pediatric intensive care is required. Most studies of this sort are not obviously applicable to public aid populations. For instance, two studies have found that higher risk and poorer women are attracted to HMOs' maternity services (Hudes et al. 1983 and Coltin et al. 1981). But the explanation for this negative selection into the HMO was based on women calculating the relative risks and benefits of their insurance options with their associated premiums and attempting to take advantage of the cheaper risk pool in the HMO. However, when a woman is deciding between Medicaid fee-for-service and an HMO they have no financial incentive to avoid insurance premiums.

An alternative theory for differential selection into HMOs is the degree of integration into the existing system of care. This theory predicts that newer residents in the community, who know little about the delivery system, and those who haven't developed a personal relationship with a physician are the most likely to be attracted to an HMO. For those with little knowledge of the system, the HMO provides a structured entry to utilization, and those without physician relationships will be less disturbed at being assigned a physician. If they neither know the system nor have a relationship with a physician it may



be because they are generally healthy. However, low utilizers may come from a socially marginalized and dislocated subculture, such as drug abusers with potential for high medical care use.

The public aid population has a broad spectrum of recipients. Some AFDC utilizers are women temporarily impoverished by loss or absence of a husband, pregnancy or the loss of a job, and who may rejoin the work force in a few months. Certain others are long-term utilizers of public aid in intensely impoverished neighborhoods.<sup>1</sup> It is not known if the HMO draws differentially from these disparate groups, with their very different health patterns. For instance, those who have been exposed to HMOs through their participation in the work force, or who are part of a community where there are many who participate in HMOs through their employment, may feel differently about HMOs than those who have never been in the work force, and who know no one who has HMO coverage through employment.

These often unmeasured differences within the AFDC/Medicaid population create problems for evaluation of HMO effects. A further complication is the length of exposure to the HMO. The long-term public-aid recipients will generally have had longer and more consistent utilization of HMO-managed or FFS care, while the temporarily dislocated women will have had discontinuous, episodic care.

## ii. HMO Enrollment Practices

The HMOs enrollment and recruitment practices may also have an important effect on the enrollee population. Critics have argued, for instance, that HMOs can intentionally target healthier, younger, employed populations that have lower utilization and costs. This would allow HMOs to show cost differences compared to the FFS system without actually containing costs. While there is some variance in the AFDC population, it has not been contended that Medicaid HMOs have (or would be able to) target "healthier" AFDC women.

There have been contentions that Medicaid HMOs have strong incentives to enroll clients without explaining the procedures of access to utilization. Enrollers motivated by per enrollment commissions could be particularly prone to cut corners on full

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<sup>1</sup>While, at any one time, the AFDC rolls are largely composed of women who will be on AFDC for an extended period, the minority of "temporarily impoverished," who are entering and leaving AFDC in shorter periods, come to be the majority of those who have utilized the program in any five or ten year period. (see Wilson, 1987, p. 9-10; Bane and Ellwood, 1983)

explanation of what enrollment entailed, or even to misrepresent the advantages and conditions of HMO enrollment. Once enrolled, use of services by Medicaid recipients might be limited by incomplete or inaccurate understanding of their benefits. Such potential concerns were expressed by the Perinatal Task Force from DHHS when it consulted in Illinois in 1985.

In order to monitor enrollers and to field problems of enrollees, CHMO expanded its department of Consumer Services in early 1987. The department sends a survey to all new enrollees, which is followed by a phone call, both to ensure address and phone number, and that the enrollee is fully informed of their site assignment and the utilization procedures. The department records and troubleshoots the enrollees' complaints. Reports are given to enrollers as to the numbers of new members that they have enrolled who are ill-informed or who later complain that they had been misinformed. This procedure has permitted a strong control over enroller quality.

Complaints are also tabulated by site, as are utilization review data, allowing checks on sites' and physicians' quality. The majority of complaints have to do with HMO policies, such as denials of requests for referrals, or data-processing problems; only 5-10% of complaints are attributable to marketing.

When clients indicate a desire to disenroll, they are interviewed to determine if their dissatisfaction can be resolved, and causes of disenrollment are again categorized.

### iii. Enrollment and Disenrollment Around Pregnancy and Delivery

In this study it is important to consider the length of time Medicaid members (in this case delivering mothers) have been enrolled in the HMO in order to evaluate the effect of their HMO membership (through use of prenatal services). If differences in perinatal outcomes between CHMO and non-CHMO enrolled women on Medicaid are related to CHMO prenatal care, then the longer the clients have received the care, the larger the difference should be. Conversely, it would be difficult to attribute outcome differences to different health care if the delivery takes place after only a short period of enrollment, except to the extent that outcomes reflect the delivery facilities.

Over 25% of the public aid deliveries in CHMO in 1987 and early 1988 occurred 9 months or less after enrollment. The actual percent who enrolled while knowing they were pregnant may be smaller because of time lag in recording new enrollments, delays in awareness of pregnancy, and the short gestations of some of these pregnancies, but clearly a number of women who deliver in the HMO have had limited opportunity to receive early

and consistent prenatal care from the HMO. (See Table 4 for distribution of enrollment in the period closely examined in this report.)

Table 4: Enrollment Time Before Delivery

1/1/87-6/31/88  
CHMO Public Aid Deliveries

Enrolled	
<1 month before:	3%
30-90 days:	6%
91-180 days:	9%
6-9 months:	9%
9-12 months:	10%
>one year	63%

About 20% of the Public Aid members who have delivered in the HMO disenroll within 6 months, and another 10% disenroll within six to twelve months after delivery. This rate of turnover does not appear to be higher than the overall turnover of public aid clients in the HMO, and in fact appears to be lower than average. By June 1988, about 45% of the public aid clients enrolled as of July 1987 had disenrolled, or were involuntarily disenrolled due to changed Medicaid eligibility. (At the same time other Public Aid recipients were enrolling, yielding a 17% decline in the HMO's Public Aid enrollment during that one year period.)

So, while one-fifth of the CHMO-PA deliverers enrolled within six months before delivery, and another fifth disenrolled within six months after, this turnover rate for women with pregnancies is not greater than for other HMO public aid enrollees. More than 90% of the public aid mothers who delivered while enrolled in the HMO have stayed in the HMO longer than one year.

#### iv. Community Areas

Given the relationship between race and perinatal health, it is important to gather information on race of membership. However, in this first (and retrospective) phase of the report we relied on the CHMO MIS which does not document the racial composition of their public aid population, nor their delivery population. We are unable to compare the HMO's race-specific mortality rates to the larger communities' race-specific rates. We know that there are some white and hispanic mothers in the HMO delivery population, but we do not know how many. In the generation of our statistically extrapolated figures for the AFDC

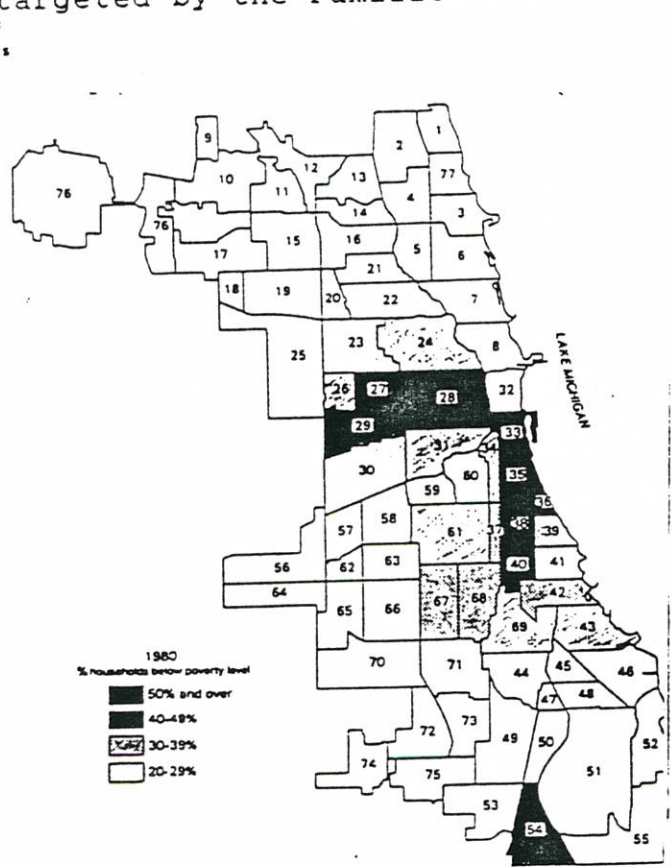
population, we assumed that the HMO's public aid delivery population was between 75% black (the proportion black of Chicago AFDC) and nearly 100% black. A more extended and prospective study will allow us to better estimate racial composition using additional information sources such as birth records.

