

Quality of Care in Public and Private Primary Health Care Facilities: Structural Comparisons in Jamaica¹

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This article examines the quality of care provided by Jamaican primary health care clinics by comparing various structural quality indexes derived from a nationwide 1990 survey of 366 public clinics and 189 private clinics. This comparison points up important differences in the quality of care being provided by public versus private and urban versus rural facilities that might not have been anticipated.

Among other things, the study found that the public clinics provided better prenatal diagnosis and counseling and more family planning services than the private clinics. However, the private clinics tended to be in better condition, better equipped and supplied, and better able to provide certain laboratory test results in a timely manner. Comparison of urban and rural public clinics indicated that the urban clinics were somewhat better provisioned with equipment, supplies, and pharmaceuticals. However, the rural clinics appeared to be in better repair.

Comparison of basic and higher-level public clinics showed the basic clinics to be in better condition and more fully staffed than the higher-level clinics while having similar perinatal diagnostic capabilities. However, the higher-level public clinics tended to have an overall profile more resembling that of the private clinics, being better equipped and supplied than the basic clinics.

While structural measures of quality such as those employed here tend to poorly estimate health outcomes, they do serve as good indicators of access to services where resources are severely constrained. For policy-makers, the results presented here could prove useful in guiding concrete interventions, summarizing the structural elements of health care quality at different types of facilities, and providing a method for less costly evaluation of programs designed to improve services at primary health care clinics.

Many developing countries have achieved substantial reductions in morbidity and mortality over the past 25 years. These impressive gains have been

accomplished partly through networks of primary health care facilities that have increased infant and maternal survival and reduced communicable diseases (1). In this vein, for example, worldwide infant mortality declined from 200 to 80 deaths

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per 1 000 live births in just 35 years (1950–1985). Also, recent improvements in primary health care have boosted childhood immunization rates from 30% in 1978 to nearly 80% by 1991, an increase saving an estimated 1.5 million lives (2, 3). Overall, primary health care has expanded steadily and is now available to approximately 61% of the world's population (4).

One of the various countries making substantial use of primary health care is Jamaica, where infant mortality in 1993 was down to 15 deaths per 1 000 live births (3). This level has been achieved partly through a health care system that includes both public and private primary health care facilities.

Despite significant improvements in these facilities in recent years, however, important problems remain. One indication of this is given by maternal mortality, which in 1988 was 11.5 deaths per 10 000 live births (3). By comparison, Malaysia, which has had a slightly higher infant mortality than Jamaica, had a maternal mortality of only 2.6 deaths per 10 000 live births. This difference occurred despite the fact that 90% of Jamaican women reported receiving prenatal care (5).

Thus, with primary health care so readily available in Jamaica, it appeared useful to look closely at the quality of the care provided by the primary care facilities, in an effort to determine how effectively the Jamaican facilities were diagnosing, treating, and referring patients.

Most researchers evaluating the quality of care divide their analysis into "structure," "process," and "outcome" portions. These three terms refer not to particular quality attributes of care but rather to three types of instruments used to assess certain elements of quality (6). In this article, our analysis will focus mainly on the structural elements of quality in the Jamaican primary care system.

Structural elements, closely aligned with access to health care in developing coun-

tries, are key indicators of resource constraints (6). Indeed, they are the critical elements of quality where resources are severely constrained (6, 7). However, structural instruments are also blunt instruments because of our limited understanding about how structure relates to health outcomes. Perhaps partly for this reason, few studies in the literature have measured and compared differences in the structural attributes of health care quality in developing countries (8, 9). In this study, we have found some important and unexpected differences between care quality in the public and private sectors and also at urban and rural facilities.

From a clinical perspective, structural elements help to define the quality of care. In this study these elements are divided into broad categories of infrastructure, staffing, equipment and supplies, medications, counseling, and laboratory testing. While this list is comprehensive and covers most aspects of health care, it does not necessarily estimate the significance of each structural component at the primary health care clinic to either the process or outcome of health care (6).

Experience from other countries suggests it is important to determine which structural components are the most critical. In Viet Nam, for example, a study found staffing adequate but infrastructure and laboratory capacity widely varied and drug costs disproportionately high. In contrast, a study of public health care in China found limited nonphysician staffing and little time for professional counseling and advice (4, 10). These findings have prompted health ministries to take specific steps to improve selected aspects of the quality of primary care and to direct international assistance toward specific problems.

Certain features of primary care services can be characterized by generalities better than others, regardless of the country involved. For example, private

facilities often provide more expedient services. Better staffing is generally concentrated in urban rather than rural areas. Material resources tend to be placed in advanced or higher-level facilities. Doctors also tend to concentrate in places where facilities are better staffed and equipped, and they in turn demand more laboratory facilities, drugs, and equipment—thereby accentuating these trends (10). This latter circumstance has the insidious effect of drawing resources away from lower-level primary care facilities and inflating higher-level facilities into secondary and tertiary care facilities. Ultimately, this undermines the concept of a widely disbursed primary care system directed particularly at poor and remote rural populations (12).

Within this context, in order to evaluate primary health care in Jamaica, policy makers need answers to the following pair of questions: Which specific structural components of primary care facilities can be identified and targeted for improvement? and What are the differences in care quality or service provided at rural versus urban, basic versus higher-level, and public versus private primary care facilities? (13).

BACKGROUND

To help evaluate the available data and provide a context for policy conclusions, we proposed four questions addressing the quality of care provided at Jamaican primary health care facilities. These questions are as follows:

- What are measures of the quality of care at the primary health care clinics of Jamaica?
- Are there differences between public facilities in urban and rural areas?
- What differences are observed between public and private primary health care facilities?

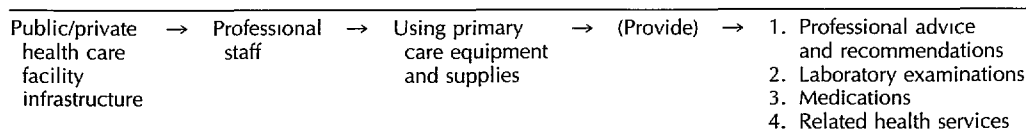
- Do higher and lower level facilities provide different health services, as they were designed to do, or just different qualities of the same service?

To make the “quality of care” concept operational in the context of this survey, it is helpful to first construct a framework for health care delivery at an “aggregate” Jamaican facility. This can be done from the perspective of patients visiting a “typical” facility as follows: When patients present themselves at the clinic, they first encounter the physical plant. Measurements of quality here need to deal with issues relating to the plant’s infrastructure. The survey (described below) contains questions that pertain to these matters—including plumbing and electricity, integrity of the floor and roof, and the functioning of telephones and refrigerators. Next, patients meet the health care staff. The measurements here need to quantify the professional staffing that is actually available and, ideally, account for the type of staff assigned to various facilities. Accordingly, the survey contains questions about staff assignments and whether or not staff members worked at their assigned posts. Once inside the facility, the patient is evaluated by the professional staff using clinical equipment and medical supplies. Questions in this area seek to get a quantifiable measure of various different types of equipment and supplies used, which can be grouped into four categories: primary equipment, sophisticated equipment, basic supplies, and delivery supplies. Finally, once a preliminary diagnosis has been made, the health care worker may order laboratory tests, prescribe drugs, and provide professional advice or recommendations. Each of these activities can be examined in a general way by means of structural indexes, as described in more detail below.

Such an operational model, providing a detailed picture of a patient’s visit to a

primary health care clinic, can be conveniently diagrammed as follows:

care quality at the public clinics and 600 variables relating to care quality and cost



MATERIALS AND METHODS

Ninety percent of all Jamaican citizens live within 10 miles of primary care facilities distributed throughout the semi-rural island nation's 14 parishes (5). The Government, under the aegis of the World Bank, conducted an extensive survey of these facilities in 1990 as part of the Jamaican Survey of Living Conditions (JSLC). A copy of the survey instrument employed may be obtained by writing to the address provided in Footnote 1.

The survey was designed to collect information about a variety of subjects, among them primary health care facilities. Site visits were made to a total of 555 clinics, including all of the 366 public clinics and 189 of the more than 800 private clinics in the country (see Table 1).

The facility questionnaires employed by this survey were exhaustive, measuring a total of 574 variables relating to

at the private ones. Data collection was cross-sectional, although it took 3 to 4 months of 1990 to complete the survey of all 555 sites.

Answers to the survey questions were provided by appropriate administrative personnel and recorded by JSLC staff members. The actual data were self-reported, the answers being determined by historic recall of the health care staff working at each site. It is thus possible that these self-reported data were influenced by recall bias and incentive bias. (Incentive bias might have led to either underreporting or overreporting if respondents intended to describe successes or explain deficiencies.)

The questions in the survey instrument generally requested dichotomous "Yes/No" answers or a numerical selection on a brief scale listing four or five choices. As a result, the data were discrete in nature, and the results could be summarized across all types of facilities.

The way different types of facilities were defined was critical to the analysis, and so several possible definitions were considered. We chose to define urban facilities as those located in districts where 50% or more of the households were located in urban areas; the remaining clinics, where over half the households were situated in areas defined as rural or peri-urban, were defined as rural. We also divided clinics into basic and higher-level facilities using the designations of the Ministry of Health. (Among other things, it was intended that basic facilities commonly be staffed by midwives and nurses, and that higher-level facilities more often

Table 1. Primary health care facilities included in the 1990 group survey of the Jamaican Survey of Living Conditions.

| | Analyzed | |
|-----------------------------|----------|-------|
| | No. | (%) |
| <i>Public facilities:*</i> | | |
| Urban | 78 | (23) |
| Rural | 260 | (77) |
| Basic | 263 | (78) |
| Higher-level | 75 | (22) |
| Total | 338 | (100) |
| <i>Private facilities:†</i> | 159 | (100) |

*Total number of public facilities surveyed = 366.

†Total number of private facilities surveyed = 189 (out of an estimated total number of private facilities exceeding 800).

be staffed by physicians.) Finally, the four categories were combined in the manner indicated in Table 2 to yield subcategories of "basic urban," "basic rural," "higher-level urban," and "higher-level rural" to permit appropriate comparisons between these types.

To adequately summarize various parameters, indices were constructed for each element of the model diagrammed above. Each index "generated" a composite percentage score for each type of facility and provided a scalar range for various measures of quality. Preliminary analysis of the survey was performed to identify miscoded data, check for multicollinearity, and correct for missing data.

A difficulty commonly faced in working with large data collections, and one that occurred in this survey, is the problem of missing data (14). Conservative estimates, equating no response with a negative answer, were used when this happened. This resulted in underreporting that tended to minimize cross-group variations and underestimate our findings. Points where this problem arose are indicated in the text.

RESULTS

Of the 366 public primary health care facilities initially included, survey data became available on 338 (92.3%). Simi-

Table 2. Numbers of public primary health care facilities surveyed, by type.

| | Analyzed | |
|---------------------------|----------|-------|
| | No. | (%) |
| <i>Public facilities:</i> | | |
| Basic urban | 47 | (14) |
| Basic rural | 215 | (64) |
| Higher-level urban | 31 | (9) |
| Higher-level rural | 45 | (13) |
| <i>Totals:</i> | | |
| Analyzed (above) | 338 | (100) |
| Surveyed | 366 | |

larly, of the 189 private facilities selected, 159 (84%) yielded questionnaires available for analysis. Most (77%) of these 338 public facilities were classified as rural, the remaining 23% as urban. A very similar division was found between basic and higher-level facilities, the former constituting 78% of the 338 public clinics and the latter constituting 22% (see Tables 1 and 2).