Based on zip codes and site assignments, we were able to identify the 20 zip codes and 25 community areas which account for nearly 80% of CHMO's public aid clients. These community areas are almost entirely black, and are the poorest areas of the city. They also include the 19 community areas that have been targeted by the Families With a Future initiative as having the highest infant mortality rates in the city (and state and even country). Conversely, 20-30% of the CHMO public aid population does not live in these predominantly black, and poorest, areas of the city.

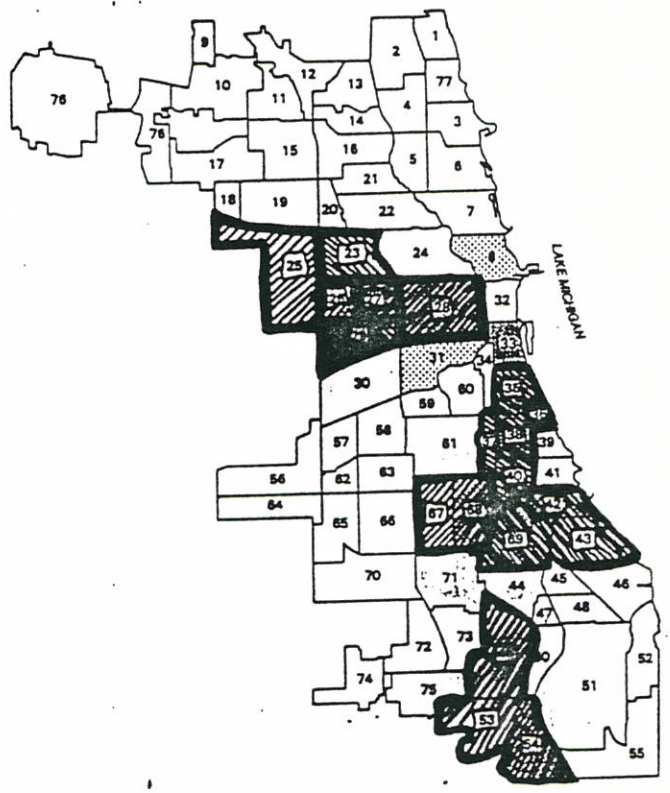
Figures 2-4 are superimposed to demonstrate the relationship of the Chicago Community Poverty Areas (Urban Poverty Project, The University of Chicago); the 25 community areas in which 75% of the CHMO Public Aid clients live; and the 10 IMRI networks targeted by the Families with a Future Project.

COMMUNITY AREA NAMES

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- 2. BRIDGEVIEW
- 3. CHICAGO
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Chicago Community Poverty Areas, 1980.



THE 10 INFANT MORTALITY REDUCTION INITIATIVE NETWORKS WHICH INCLUDE 19 COMMUNITY AREAS TARGETED BY FAMILIES WITH A FUTURE

## b. STRUCTURE

### i. The Corporation

Chicago HMO is a wholly owned subsidiary of HMO America, Incorporated and is a publicly traded corporation. Its seven officers are found at its major headquarters in downtown Chicago, and have direct responsibility in managing the firm, now the third largest HMO in the area. With about 300 employees, the HMO includes a wide range of medical and management professionals. While those writing about HMOs often discuss them as monolithic structures, organized around the control of utilization, our informal observations to date suggest great diversity within the HMO. Those with whom we worked appear to act principally out of their professional, not their organizational identity.

For example, the social services department of CHMO, where we were helped to find much of the paper records that we needed, is a center for member advocacy. Social workers, health educators and nurses who are now discharge planners contract for and coordinate an array of services for members. These include extended care placement, home health care for pregnant and postpartum members as well as convalescents, crisis intervention, counseling programs, etc. Each social worker has a particular area of interest or expertise; they coordinate with community based programs and connect CHMO members with community based resources and agencies. Examples include drug abuse programs, infant stimulation programs (0-3 years), the AIDS Task Force, Healthy Mothers and Babies, IMRI and so on. The staff of the member services department has important observations about the problems of their clients, for example the problems of cocaine addicted mothers and infants, and say they would like to research some of the issues but have not yet had the time.

In Utilization Review (UR), where we often sat at terminals or plowed through paper records, we were able to observe most of the 13 board certified nurse utilization review coordinators. UR works seven days a week monitoring admissions and stays in the hospitals around the city. They work directly with the utilization review departments of the hospitals to get information, authorize days and services, as well as deny services not covered by the HMO. They are guided largely by Intensity of Service Criteria. The UR Nurse Coordinators work with four MD medical directors who speak directly with physicians to understand what it is necessary to authorize for their patients and to encourage them to think about appropriate utilization and cost effective treatment. The UR coordinators have usual "territories" with which they speak regularly. They are professional and systematic in their interactions and their record-keeping. UR coordinators have attempted to take on

certain research projects in order to understand the patient population and utilization issues better. These have been important beginnings, but because of the coordinators' daily work, and because not all the data are yet available and coded in the MIS, their efforts are not always complete. [These coordinators are, however, important sources of information on patient patterns and problems.]

Quality Assurance is an increasingly important and active section of CHMO. Some literature suggests that Medicaid contracting HMOs are insufficiently attentive to quality assurance. Rowland and Lyons (1987) observed that "Many HMOs contracting for medicaid enrollees are new in the market and are so "heavily involved with daily administration and monitoring overutilization...(that they) put less emphasis on quality assurance...(but the older HMOs are more experienced with quality evaluation and have large non-Medicaid populations that they must satisfy." Chicago HMO is not a newcomer to care for the indigent nor to care for employed members. It has an active quality assurance program that provides regular education and review of services at the sites. Quality assurance further coordinates efforts within the corporation itself with meetings attended by the directors of each department or their representatives. Here they discuss problems at the sites or in their departments and plan strategies for solving them. Clearly the largest problem in an IPA which by definition has multiple independent sites is getting the attention and cooperation of the providers at the individual sites. In an IPA with a diverse population spread through equally diverse neighborhoods, the cooperation with the HMO and the quality of care for the patients varies widely. Our observation from the central location suggests that it remains a challenge to the administration as well as to all the departments which work with the provider sites to gain their cooperation. CHMO staff estimate that a quarter to a fifth of the sites are not sending in records of services they provided, and almost half are not telling the HMO when they identify a pregnant member. This is particularly important for prenatal programs and services for the Medicaid, often high risk pregnant members.

While in this phase of the study we visited only a few sites superficially to observe the diversity, the next phase of evaluation will necessarily include observation and gathering data from the providers.

## ii. Providers, Sites and Hospitals

Chicago HMO has contracted with some 1200 Chicago-area physicians, based in some 180 clinics, to provide service to its public and private clients. The nature of the sites varies

tremendously from huge inner-city clinics to small doctors' offices. The twenty largest sites account for 70% of the public aid enrollees, and more than 70% of the public aid deliveries in the HMO. These sites are all in the 25 poor minority west and south-side communities referred to above. HMO enrollees can choose any site with which the HMO has contracted, and at that site the patient may choose a primary care physician. Virtually all of the sites have obstetricians and pediatricians on site and other specialists to whom the primary care physicians can refer their patients.

There are a number of prerequisites for physicians with whom the HMO contracts. The physicians must be board certified or eligible, have hospital privileges at a JCAHO accredited hospital, carry malpractice insurance, and if treating Public Aid patients, have an IDPA registration number and a site which is approved by the Department of Public Aid. The physicians receive a capitated fee which now ranges widely between about \$8 and \$35 per month depending on age and sex of the enrollee. In cases of physician negligence, the HMO can and does cancel contracts. In consultation with the HMO's Utilization Review Department, the primary care physicians act as the gatekeepers of hospitalization and referrals.

Though the HMO has contracted with almost all the area hospitals, totaling 79, thirteen hospitals account for nearly 80% of the public aid deliveries. The largest delivery case load (18% of all CHMO public aid deliveries January 1987-June 1988) is handled by Mt. Sinai Hospital, a Level III perinatal center which has developed a close relationship with CHMO. Another third of all CHMO-PA deliveries are in seven south-side hospitals which are all part of the University of Chicago Perinatal Network. Saint Frances Cabrini Hospital (south of the Loop) accounts for 12%, and Cook County, Roseland, Grant and Norwegian-American Hospitals for 4% each. The rest of the CHMO-PA deliveries are scattered among dozens more hospitals across the city.

CHMO has no explicit arrangements with given perinatal networks but the medical director explains that the HMO has had patients cared for in all of them. Because of contracts for care that the HMO has arranged with Mt. Sinai Hospital and its tertiary perinatal facility, whenever possible, CHMO's high-risk mothers and infants are sent to Mt. Sinai for delivery and/or neonatal care.

## C. PROCESS OF PERINATAL CARE DELIVERY

### i. Prenatal Care Program

The prenatal program for pregnant members is designed and supervised by the Member Services department which is responsible for all Social Services, Health Education and Discharge planning. When we began our evaluation in early 1988 the program had a staff specifically for providing support services and programs for pregnant members which included the "Mother and Infant Home Care Program." It required (and depended on) the provider sites to notify the HMO when a member had her first prenatal visit. When notified, the HMO telephoned the member to set up a prenatal home nurse visit to the member to provide information about health, pregnancy and delivery, and especially to encourage the appropriate number of prenatal visits. In addition, the program sent three mailings of relevant information to the member's home; offered to pay for Lamaze classes and "quit smoking" classes; and provided a wide selection of self help books to all pregnant members. Furthermore, it was one of the early programs to provide incentive gifts for mothers when they had prenatal visits.

However, the CHMO administration and staff were disappointed in the program. First, the providers were not generally compliant with the HMO's requirement that they notify the HMO of pregnancies; the staff reports that only 60% of the doctors consistently inform the HMO of pregnancies; second, the staff reports that the patients do not return consistently for their prenatal visits and in spite of the physicians' written agreement to inform the HMOs of missed prenatal visits, they rarely complied. Third, and most irremediable, less than half of the pregnant enrollees could be reached by phone. After several tries the staff sent letters offering the benefits noted above, but the response was limited; fourth, even when reached by phone, women often refused a home visit, apparently the staff thinks, seeing it more as some manipulation by the bureaucracy and/or an invasion of privacy rather than a service that would improve their health and the health of their unborn babies.

In August a new coordinator of the prenatal program was hired and CHMO is trying a new approach. Pregnant members are written asking them to check off on a card what information or services they would like. In response a professional contacts the members and in "one-to-one communication" determines what would be best for this individual mother. The director of social services believes this will be a better approach because she finds both the providers and the patients to be markedly diverse; some, she says, count on the HMO for all their social and support



services, some provide excellent or adequate programs themselves, and some as yet unmeasured number are doing neither.

The prenatal program inevitably depends heavily on the cooperation and communication of the provider sites. and the first phase of this evaluation has little information on the sites themselves. This will be an essential central aspect of the second phase. Further study of the provider sites will be pursued in consultation with the Quality Assurance Department.

## ii. Delivery in Hospital

The circumstances and nature of the delivery of an infant are an important part of the process of care; it has a critical relationship with the morbidity and mortality of infants and mothers. There is unresolved debate in the obstetrical and pediatric literature about the indicators for caesarean section. Because the occurrence of a c-section or an abnormal vaginal delivery (NSC) is also considered an outcome measure of pregnancy, the data are presented in the following section on outcomes.

The vast majority of HMO enrollees deliver in a hospital. Delivery may occur in three ways:

- 1) Optimally, a delivery will have been expected by a regular provider who will arrange for delivery at time of labor. When a delivery is expected it is performed by an obstetrician or a family practitioner.
- 2) In the case of those enrollees with identified high risk pregnancies, arrangements are made for delivery in a level III hospital, usually Mt. Sinai. (The actual incidence of this and the process by which it is arranged will be a subject of future study.)
- 3) Often, however, either in the absence or presence of prenatal care, mothers present for delivery in an emergency room -- a continuation of an observed pattern of indigent health care.

The HMO hears of the patient's delivery through the hospital. The utilization review department of the hospital informs the UR department of the HMO at the point of admission. In the case of a normal vaginal delivery and healthy baby, the mother rarely stays more than one day and, in that case, she is entitled to two home visits by a registered nurse and one visit by a "homemaker." The first visit is of a home health nurse who draws a blood sample for the mandated PKU test and offers the mother postpartum instructions in care of herself and baby. (These nurses, from agencies who have contracts with CHMO, keep

records which are filed at CHMO and provide a rich source of data.)

In the case of caesarean delivery, the enrollee normally stays in the hospital three or four days and is provided with a visit by a registered nurse and a homemaker. While mothers are offered home health visits, as noted earlier, social service coordinators say that many women refuse the offer. If, because of the infant or mother, hospitalization is extended, Utilization Review monitors the extended stay and asks for updated reports and explanation. If a UR nurse questions the necessity for an extension, a utilization review physician will discuss the case with the attending physician. The HMO will deny payment for a stay beyond that approved by the UR physicians. They base their determination on the Intensity of Service Criteria (ISC).

## d. PERINATAL OUTCOMES

In this first phase of the effort to evaluate the health care delivery to Medicaid recipients of CHMO we have focused on the measures most discussed in the literature and the community and for which we could find data in comparable groups. Here we present an overview of those data gathered about perinatal outcomes from July 1987 through June 1988 at CHMO. (See Table 5)

TABLE 5: SUMMARY TABLE OF CHMO-PA PERINATAL OUTCOMES

	Births	NSV	NSC	C-sec.s	LBW	in-hosp NNM	NNM
7-12/87	1309	72.8% (953)	14.4% 188	12.8% (168)	16.0%*	12.2 (16)	13.6 (18)
1-6/88	1150	78.1% (898)	6.7% 77	15.2% (175)	NA	8.7 (10)	8.7 (10)
7/87-6/88	2459	75.3% (1851)	10.8% 265	13.9% (343)	NA	10.6 (26)	11.4 (28)

\* When weighted, the sample is equivalent to 33.4 LBWs over Sample N of 209.5

NSV = Normal Spontaneous Vaginal Delivery

NSC = Complicated Vaginal Delivery

As explained in the earlier section on Methodology, these data were gathered from a number of CHMO sources and departments, as well as hospitals where necessary, to create a complete set for that 12 month period. It should be noted that this complete search was limited to the HMO data. For the comparison groups (in this first phase) only aggregate numbers are available.

The table reports two six-month periods 7-12/87 and 1-6/88 and their totals. Immediately one sees the distortion of small numbers as the NNM varies widely from 13.6 to 8.7. The LBW of 16.0 was drawn from a sample (explained below) in a six-month period.

## i. Delivery Outcomes in CHMO

The C-section rate for Chicago HMO's public aid deliveries will be seen later to be comparable to that of other Medicaid populations. But the C-section rate for the AFDC/Medicaid deliveries, both inside and outside CHMO, is significantly lower than that for Chicago deliveries as a whole, which includes the privately insured majority. It is not immediately obvious how to interpret this finding. (See Table 6)

Table 6: Normal, spontaneous vaginal deliveries and Caesarean sections as percents of all births: CHMO-PA and Chicago

	CHMO-PA		Chicago	
	NSV	C-sec.s	NSV	C-sec.s
1986	NA	NA	71%	25%
Jan-June '87	75%	17%	NA	29%
July-Dec '87	73%	13%	NA	NA

NSV = Normal Spontaneous Vaginal Delivery

There is much discussion in the literature of the benefits and risks of C-sections, the incidence of which has steadily increased over the last 20 years (Myers and Geisher 1988; Placek et al. 1988; Goldfarb 1984; IHCCCC 1988). Many physicians and payors believe that the C-section rate is higher than necessary, in part because of obstetricians' fears of malpractice litigation by women with poor birth outcomes. On the other hand, physicians point to the lower morbidity and mortality (maternal and infant) associated with C-sections. The general concern is that those who do not need them may be getting them, and those who do need them may not get them. Our data do not allow us to evaluate whether the lower rate of C-sections in the AFDC population is positive or negative.