Using the four policy perspectives described above, various measures of health care quality were analyzed by comparing the different types of clinics (urban vs. rural, basic vs. higher-level, public vs. private, basic urban vs. basic rural, and higher-level urban vs. higher-level rural).

Infrastructure

The plant's physical condition, which we referred to earlier as "infrastructure," was assessed by aggregating responses indicating the condition of the roof, floor, electrical system, plumbing (two measures), yard maintenance, and security. (In each case, if the condition was adequate the facility was given 1 point, while if there was a problem it received no score, the maximum score attainable being 7 points.) When these results were tallied, the percentage of facilities with 1 problem or less and also the percentage with 2 problems or less were noted. These percentages for the urban, rural, and private clinics surveyed are shown in Figure 1. The data clearly indicated that private facilities were in better repair (87% having 1 problem or less and 96% having 2 or less) as compared to public facilities (of which only 44% had 1 problem or less and 55% had 2 or less). Basic rural facilities tended to have fewer of these infrastructure problems than did the higher-level urban centers.

Staffing

Several measures were used to assess staffing levels, partly because there were

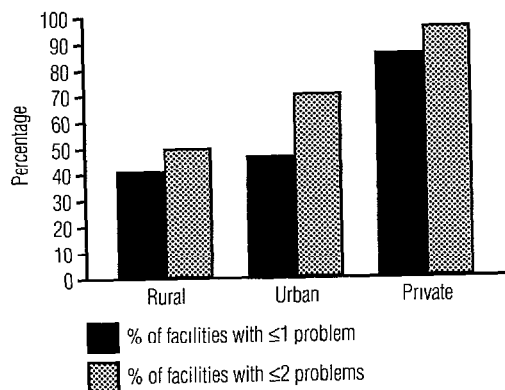


Figure 1. Percentages of rural public clinics, urban public clinics, and private clinics with 1 problem or less (black columns) and 2 problems or less (grey columns).

three separate issues to consider. First, to reduce recall bias we chose the most rigorous definition possible; that is, we considered the percentage of staff members working to be the number actually working on the day of the survey divided by the number assigned (listed) on the clinic's roster. (The assigned staffing level is the number of staff members who should be available to a clinic in an idealized setting, as determined by the Ministry of Health.) We also included a measure derived by taking all those posted at the clinic (whether or not they were necessarily working on the day of the survey) divided by those assigned (listed) on the clinic's roster (Table 3). We antici-

Table 3. Percentages of public clinics found with full physician, midwife, or nurse staffing on the day of the survey, when full staffing was defined as having the number of staff posted to the clinic equal the number of staff members assigned.

| Type of public clinic | % clinics with full staffing by: | | |
|-----------------------|----------------------------------|----------|--------|
| | Physicians | Midwives | Nurses |
| Urban | 56% | 85% | 64% |
| Rural | 66% | 78% | 57% |
| Basic | 67% | 78% | 60% |
| Higher-level | 61% | 84% | 58% |

pated and then observed that the first measure (staff working/staff assigned) yielded a lower percentage in each category than the second measure (staff posted/staff assigned). We used the lower percentage (Table 4) because the other (staff posted/staff assigned) might have overestimated functional staffing. Perhaps the ideal index would have been provided by the number "actually working," but this information was not available.

The second issue concerned the types of staff members working at the different clinics. Since staffing requirements at different facilities vary according to the level of care provided and cannot be directly compared, we looked at three types of personnel (doctors, nurses, and midwives) and then made appropriate comparisons between personnel found at different types of facilities. Among other things, we expected to find that physician staffing and attendance at basic public facilities would be less than at higher-level public facilities. In addition, we recognized that, ideally, there should be no marked staffing and attendance disparities between public urban and public rural facilities. (Had data been available, we would also have liked to compare each professional group's level of experience, but this was not possible.)

The final issue we considered was the problem of missing data. Here we took two alternate approaches. The first approach ignored unrecorded data and calculated the percentage of clinics with all the indicated class of staff members working at those clinics where data for all employees in that class were available. The second approach took all the clinics surveyed and considered that those with less than complete data for a given class of employee had less than 100% of the employees in that class working.

The first approach could have made it difficult to distinguish between different clinic groups and subgroups. On the other

Table 4. Percentages of public and private clinics found with full physician, midwife, nurse, and nurse plus midwife staffing on the day of the survey, when full staffing was defined as having the number of staff members working (not merely present) at the clinic equal the number of staff members assigned. In each case the number of clinics for which full data were available is indicated in parentheses. In general, the numbers of clinics providing full data were considerably fewer than the total number included in the survey.

| | Clinics with full physician staffing | | Clinics with full midwife staffing | | Clinics with full nurse staffing | | Clinics with full midwife and nurse staffing | |
|--------------------------------------|--------------------------------------|-----------------|------------------------------------|-----------------|----------------------------------|-----------------|--|-----------------|
| | % | (No. with data) | % | (No. with data) | % | (No. with data) | % | (No. with data) |
| <i>Public facilities:</i> | | | | | | | | |
| Urban | 32% | (41) | 67% | (67) | 54% | (33) | 54% | (76) |
| Rural | 32% | (97) | 61% | (225) | 43% | (83) | 51% | (235) |
| Basic | 23% | (66) | 61% | (215) | 44% | (61) | 55% | (227) |
| Higher-level | 39% | (66) | 66% | (70) | 50% | (58) | 44% | (75) |
| <i>Public facilities by subtype:</i> | | | | | | | | |
| Basic urban | 20% | (12) | 75% | (36) | 50% | (12) | 65% | (40) |
| Basic rural | 25% | (54) | 58% | (179) | 43% | (49) | 53% | (187) |
| Higher-level urban | 35% | (27) | 57% | (28) | 57% | (26) | 42% | (31) |
| Higher-level rural | 44% | (39) | 72% | (42) | 44% | (32) | 35% | (44) |
| <i>Private facilities:</i> | | | | | | | | |
| | 79% | (158) | 25% | (4) | 78% | (106) | — | — |

hand, the second approach consistently biased the data downwards and underreported health care availability. A further problem with the second method was that we had already elected to use the most rigorous (and conservative) estimate of full staffing when we chose to compare staff working to staff assigned on the day of the survey. After evaluating both approaches, we found that the first approach yielded patterns showing clear differences between groups; we therefore elected to use this method and to ignore the missing values.