In a later study, we hope to examine more closely the relationship of complicated vaginal deliveries and caesarean sections; presumably, if women who need caesarean sections don't get them, they will end up as complicated vaginal deliveries or fetal deaths. This range of complicated vaginal deliveries is the residual between the normal spontaneous deliveries and the C-sections. Further, analysis of these outcomes seems important.

#### ii. Low Birth Weight/Neonatal Intensive Care

Because birth weight information is gathered at the physician sites and by the hospitals, but is not entered into the central information system of the HMO, it was necessary to go to paper records filed at the HMO and the hospitals. Therefore we used a sampling technique to determine the extent of low birth weight deliveries among CHMO's public aid mothers. A random sample of 270 public aid mothers was selected from the 1309 public aid deliveries paid for by the HMO between July 1, 1987 and December 31, 1987. Numerous records were examined to determine the extent of low birth weight deliveries, including

birth records (which were appended to visiting nurse phenylketonuria (PKU) reports discussed above), medical service records in Utilization Review, and hospital records. Records were examined for nearly all of the sample (98%), and weights were recorded on 70% of the records examined. In a number of cases the baby was described as healthy and thriving but did not include birth weight per se, and these we inferred to be normal birth weight. For the third of the deliveries in the sample which were not available through PKU reports, we asked for hospital records.

The sample included a third of all neonatal intensive care unit or nursery admissions, and one sixth of all remaining deliveries. The observations were differentially weighted to take into account the oversampling of the high risk group. (See Table 7)

Table 7: Birth Weights Sample of CHMO-PA Deliveries 7-12/87

	Total Sample	Records Examined	LBWs Found	Percent LBW
<u>Tier One</u>				
Intensive Care Admits	(28)	28	18	64%
Nursery Admits	(85)	85	29	34%
<u>Tier Two</u>				
Deliveries w/o neonatal admissions	(157)	153	10	6.5%
Total Sample (weighted)				16.0%

### iii. Neonatal Mortality

We chose a time period in which the computerized data were most complete to determine a neonatal mortality rate. Prior to June of 1987 there had been changes in the information system and we were not confident that the deaths recorded were complete. The information system records all the information received from the hospital but not that received from the provider sites or communities. Therefore, in addition, we searched the paper records through a number of departments of the HMO where a reflection of mortality might be found. (For example, through the visiting nurse reports where we occasionally found that an

infant had died in the first 28 days but after leaving the hospital.) We examined all the paper records on premature infants (a higher risk group), and scoured the medical service reports in Utilization Review examining the records of all newborns who had been admitted to the neonatal intensive care unit or to the nursery between July 1987 and June 1988. We were further able to follow up on any infant's computerized record where necessary. We had open access to the MIS of the HMO. After this search of numerous overlapping records we are confident that we have identified all the neonatal mortalities of women who were enrolled when they delivered and remained in the Chicago area for 28 days.

Table 8 reflects the enrollment patterns of those women whose infants died in the first 28 days (NNM). In fact, their enrollment patterns were not markedly different than the enrollment patterns of the Public Aid enrollees as a whole. Nonetheless, in this group 4 of the 19 mothers with neonatal deaths had enrolled during their pregnancies.

**Table 8: Enrollment Time Before Delivery: Neonatal Mortalities**

	7/87-12/87 PA NNMs (19)	1/1/87-6/31/88 PA (approx. 3649)
<1 month before:	0%	3%
30-90 days before:	5%	6%
91-180 days:	5%	9%
6-9 months:	11%	9%
9-12 months:	16%	10%
>one year	62%	63%

Age of mother was one of the few controls that allowed us to measure whether the HMO and AFDC populations had different amounts of risk. The public aid deliverers in the HMO do not appear to have a significantly different age distribution than those in our other comparison groups.

Table 9 reflects the age distribution of those women (and adolescents) whose infants died in the first 28 days and compares them to age distributions of all CHMO/IDPA delivering mothers as well as to the age distributions of delivering AFDC mothers in Illinois and Cook County.

Table 9: CHMO-PA Deliveries and Neonatal Mortalities by Age

Population	CHMO-IDPA		AFDC*	
	7-12/87 NNMS	7/87-6/88 All	1984 Illinois All	1984 Cook Cty Non-white
<15	0%	2%	<1%	1%
15-19	21%	22%	26%	22%
20-24	32%	36%	40%	39%
25-29	32%	26%	21%	23%
30-34	16%	11%	9%	10%
35-39	0%	3%	3%	3%
>40	0%	<1%	<1%	<1%
	100%	100%	100%	100%
Total N	(19)	(2531)	(47,603)	(26,024)

\*Figures from unpublished study

Table 10 offers another comparison of age distribution of mothers in CHMO to that of the black population in Chicago.

Table 10: Teen Birth Rate in CHMO and Chicago Black Population

	7/87-6/88	1986
<u>Deliveries to:</u>	<u>CHMO-PA</u>	<u>Chicago Blacks</u>
Teens	24%	27%
Non-teens	76%	73%

## 2. COMPARISON GROUPS

The most straightforward way to compare the HMO's perinatal outcomes to those of the population from whom they are drawn would be to have the medical records and demographic information for all women who delivered in the same area while receiving public aid. Unfortunately, as noted earlier, these kinds of data are not available. Public aid records do not record medical information, and public health records of births and infant deaths do not indicate form of payment. Linking of these data sets is difficult, and is not yet available. Consequently, we used a number of comparison groups along with statistical techniques as the basis for evaluating the HMO's outcomes.

### a. RESEARCH TRIANGLE DATA

While the four samples in the Research Triangle Study described earlier were 100% AFDC, the two California samples included few black clients which makes it less useful as a comparison. While the two Missouri projects were 73%-83% black, and all inner-city, they were both too small (roughly 600 deliveries each) for the neonatal mortality rate to be meaningful, and it was not reported. We have included the Missouri sites' Caesarian section rate and low-birth rate.

TABLE 11: C-section and LBW rates, CHMO and Research Triangle Study

	CHMO-PA 7/87-6/88	Research Triangle 1985	
		managed care (Jackson County)	fee-for-service (St. Louis, MO)
Live Births	2459	599	575
C-sections	343	95	92
rate	13.9%	15.9%	16.0%
LBWs	57/266)*	67	68
rate	16.0%	11.2%	11.9%

\*Weighted, the sample N=209.5, with 33.5 LBWs. Sample is also only for 7/87-12/87.

Though the differences between the two Missouri sites and their differences from CHMO are not statistically significant,



they suggest that the mothers in the Chicago HMO had higher risk since the low birth weight rate was higher here.

#### b. ILLINOIS DEPARTMENT OF PUBLIC AID

There was an attempt in 1984 to analyze the neonatal mortality of Illinois Medicaid recipients by linking IDPH birth and death records to IDPA Medicaid records. The report of this analysis remains unpublished because of severe methodological problems. Nevertheless the study did generate some numbers that provide a general comparison to our findings. The total recorded live births to mothers who had received AFDC in 1984 were estimated to be 47,600, and the recorded neonatal mortalities to those infants were 859. This equalled a neonatal mortality rate of 18.0 significantly greater than the 11.2 CHMO figure. One hopes that in the future linked IDPA-IDPH data sets will be made available to allow more reliable studies of this important relationship.

c. Perinatal Statistics from University of Chicago and University of Illinois Networks and Mt. Sinai

With the cooperation of data coordinators at the perinatal networks based at University of Chicago and University of Illinois, and the help of Mt. Sinai Hospital, perinatal statistics for women on Medicaid who delivered in 1987 were aggregated for this study. Unfortunately these hospitals only record neonatal mortality that occurred before the newborns were discharged; though the majority of neonatal mortality does occur in the hospital shortly after birth, "In-hospital neonatal mortality" does have a greater factor of error than neonatal mortality counted from state death records. (We have compared these figures to the number of CHMO infants who died without being discharged from the hospital.) Also, as the number of deliveries and morbidities are relatively small, a certain degree of variation is to be expected. Nonetheless, several observations can be made. (See Table 12)

More than a third of the CHMO-PA population delivered in the 13 University of Chicago hospitals,<sup>1</sup> the C-section rate in the HMO is slightly lower than the U. of C. Network's, and the Network's low birth weight and neonatal mortality rates are higher than the HMO's.