As anticipated, there was a marked tendency to assign trained nurse practitioners and midwives to positions at the basic public facilities. Positions at the higher-level public facilities as well as private facilities were typically held by doctors. (By definition the private clinics were run by physician-entrepreneurs—5.) We also found, however, that a substantial

share of the higher-level public facilities were staffed by midwives—in marked contrast to the private facilities, where almost no midwives were present (Table 4).

The staffing index of physicians confirmed our expectation that the 66 basic public clinics covered would yield a poorer showing (23%) than the 66 higher-level public clinics covered (39%). However, when these public clinics were grouped according to rural and urban subtypes, we found that the staffing index of physician attendance was higher at the (basic or higher-level) rural facilities than at their (basic or higher-level) urban counterparts (see Table 4), a counterintuitive finding considered in more detail in the Discussion section.

Overall, the public facilities were found to be staffed relatively heavily by midwives (thereby confirming the government's policy of staffing many of its basic facilities, where appropriate, with these

personnel). The observed staffing index of midwife attendance ranged from 61% at the 225 rural facilities and 215 basic facilities where midwife staffing and attendance were known to 66% and 67%, respectively, at the 67 urban and 70 higher-level facilities where midwife staffing and attendance were known (see Table 4). When the midwife data were further subdivided, it appeared that midwife attendance was somewhat better at the basic

comparison with respect to physician staffing would be provided by the higher-level public facilities; even there, however, the observed staffing index of physician attendance was a much lower 39%.

Equipment and Supplies

Several types of equipment are needed for various facility functions. We defined four groups as follows:

| Basic equipment | Sophisticated equipment | Basic supplies | Delivery supplies |
|------------------|-------------------------|------------------------|---|
| Adult scales | Glucometer | Syringes | Linens |
| Tape measures | Microscope | Needles | Mucous extractors |
| Sphygmomanometer | Centrifuge | Urine/stool containers | Vitamin K/silver nitrate |
| Stethoscope | Autoclave | Uristix | Diagnostic sets (supplies for internal examination) |
| Thermometers | | Bandages | Fetal stethoscope |
| Infant scales | | Scissors | |

urban and higher-level rural facilities for reasons that are not entirely clear. However, when the midwife and nurse data were combined (see the last column of Table 4), they showed that the combined nurse and midwife staffing indexes were higher at the basic facilities, as one might have expected (because basic facilities, by definition, are not expected to provide advanced-level care and would not necessarily require physician staffing). There was also a further (modest) tendency of the combined staffing indexes of nurse and midwife attendance to be higher at the urban as compared to the rural facilities, a result that is not as apparent in the broader categories shown in the upper part of the table.

Private facility staffing was characterized by higher staffing indexes of physician attendance (79%) and nurse attendance (78%) than were found in the public sector. This was to be expected in the case of physicians, since physicians owned and ran the private clinics. Within the public sector, the most appropriate

While these lists are not exhaustive, they are representative of essential equipment required for various clinic activities. Delivery supplies (as listed above) are indexed separately because, although all clinics do not perform deliveries, clinics need to support midwives doing either home deliveries or unexpected deliveries. Both the physical presence and functional status of equipment present at the clinics was assessed in order to determine this equipment's operational characteristics and maintenance needs at the time of the survey.

The public facilities were found to be poorly equipped when the presence of 80% of this basic equipment (listed above) was used as a standard. That is, 80% of the items listed were present at only 61% of the urban public clinics, 67% of the rural public clinics, 76% of the higher-level public clinics, and 64% of the basic public clinics. Improvements ranging from slight to considerable were found when the standard was lowered from 80% to 60%, with urban public clinics still com-

ing out slightly better than rural ones and higher-level public clinics doing better (at 92%) than basic public clinics (at 85%) (Figure 2). By comparison, 85% of the private facilities were found to have 80% of the basic equipment, while 97% had 60%.

Many private clinics are "specialized" in the sense that they do not provide obstetric or pediatric care. If baby scales and tape measures were dropped from the list, however, the private clinics would possess 80% of the basic equipment.

The more sophisticated equipment on the list, and by extension more sophisticated on-site laboratory facilities, really do not exist at this time in either the public or private sector.

In general, we found the private facilities better equipped and their equipment in better repair. This was especially true of more sophisticated items but also held true for basic equipment. The comparison remained valid irrespective of whether one compared the private clinics to urban or rural public clinics. However, when only the higher-level public facilities were compared to the private facilities, the equipment and its functional status (ad-

equate functional status being defined as working on the day of the survey) appeared very similar in both groups. This last comparison may in fact be the most valid one, since basic facilities are not intended to apply advanced diagnostic methods.

With regard to basic supplies, we determined the percentages of the study clinics that had 50% of the listed items on hand. These determinations indicated that the private clinics were considerably better stocked at this level. More specifically, about the same percentages of urban public clinics (64%) and rural public clinics (63%) had at least 50% of the listed basic supplies on hand, while 88% of the higher-level public clinics but only 58% of the basic public clinics did so (Figure 3).

The percentage of delivery supplies on hand was generally much lower at all the various types of facilities (Figure 4). Again, about the same percentages of urban clinics (23%) and rural clinics (18%) had 50% of these supplies on hand, but there was a significant disparity between the percentage of basic clinics (14%) and higher-level clinics (41%) that did so.