At Mt. Sinai, where a fifth of the CHMO-PAs deliver, the normal spontaneous vaginal delivery rate is markedly higher than the HMO's or the other two networks, and their low birth weight and neonatal mortality rates are somewhat lower than the HMO's. In this table we see reflected the relationship of LBW and NNM.

The University of Illinois network data are the most disparate: the number of C-sections performed in the 18 University of Illinois hospitals<sup>1</sup> is markedly higher than that in the University of Chicago hospitals, in Mt. Sinai Hospital, or in the CHMO-PA population, and the University of Illinois Network's one year 1987 black Medicaid neonatal mortality rate of 4.7 is markedly low. This appears to be a one year fluctuation in a

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<sup>1</sup> The University of Chicago Network included: Michael Reese, Englewood, Ingalls, Jackson Park, Little Company of Mary, Mercy Medical, Provident, Riverside, St. Barnards, St. Marys, S. Chicago Community, S. Suburban, and University of Chicago.

<sup>2</sup> University of Illinois Perinatal Network includes Chicago-area hospitals: Chicago Osteopathic, Norwegian-American, Illinois Masonic, Lutheran General, MacNeal Memorial, Mercy Hospital, Northwest, Olympia Fields, Ravenswood, Skokie Valley, Holy Family, Weiss, and University of Illinois.

year of notable change in the population served at the University of Illinois Hospital. These data are too limited to draw conclusions and the comparison is of lesser importance because less than 10% of the CHMO population delivered in the University of Illinois Network hospitals.

**Table 12: Chicago Perinatal Networks' Black Medicaid Deliveries and CHMO-PA: NSV, C-sections, LBW, and NNMS**

<u>CHMO-IDPA</u>	<u>Live Births</u>	<u>NSV</u>	<u>C-sec.s</u>	<u>LBW</u>	<u>in-hospital NNM</u>
7-12/87	1309	72.8% (953)	12.8% (168)	16.0%	12.2 (16)
1-6/88	1150	78.1% (898)	15.2% (175)	NA	8.7 (10)
7/87-6/88	2459	75.3% (1851)	13.9% (343)	NA	10.6 (26)
<u>Black Medicaid Deliveries</u>					
Mt. Sinai Network					
1987	2347	83.2% (1888/2269)	11% (250/2269)	13.9% (326)	8.6 (20)
U. of C. Network					
1987	5788	76.8% (4443)	17.1% (992)	20.8% (1203)	11.7 (68)
U. of I. Network					
1987	2123	72.8% (1544)	23.6% (501)	14.2% (301)	4.7 (10)
1984	4207	NA	NA	14.0% (589)	8.6 (36)
<u>U. of C. Network Medicaid - All races (81% Black)</u>					
1987	7211	75.2% (5420)	17.5% (1265)	18.9% (1366)	10.5 (76)

### Mt. Sinai High Risk Study

Mt. Sinai hospital studied the outcomes of the high-risk infants they delivered in the last four months of 1987. During that period they delivered 83 public aid infants and 56 CHMO infants. Ten of the CHMO infants had been transferred in as high-risk, while only 2 of the public aid deliveries were high-risk transfers. There appeared to be greater prenatal care and better prenatal knowledge among the CHMO patients. The outcome comparison found no significant differences between the two groups, even when not controlling for the higher numbers of high risk transfers. Because of the nature of the study, the prematurity and neonatal death rates for both populations were much higher than all other comparison groups, and so are not comparable to normal deliveries.

**Table 13: Mt. Sinai High Risk Study**

Mt. Sinai Hospital	NSV	C-sec.s	LBW	NNM
CHMO High Risk 8-12/1987	76%	20%	39%	54 3/56
Medicaid High Risk 8-12/1987	76%	24%	37%	48 4/83

These data are from a private communication from Dr. Howard Levy, Chairman, Department of Pediatrics, Mt. Sinai Hospital, to Dr. Mitchell Trubitt, Vice President for Medical Affairs, CHMO.

## d. COMMUNITY AREAS

Table 14 illustrates that in comparison to the Chicago Metropolitan area deliveries as a whole, the AFDC population in the HMO has higher rates of low birth weight and neonatal mortality, but this would be predicted on the basis of the much higher risk factors of AFDC mothers.

TABLE 14: CHMO Public Aid and Chicago Perinatal Outcomes

<u>CHMO-PA</u>	<u>Births</u>	<u>NSV</u>	<u>C-sec.s</u>	<u>LBW</u>	<u>in-hp. NNM</u>	<u>NNM</u>
7/87-6/88	2459	75.3% (1851)	10.8% (265)	16.0	10.6 (26)	11.4 (28)
<u>City of Chicago</u>						
1986	51616	71.0% (36302)	22.2% (11353)	10.6% (5476)	9.1 (470)	10.6 (573/53904)

It is particularly important, however, to compare CHMO-PA mothers and infants to mothers and infants in the community areas in which more than 2/3rds of the CHMO-PA mothers live. Of such comparison groups, these community areas offer the comparisons with the most face validity. That is, over 70% of the CHMO enrollees live in the 19 community areas covered by the Infant Mortality Reduction Initiative (IMRI) and the Families with a Future Program, and more than 75% live in the poorest 25 community areas. Furthermore, the number of Medicaid enrollees in the HMO (an average of 74,000 in 1987) and the number of births in that population (2459 in 1987) reflect a community of size and births appropriate for comparison to the geographic communities within the FWF program. (See Table 15) Table 16 shows the community characteristics and birth outcomes for the ten FWF network areas (including 19 community areas) for three years. Note in Table 16 the often great variation between any two given years -- a consequence of the small numbers of events observed. However, the averages for three years offer a more stable group of data for comparison.

Table 15: Characteristics of CHMO and Ten Comparable Communities 1987

Area	Population	Births	Rate	Below Poverty	On Public Aid	% Teen Births	LBW	NNM
1	70,879	1979	27.9	28.3	23.6	26.2	11.3	13.6
2	138,026	2957	21.4	24.0	23.0	25.5	14.0	13.9
3	33,865	797	23.5	39.4	37.5	28.9	13.6	15.1
4	31,580	763	24.2	43.1	44.0	31.0	16.0	11.8
5	57,305	1388	24.2	51.9	41.4	28.7	16.0	16.6
6	61,534	1506	24.5	43.0	38.6	32.1	15.7	6.6
7	143,958	3145	21.8	27.6	23.8	31.6	15.6	12.1
8	159,284	2817	17.7	27.6	23.8	22.0	13.7	13.5
9	122,815	2198	17.9	20.1	20.5	26.1	12.7	17.7
10	121,144	2773	22.9	35.7	35.9	29.9	15.3	13.7
Total	940,390	20323	--	--	--	27.7	14.3	13.5
CHMO*	74,214	2459	33.1	(100%)	(100%)	23.6	16.0	11.4

\* June 1987 - June 1988

Key to Family with Future Networks and Community Areas

#	Network	Community Areas
1	Humboldt Park	23
2	Austin	25
3	West Garfield Park	26
4	East Garfield Park	27
5	West Side	28
6	North Lawndale	29
7	Southeast Infant Health	35,36,37,38,40
8	Family Life Organization	42,43,69
9	Vision for Life (HRDI)	49,53,54
10	Englewood Quality of Life	67,68

Table 16: Births and Neonatal Mortality CHMO and Ten Comparable Communities 1985-1987

Area	Population	1985			1986			1987			3-Year Rate
		Births	NNM	Rate	Births	NNM	Rate	Births	NNM	Rate	
1	70,879	1700	16	9.4	1803	23	12.8	1979	27	13.6	12.0
2	138,026	2830	32	11.3	2921	26	8.9	2957	41	13.9	11.4
3	33,865	750	16	21.2	776	13	16.8	797	12	15.1	17.6
4	31,580	790	14	17.7	763	13	17.0	763	9	11.8	16.8
5	57,305	1430	16	11.2	1405	10	7.1	1388	23	16.6	11.6
6	61,534	1440	18	12.5	1435	22	15.3	1506	10	6.6	11.4
7	143,958	2930	49	16.7	2872	45	15.7	3145	38	12.1	14.8
8	159,284	2850	43	15.1	2736	32	11.7	2817	38	13.5	14.1
9	122,815	2160	37	17.1	2128	31	14.6	2198	39	17.7	16.5
10	121,144	2850	35	12.3	2656	46	17.3	2773	38	13.7	14.4
Total	940,390	19720	276	14.0	19495	261	13.4	20323	275	13.5	13.6
CHMO*	74,214	--	--	--	--	--	--	2459	28	11.4	--

\* June 1987 - June 1988

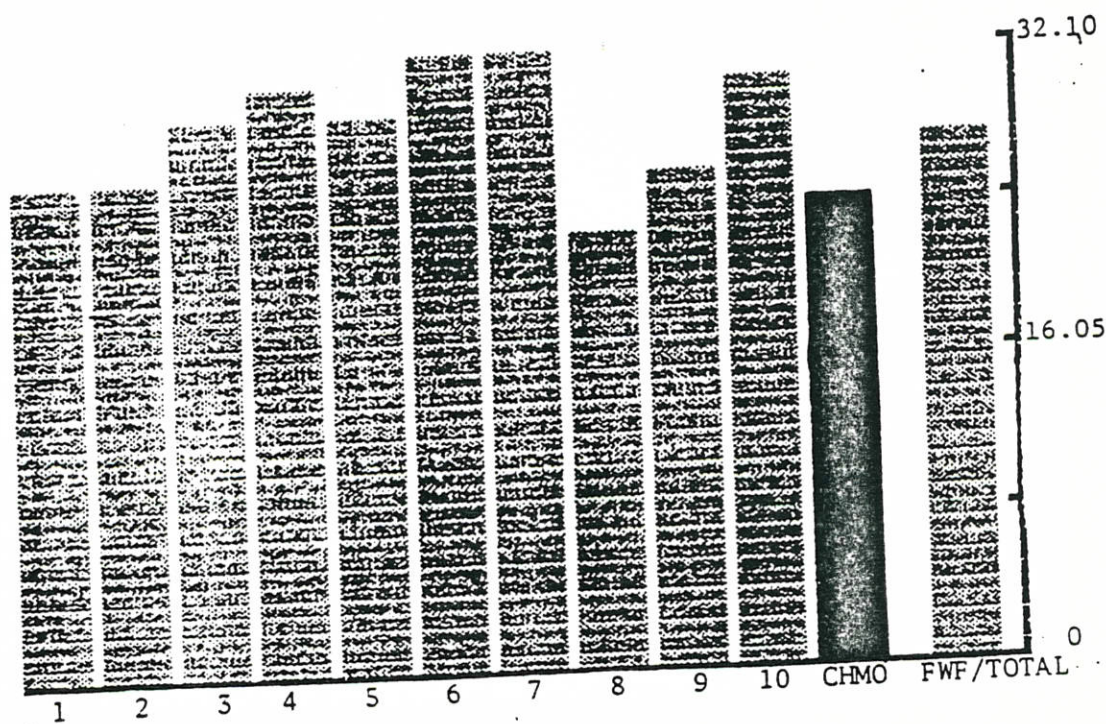
Key to Family with Future Networks and Community Areas

#	Network	Community Areas
1	Humboldt Park	23
2	Austin	25
3	West Garfield Park	26
4	East Garfield Park	27
5	West Side	28
6	North Lawndale	29
7	Southeast Infant Health	35, 36, 37, 38, 40
8	Family Life Organization	42, 43, 69
9	Vision for Life (HRDI)	49, 53, 54
10	Englewood Quality of Life	67, 68

A METHODOLOGICAL NOTE:

Tables 15 and 16 and Figures 5, 6, 7 and 8 offer different ways of considering CHMO's public aid population in comparison to those in the ten Families with a Future networks (covering 19 community areas). While these offer the best available groups for direct comparison, one should note that certain aspects of the communities are not comparable. Some of these aspects suggest less risk for adverse perinatal outcomes in the community networks, e.g., in the communities only one-fifth to one-half of the population is below poverty and/or on public aid, while the CHMO population we are evaluating is 100% poor and on public aid. On the other hand, the communities' data as a whole include both men and women and a full range of ages. We do not have data on the level of poverty or public aid specifically for the mothers and infants in those areas which in fact would be the most fully comparable group.

FIGURE 5: FWF/CHMO - % Deliveries to Teens 1987



Teen Births

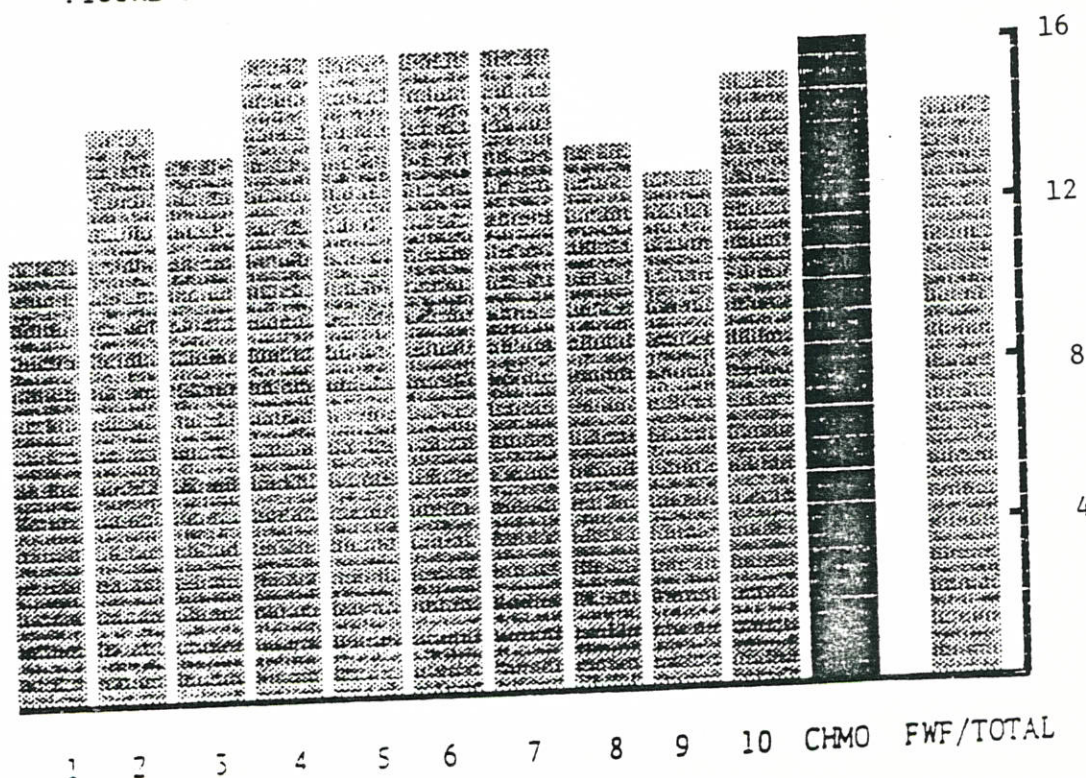
Table 15 and Figure 5 provide a comparison of the incidence of teen births in CHMO public aid population and the ten community network areas in 1987. These show that with 23.6% teen births, the HMO, in fact, is below the 27.7% average for the communities and some below all but one of the community areas.



Low Birth Weight

Table 15 and Figure 6 provide a comparison of the incidence of low birth weight in CHMO public aid population and the ten community network areas in 1987. Here one finds that CHMO has a high incidence of low birth weight at 16%, notably higher than the community average of 14.3%. Figure 6 which shows that CHMO is the same or close to five of the community areas but notably higher than the other five. As noted in the introductory discussion, low birth weight, race, and poverty are themselves closely associated. The incidence of low birth weight persists into 1989 in areas where the population is largely black and poor. (Lieberman, 1987; Shiono, 1986; Wise et al., 1988) While programs strive to reduce low birth weight with prenatal care, poor mothers are reported in the literature to continue to receive less prenatal care than is appropriate. The data collected in this phase of our study does not give information on the specific utilization of prenatal care. Thus, we cannot say to what extent CHMO members use appropriate prenatal care, nor it, when they do not receive prenatal care, it is a consequence of the member's choice or ineffectiveness of the system, or a combination of the two. Collecting and analysis of such data will be a part of Phase II.