When we looked at family planning supplies (including contraceptives), we found a markedly different situation. Clearly, the public primary health care

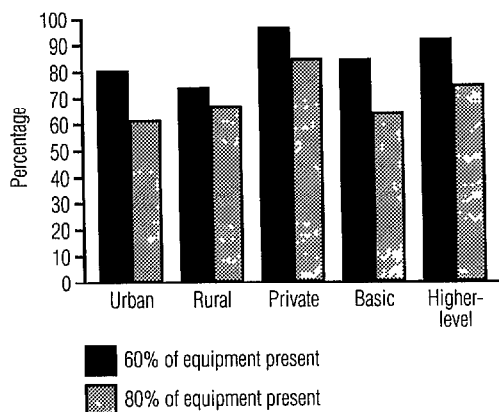


Figure 2. Percentages of public (urban, rural, basic, and higher-level) clinics and private clinics with 60% (black columns) and 80% (grey columns) of the basic equipment items listed at the time of the survey.

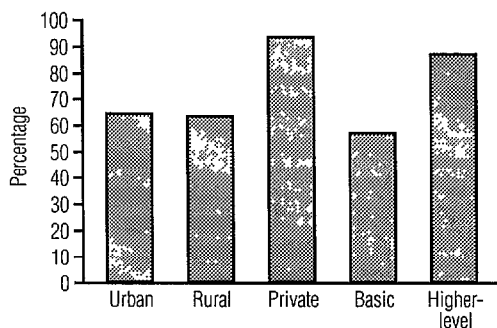


Figure 3. Percentages of public (urban, rural, basic, and higher-level) clinics and private clinics with at least 50% of the basic supply items listed at the time of the survey.

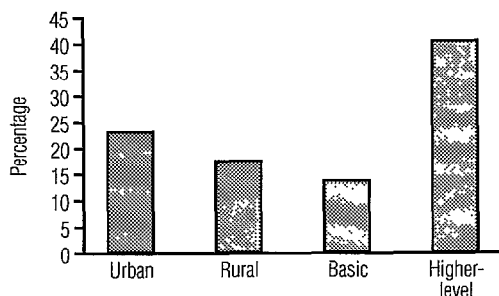


Figure 4. Percentages of public and private clinics with at least 50% of the listed delivery supplies on hand at the time of the survey.

facilities were far better equipped to provide family planning services (Figure 5). It should be pointed out that the threshold here (as above) was only 50%, leaving open the question of whether family planning supplies and services might be substantially improved if a 75% or 90% supply level were attained.

Because of the way the indices were constructed, it was possible for the consistent absence of a specific piece of equipment or supply item to consistently lower the index for a particular type of facility. With respect to basic equipment, it was found that the clinics generally had stethoscopes, sphygmomanometers, thermometers, and adult scales. The indices were generally depressed by the

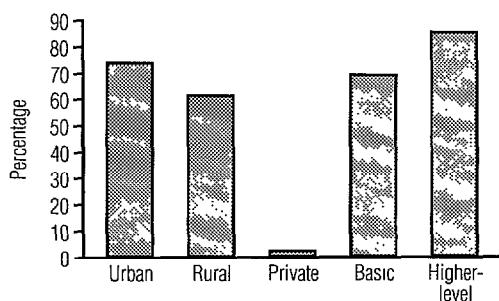


Figure 5. Percentages of public (urban, rural, basic, and higher-level) clinics and private clinics with at least 50% of a list of family planning supplies (including condoms, spermicides, birth control pills, diaphragms, and IUDs) on hand at the time of the survey.

absence of tape measures or infant scales. These pieces of equipment are important, of course, but only for clinics that intend to provide prenatal or postnatal care. Even after tape measures and infant scales are dropped from the index, however, it is clear that higher-level facilities are better equipped than basic facilities.

Regarding sophisticated equipment, the basic public clinics and private clinics had essentially no microscopes or centrifuges and also showed a surprising paucity of autoclaves. The higher-level public facilities were found to be best equipped in this regard.

With respect to basic supplies, we found that urine and stool containers were the most frequently missing items at all types of facilities. Again, the higher-level public clinics tended to have more of these supply items than the basic public clinics, while the private clinics had a higher percentage than the public clinics of nearly every individual item.

Delivery equipment and supplies tended to be more consistently available at the higher-level and private facilities, with mucous extractors and linens being the most consistently absent items.

Pharmaceuticals

The availability of 10 selected basic drugs was examined in several different ways. Data gathered included (1) drugs present at the time of the survey, (2) usual drug availability, (3) shipment of expired drugs, and (4) lack of drug availability for more than 1 week. The most robust index was the availability of drugs on the day of the survey. When availability of 50% of the drugs was used as the criterion, the results showed that about the same percentages of urban and rural public clinics had 50% of the drugs in stock for their patients. However, comparison of data from the higher-level and basic public facilities showed a clear-cut disparity in-

dicating inadequate drug supplies at the basic clinics:

| Clinics with 50% of drugs available | |
|-------------------------------------|-------|
| <i>Public:</i> | |
| Urban | 43.6% |
| Rural | 39.2% |
| Basic | 30.0% |
| Higher-level | 70.0% |
| <i>Private</i> | 47.8% |

Maternal Counseling and Screening

An essential task of primary care is to identify women at risk of peripartum complications and low birth-weight deliveries. This requires counseling women to detect risk factors and testing them for clinical symptoms relating to anemia, preeclampsia/eclampsia, and gestational diabetes. We sought to measure how well this was being done by using two indices that reflect essential, required elements of prenatal care. Below is a partial list of the measures used to construct the two indices:

Are the following items routinely discussed?

diet/nutrition
the importance of breast-feeding
ideal prenatal care schedule
risk of smoking/alcohol/drug use
dangers of high blood pressure
individual risk factors in pregnancy
review of clinical warning signs
emergency plans

And are the following clinical symptoms regularly evaluated?

weight gain
blood pressure
edema

In general, we found that prenatal care was being provided better with more detailed counseling and testing at the public clinics than at the private facilities.