FIGURE 6: FWF/CHMO - Low Birth Weight Distribution 1987



## Neonatal Mortality

Table 16 and Figures 7 and 8 provide a comparison of neonatal mortality rates among the CHMO public aid population and the ten community network areas in 1987 and for the community areas for the three year period 1985-1987. The three year comparison in Table 16 gives a vivid demonstration of the wide fluctuations and instability of the NNM rate both among communities in a given year and across years for a given community. One finds rates as high as 21.2 and as low as 6.6. The range of the ten community averages over three years is moderated, however, by the larger numbers (11.4-17.6). And the range of the averages of all communities across the three years, based on yet larger numbers, is quite narrow (14.0, 13.4, and 13.5). A comparison of Figures 7 and 8 show the jagged differences found in one year (Figure 7) and the smoother range over three years (Figure 8). In these tables and figures CHMO's 12 month rate (11.4) is presented for comparison. One sees that in the closest year, 1987, CHMO's NNM rate is lower than the community average of 13.5 and is as low as or lower than nine of the ten community areas (Figure 7). Even when compared to the more stable three year rate, CHMO's NNM rate is lower than the communities' average 13.6 and is as low as or lower than all of the ten community areas (Figure 8). The CHMO neonatal mortality rate, consistently in the lower range among comparable groups, is particularly notable given the incidence of low birth weight discussed above, which is consistently among the highest. Although it is not possible to explain the incidence of low birth weight, it is clear that CHMO's neonatal mortality rate is low given the low birth weight. Again, comparing this to research reported in the literature, CHMO's outcomes are consistent with reports of improved outcomes attributed to improved technology and hospital care in spite of low birth weight (Wise et al. 1988).

FIGURE 7: FWF/CHMO - Neonatal Mortality 1987

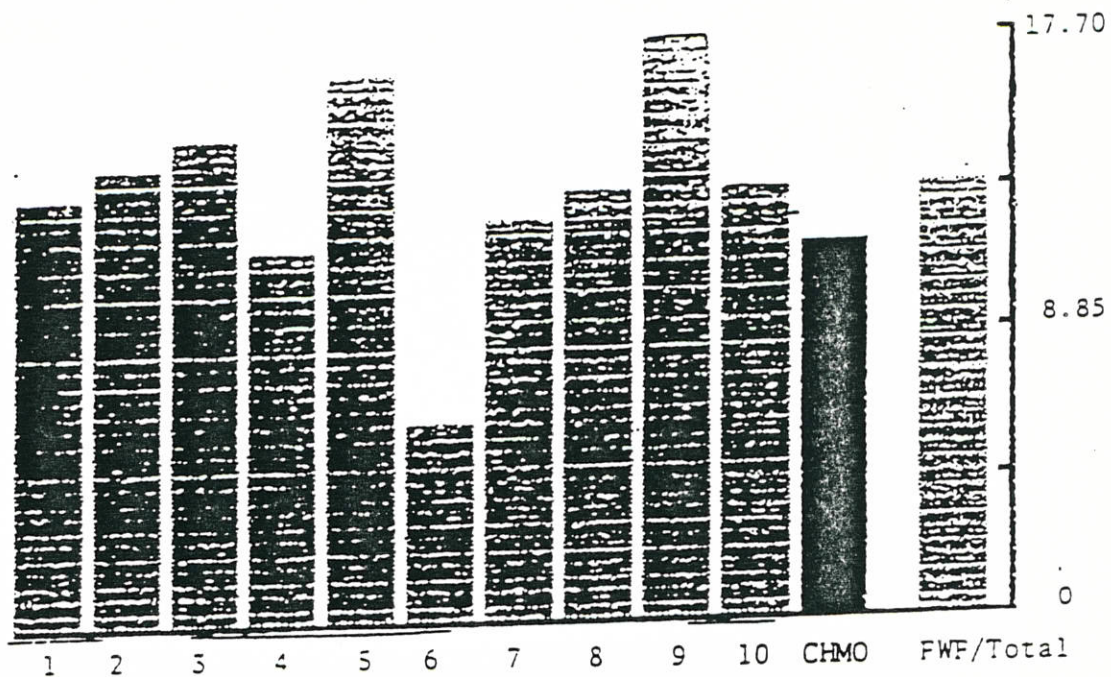


FIGURE 8: FWF/CHMO - 3 Year Neonatal Mortality 85-87

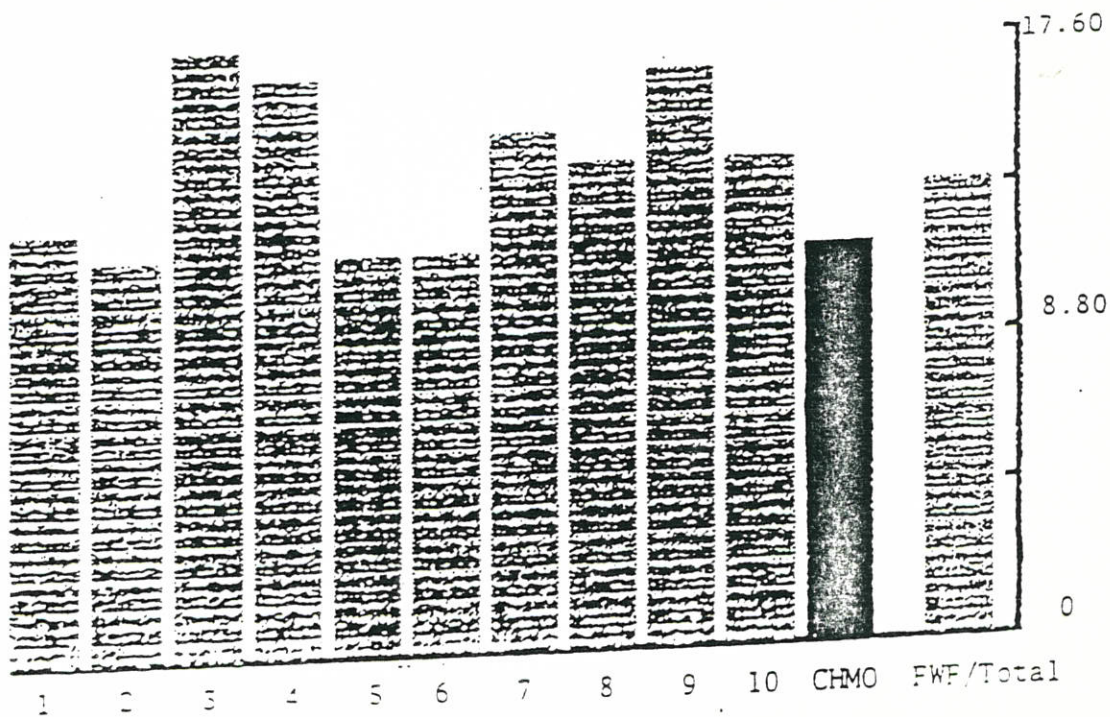


Table 17 compares the CHMO-PA births with all births in FWF areas and to births to blacks in 25 community areas. Again CHMO's incidence of low birth weight is higher and NNM rate is lower.

**TABLE 17: Low-birth weight and neonatal mortality rates in Chicago Community Areas with the majority of CHMO-PA clients**

	<u>All Births CHMO-PAs</u>	<u>All Births in 19 FWF areas (includes 75% CHMO-PAs)</u>	<u>Black Births in 25 Comm. Areas (includes &gt;75% CHMO-PAs)</u>
	<u>7/87-6/88</u>	<u>1987</u>	<u>1986</u>
Total Live Births	2459	20385	20087
Low Birth Weights	57/266*	2915	2973
LBW rate	16.0%	14.3%	14.8%
Neonatal Deaths	28	275	287
NNM rate	11.4	13.5	14.3

\* Weighted, the sample is equivalent to 209.5 with 33.5 LBWs.

#### e. STATISTICAL EXTRAPOLATION

Our approach has generally been to make direct comparisons with various groups similar to CHMO enrollees. An additional strategy is to statistically construct a comparison group using linear regression and community area data to estimate what the low birth weight rate and neonatal mortality rate would be if community residents had characteristics like those of Chicago HMO enrollees. The characteristics we considered to predict the outcome are race and AFDC enrollment.

There are several cautions to this approach however. First, neonatal statistics are based on women who bear children, not communities as a whole. Thus, in a community that has 60% of its population on AFDC (the highest rate in Chicago), nearly all the women of child-bearing age are probably in the program. Projecting the rate for a community with 100% AFDC would be nonsensical.

Secondly, the actual relationship between the percent of a community's residents who receive public aid and the community's perinatal morbidity and mortality may be confounded by the proportion who have no insurance at all. Frank Norris and Ronald Williams conclude their 1984 study of perinatal outcomes in the California Medicaid system observing that indigent non-Medicaid women delivering in county hospitals had significantly more adverse outcomes than the Medicaid deliveries (Norris and Williams 1984). We find the same markedly worse outcomes for the uninsured deliveries at Cook County hospital in Chicago, compared to the Medicaid deliveries at other hospitals.

There is no information available on the proportion uninsured by community area. On the other hand, we did use a related measure, the percent of a community's deliveries that received "inadequate prenatal care." Presumably uninsured pregnancies have the least prenatal care, and the relationship of insurance coverage to morbidity and mortality has largely to do with access to prenatal care. Inadequate prenatal care did not turn out to be a significant variable in regression.

The most recent community-level statistics available for the percent of community residents on AFDC is from the 1980 census, and this is the data we used. To make the model as sound as possible, we also used 1982 perinatal data. Changes since 1982 in the overall low birth weight rate, and in particular in the rate among the poor, black high-risk population, would likely make the estimated figure slightly different than a figure based on 1987 data.

Table 18: REGRESSION MODELS OF AFDC AND RACE ON LOW BIRTH WEIGHT AND NEONATAL MORTALITY

<u>Independent Variables</u>	<u>Dependent Variables</u>	
	<u>LBW rate</u>	<u>NNM rate</u>
Model One (N=76)	R2=.944	R2=.654
% Births Black	.75	.65
% Residents on AFDC	.25	not sig.
	<u>Black LBW rate</u>	<u>Black NNM rate</u>
Model Two (N=48)	R2=.53	R2=.14
% Black Residents on AFDC	.53	not sig.

Both race and AFDC enrollment were found to be correlated to low birth weight rate in regression, but no significant relationships between rate of AFDC enrollment and neonatal mortality were found once race was controlled. Using the two predictive models above, two LBW rates of black communities with 100% of women of child-bearing age on AFDC (equal to roughly 75% community) can be projected.

Model One: Constant+(75%AFDC)+(100%Black)

$$5.66+(75x.055)+(100x.064)= 16.2\% \text{ LBW}$$

Model Two: Constant+(75%AFDC)

$$11.42+(75x.092)= 18.3\% \text{ LBW}$$

Since we know that 75% of the AFDC population is black, a rate can also be projected for the AFDC community as a whole.

Model One: Constant+(75%AFDC)+(75%Black)

$$5.66+(75x.055)+(75x.064)= 14.6\% \text{ LBW}$$

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TABLE 19: STATISTICALLY EXTRAPOLATED LOW BIRTH WEIGHT RATES FOR  
1982 CHICAGO AFDC POPULATION

	CHMO-PA 7/87-6/88	AFDC 1982	AFDC 1982
<u>Assumption:</u>	<u>75%-100% Black</u>	<u>75% Black</u>	<u>100% Black</u>
LBW rate	16.0%	14.6%	16.2%-18.3%

## Other Possible Levels of Analysis and Interpretation

How different would CHMO have to be from the city to be significant?

If the Community Areas' Low Birth Weight (LBW) rate - 14.3  
and their neo-natal mortality (NNM) rate = 14.0

With a confidence level of

95%                      90%                      80%

*and if the CHMO delivery N= 25000*

the CHMO LBW rate would be significantly different if outside of the range of

12.9%-15.7%

13.1%-15.5%

13.4%-15.2%

and the CHMO NNM rate would be significantly different if outside

9.2 - 18.8

10.0 - 18.0

10.9 - 17.1

*if CHMO delivery N = 5000*

CHMO LBW would be significantly different outside of

13.3% - 15.3%

13.3% - 15.3%

13.6% - 15.0%

CHMO NNM would be significantly different outside of

10.6-18.4

11.5-17.1

12.1-16.5



### III. PRELIMINARY DISCUSSION

In this study we have examined data about the care to pregnant women and infants in CHMO with the intention of evaluating the outcomes, i.e., perinatal morbidity and mortality measured by types of delivery, incidence of low birth weight, and neonatal mortality. We have found that during the period 7/87 to 6/88 the morbidity and mortality for the public aid population in the HMO when compared to the poor black public aid populations were different at a descriptive level: The caesarean section rate is lower for CHMO than most comparable populations; the incidence of low birth weight is as high or higher than most comparable populations; and the neonatal mortality is somewhat lower than most comparable populations. The data were sufficiently similar, however, that we could not draw conclusions based on statistical significance.

At the level of general trends, while the HMO population's LBW rate of 16.0 is in the higher range of variation in the comparison, their NNM rate is in the lower range of variation. This suggests that the HMO low birth weight infants may have a more favorable neonatal mortality rate. Whether the somewhat higher LBW rate is the result of selection of women with higher risk factors into the HMO, or less effective prenatal care is not possible to determine from the data.

The birth weight findings are consistent with other research that demonstrates that with disadvantaged population treatment or service changes over a short time do not necessarily manifest in changes in outcomes at the aggregate level. The lower NNM rate in spite of low birth weight is consistent with reports of lowered NNM with improved neonatal intensive care technology.

#### Disenrollment and Its Effects

Lack of continuous care is said to be a significant problem in the prenatal care of mothers from a high risk group. We have noted earlier in the report that there is continuous turnover of HMO public aid members -- both those who are pregnant and those who are not. Staff in Consumer Services report that both enrollment and disenrollment are often caused by a change in Medicaid eligibility. (In Illinois, an AFDC family of three must have an income of no more than \$4,104 or 42.4% of the federal poverty level of \$9,690 to be eligible for Medicaid benefits. This is well below the average state Medicaid eligibility level of \$4,700 or 48% of poverty.) (NACHRI 1988) Research and agencies focused on infant mortality emphasize the importance of sustained benefits during pregnancy and in fact the Medicare Catastrophic Coverage Act of 1988 mandates that by July 1990, all pregnant women and infants to one year who have incomes up to

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100% of the federal poverty level and meet AFDC resource standards will be covered. The methods of our research for phase I of this project do not permit further analysis of the impact of enrollment and disenrollment on prenatal care or on outcomes of pregnancy. In phase II in which we will follow cases at the provider sites as well as in the hospital, we will be able to gather data for individual cases and also determine if enrollment and disenrollment occur within a year's period -- thus denying a mother continuous prenatal care in spite of the fact she is enrolled at the beginning and end of her pregnancy.

Other issues for consideration and further research:

Provider responsiveness -- "burnout"

Consumer/mother interaction with "the system"

Investment of resources in technological solutions

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## GLOSSARY

AFDC	Aid for Families with Dependent Children
CHMO	Chicago HMO
CHMO-PA	Public Aid Clients of Chicago HMO
GHAA	Group Health Association of America
HHS	Department of Health and Human Services
HMO	Health Maintenance Organization
IDPA	Illinois Department of Public Aid
IDPH	Illinois Department of Public Health
IHA	Illinois Hospital Association
IMR	Infant Mortality Rate
IMRI	Infant Mortality Reduction Initiative
LBW	Low Birth Weight
NNM	Neonatal Mortality (death of a newborn in 1st 28 days)
NSC	Vaginal Delivery with Complications
NSV	Normal Spontaneous Vaginal Delivery
PA	Public Aid
PKU	Phenylketonuria
PNNM	Post-neonatal Mortality
VLBW	Very Low Birth Weight