Adequate counseling, as indicated by the performance of 15 out of 20 important (and inexpensive) counseling interventions, was consistently provided by about half of the public facilities (54% of the urban clinics, 49% of the rural clinics) as compared to 21.5% of the private facilities (Figure 6). A slight disparity was also observed between the percentages of basic public clinics (53%) and higher-level public clinics (41%) performing adequate counseling defined in this manner.

The public clinics also appeared to be doing better with regard to prenatal testing (see Figure 6). That is, over 80% of the public facilities in all four categories, regardless of location or type, were performing seven out of eight basic prenatal clinical tests (e.g., checking for edema and high blood pressure). Only 60% of the private facilities were performing seven of these eight tests.

Laboratory Tests

Laboratory tests employed in prenatal care revealed a different pattern. We applied an index of routine laboratory tests

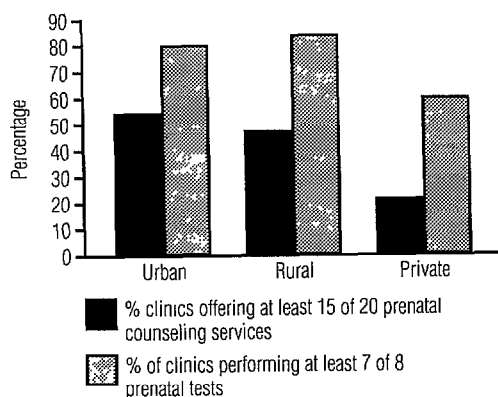


Figure 6. Percentages of public (urban, rural) clinics and private clinics offering at least 15 of the 20 selected prenatal counseling services at the time of the survey (black columns) and at least 7 of 8 selected prenatal tests (grey columns) at the time of the survey.

to determine whether (1) the study clinics were testing for anemia (through hemoglobin testing) and for glycosuria and proteinuria (through urinalysis); and (2) whether specific laboratory tests for ABO/Rh blood typing, parasitic and sickle cell disease, and syphilis were available. It was found that approximately 90% of the public facilities were appropriately per-

forming routine urine and hemoglobin tests (Figure 7). In general, the basic and rural public clinics did about as well as the higher-level and urban public clinics in performing these routine tests.

However, sharp differences were found in the times needed to obtain the results of the hemoglobin tests. Only 22% of the urban public clinics and 14% of the rural

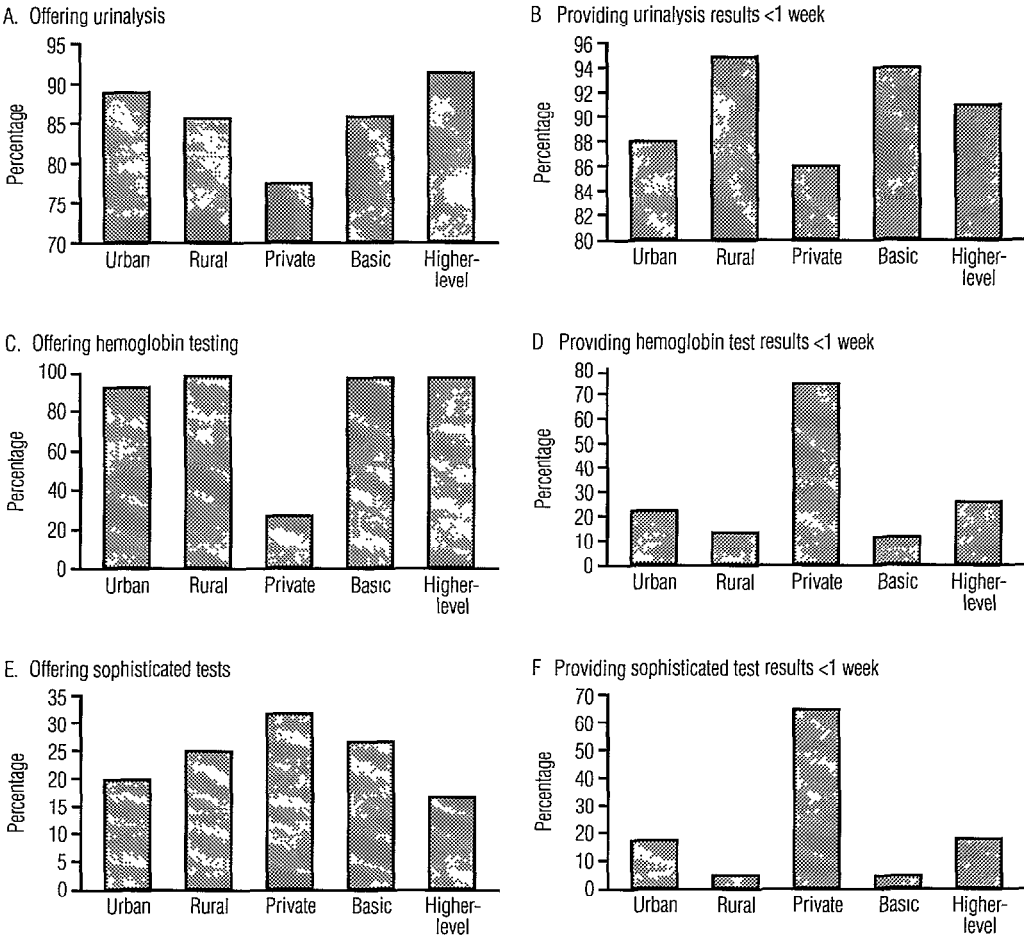


Figure 7. Percentages of public (urban, rural, basic, and higher-level) clinics and private clinics providing certain types of laboratory tests and reporting the results in less than a week. (A) percentages of clinics offering urinalysis for glycosuria and proteinuria; (B) percentages of clinics doing urinalysis that provided test results in less than a week; (C) percentages of clinics offering hemoglobin testing for anemia; (D) percentages of clinics offering hemoglobin testing that provided test results in less than a week; (E) percentages of clinics offering blood typing (ABO/Rh) and tests for parasitic diseases, sickle cell disease, and syphilis; and (F) percentages of clinics doing the latter group of tests that provided test results in less than a week.

public clinics were found to provide hemoglobin test results within a few days (less than a week). The higher-level public clinics did not do much better, only 27% getting the results back within this time period (as compared to 12% of the basic public clinics). Private sector clinics performed more satisfactorily, with about 72% providing the results of hemoglobin testing in the specified time period (see Figure 7).

Urine test results, however, were usually available in a few days (less than a week) regardless of clinic type. Most public clinics (95% of the basic rural clinics and 90% of the higher-level urban clinics) had them available within this period. Private clinics provided results within this period 86% of the time.

As might have been expected, waiting times for specialty laboratory tests were generally quite long at the public facilities. While 65% of the private facilities typically had the results of such tests available within a few days, this was true of less than 6% of the rural and basic public clinics and of only 16% of the urban and higher-level public clinics (see Figure 7).

DISCUSSION

Facility-based surveys have a number of important limitations. Recall bias, availability heuristics, and problems estimating equipment and supplies pose difficulties for self-reported surveys. Moreover, care quality as indicated by such indexes does not necessarily reflect the patient's point of view, since they deal only with the structural characteristics of quality as those characteristics are reported by the facility's staff; and while there is certainly linkage between structural characteristics and outcome characteristics with respect to quality, these connections are remote, require the patient's perspective, and are appropri-

ately a subject needing further research (6, 7).

To date only a few studies have tried to measure the structural components of health care quality in developing countries. These have relied on relatively sophisticated sampling techniques and have often proved costly (8, 9). In contrast, we have used a relatively simple technique for evaluating many structural characteristics of health care quality at primary health care facilities that may prove useful in other primary care settings. Application of this technique in the present instance yielded a few unanticipated findings that are discussed below.

Indexes

We found that the indexes employed in this study were useful and provided a reasonable numerical ranking system for assessing the quality of selected structural health care elements. Should these indexes be used elsewhere, they might also prove valuable in another way; that is, they could be used in follow-up studies as part of a feedback and evaluation scheme. For example, initial work might show that higher-level public clinics have a relatively high "pharmaceutical" index, indicating little or no difficulty providing medications, but need to improve their physical condition or equipment in order to improve the quality of care. In this example, the infrastructure index and equipment indices could be used to measure the effects of targeted government interventions designed to improve physical plants and equipment. Applying such indexes could help the government to evaluate changes in a random sample of public facilities while avoiding any need to complete the entire survey (8). It should be emphasized, however, that the index values are only indicators; and if, for whatever reason, a clinic comes to focus primarily on improving its index

score, the index will no longer accurately gauge the overall parameter it is intended to assess.

It should also be noted that a key feature related to structure that has not been dealt with in this survey is the leadership or management process. The quality of local and regional leadership and management affects infrastructure, staffing, equipment, laboratory services, and indeed every aspect of our prototype clinic. Hence, the quality of structural characteristics relating specifically to leadership and management is an important subject for future studies.

Facilities

The survey indicated that public sector clinics in general need physical repair and better maintenance. Basic construction as well as plumbing and electrical improvements are called for. What was somewhat unexpected in this regard was the relatively better condition of basic and rural clinics relative to the higher-level and urban clinics.

Such deficiencies may relate directly to health care delivery—if, for example, they tend to hinder prevention of infection or treatment of sepsis in the clinical setting. They may also be indirect determinants of clinic utilization, to the extent that they make the facility more or less attractive and confidence-inspiring to the patients. This latter point is important when viewed in the context of such things as studies relating the frequency of prenatal visits to successful pregnancy outcomes (7).

Professional Staffing

As a rule, our data found that the clinics were understaffed. For example, consider the better staffing indexes: At the basic (urban and rural) public clinics the combined staffing index for nurse and midwife attendance ranged from 53% to

65%; and at the higher-level (urban and rural) public clinics the staffing index for physician attendance ranged from 33% to 44%. Even if we use a more generous standard of staff at the post/staff assigned, the percentage of clinics with full staff attendance was 61% for higher-level clinics with respect to physicians and 78% for higher-level clinics with respect to nurses and midwives combined.

In the case of physicians at private clinics, who rely on per capita reimbursement, it was not surprising to find that the staffing index for physician attendance was much higher, at 79% (see Table 4), while the index for staff posted was 89%.

These observations must be tempered by two facts: There is a significant amount of missing data for the physician measures; and job descriptions for many of the midwives, nurses, and rural physicians required them to be off-site from time to time visiting patients. With this in mind, it is interesting to speculate on why full physician attendance at rural clinics was found greater than at higher-level clinics. One possible explanation is that physicians at urban clinics do not have to confine themselves to these urban facilities because other locations where they can offer their services are available in the cities. This option is not available to physicians in the countryside.

The combined index measuring full attendance at clinics where at least one nurse or one midwife was assigned (the last column in Table 4) seemed to constitute the most appropriate gauge of staffing at basic public facilities. However, one might still want to investigate why the staffing index of nurse and midwife attendance was only 53% at basic rural clinics as compared to 65% at basic urban clinics. It is also noteworthy that the higher-level public clinics were commonly staffed by a combination of nurse practitioners, midwives, and physicians, and that this probably accounted for the lower staffing

indexes of combined nurse and midwife attendance seen at these clinics.

This highlights another important point that should be considered in evaluating any of the staffing indexes. Problems in staffing may not lie so much with government assignment levels as with actual daily staffing requirements. These requirements might be lower than the assigned levels and might only require continuous nurse-level staffing. Since the bulk of the staffing in basic and rural facilities is provided by midwives, it may be worthwhile to further evaluate midwifery staffing shortages at basic and rural clinics. Conversely, it may also be worthwhile to further evaluate physician staffing shortages at urban and higher-level clinics.

Medical Equipment and Supplies

We observed that all the clinics surveyed, regardless of their level or location, were poorly equipped, and that there was little difference between the public and private facilities. When the analysis was restricted to only primary care equipment, we still found underequipped facilities. When relatively rigorous standards (80% of the basic equipment listed) were used, the results were uniformly suboptimal, indicating that few clinics were well-equipped with the essential items listed.

Regarding overall equipping and supply of facilities, the survey results found little difference between the urban and rural public clinics. However, this was not the case when equipment at the basic and higher-level public clinics were compared, it being found that the higher-level facilities appeared consistently better equipped regardless of the index used.

In addition, the equipment in place (both basic and sophisticated) was found to be in marginally better repair at the private facilities than at the public clinics. This lat-

ter circumstance could reflect the differences in personal versus public investment in these goods. A more detailed analysis of the biomedical equipment repair and maintenance process is needed to better understand this process and to help optimize selection and maintenance of both basic and sophisticated equipment.

When we turn our attention to supplies, a different picture emerges. The survey results indicate that the private facilities were well supplied with the basic items listed, while the public clinics were undersupplied. When the data are disaggregated by public clinic type, one can see that the higher-level public facilities were in about the same position as the private facilities with respect to basic supplies, so that only the basic public clinics seemed undersupplied with these items. On the other hand, the public facilities of all four types (rural, urban, higher-level, and basic) were clearly better positioned to provide family planning services, since far more of them had at least marginally adequate supplies of contraceptives.

Overall, the present survey found that most facilities had sphygmomanometers and stethoscopes, and so were in a position to screen for hypertension during pregnancy; most also had thermometers as well as equipment for drawing blood and so were in a position to evaluate infection (hypertension and infection being two of the most important causes of maternal death).

Other equipment and supplies might be added at relatively little cost. Specifically, mucous extractors, linens, tape measures, silver nitrate, and vitamin K could be used for deliveries or emergency care in clinics that do not provide these services routinely. In addition, the lack of sterilizers or autoclaves found by the survey was of particular concern. These items are available at relatively low cost or even at a subsidized cost from international health agencies. Overall, it seems

evident that equipment and supplies for basic facilities could be targeted and, as resources allow, selected pieces of equipment and medical supplies could be procured that would significantly improve the situation.

Pharmaceuticals

The information considered here is limited to the selection of drugs evaluated in the survey. In the future it might be useful to assess a more complete list of medications or at least to include most drugs used for some of the more common clinical conditions seen at primary care clinics—including oxytocin and magnesium sulfate (used to treat pregnant women), various antibiotics, and volume expanders employed in treating trauma. This notwithstanding, in our survey drug supplies appeared to be comparable across facilities. The drugs surveyed were available a little less than half the time, but few if any expired drugs were either delivered to the clinic or had accumulated on the shelves. There was also no major overall disparity between the public and private clinics. The most notable finding was the paucity of drugs available at basic clinics. This shortage was even more pronounced for drugs than supplies.

In rural settings, one supposes that this drug shortage problem is further compounded by the distance involved in traveling to a chemist/pharmacist and by transportation problems. If clinically feasible, it would be a valuable improvement to expand the inventory of medications available at rural clinics. This might prove especially worthwhile within the overall context of efforts to provide pharmaceuticals, contraceptives, delivery equipment, and basic supplies to lower-level facilities with a view to making them comparable to the more advanced public facilities and private clinics.

Professional Advice and Counseling

In general, the professional staff at the survey clinics reported that basic clinical services were provided for pregnant women during prenatal visits.

When careful histories of pregnant women are combined with the results of relevant clinical examinations, it should be feasible to identify women at high risk during the prenatal period (7, 18). The greatest deficiencies in advice and counseling, however, were found in the area of "prenatal health promotion." Although public clinics of all four types provided better service than the private clinics, only slightly more than half the public clinics were found to provide 15 of the 20 counseling services surveyed. For example, patients were not always advised of the need to return to the clinic on a regular basis, nor were they always counseled about how to identify danger signs or what to do in case of an emergency. Hence, it may be possible to improve care in this area by covering these topics during supervisor visits, health department reviews, or staff in-service training.

Because the counseling data gathered were self-reported data, it is important to point out the potential for overreporting. The suspicion here is that most health care workers know what they should be doing but may not necessarily do it with each patient. Furthermore, a certain amount of overreporting is consistent with recall patterns, because people are more likely to recall a recent event that occurred than one that did not occur. The survey did not explicitly query whether they remembered a time when they failed to ask one of these questions, but rather if they routinely asked the questions (15). This limitation needs to be kept in mind, particularly when evaluating the degree of efficacy of counseling services provided by primary health care programs.

These considerations notwithstanding, the level of prenatal care counseling provided in the rural and urban public facilities was generally good, with around 50% of the clinics apparently providing at least 15 of the 20 services surveyed, as compared to about 21% of the private clinics. With respect to prenatal diagnostic testing the picture was even better, with over 80% of the public facilities in each of the four groups performing seven out of eight prenatal clinical tests. This level of performance, like that of prenatal counseling, was substantially better than that found at the private clinics, clearly indicating that prenatal services in Jamaica are being performed best by the public primary health care facilities.

Laboratory Tests

Two issues, the performance of certain basic tests and the time needed to obtain results, were considered by the survey. It was found that the key surveyed laboratory evaluations were being appropriately requested and performed at all the types of clinics surveyed. The matter that might need slight improvement is routine evaluation of urine during prenatal visits, which was found to be done by approximately 88% of the public clinics.

In contrast, the long delay involved in obtaining the results of tests that were sent out renders many of these tests at best irrelevant and at worst wasteful. Some of this delay could be avoided if basic laboratory services were available at the clinics themselves. For example, when the testing data were disaggregated for certain tests sent out (hemoglobin) and others done on-site (urine), we found that the waiting time tended to be considerably less when on-site testing was performed.

From a staffing perspective, there appeared to be at least a small number of laboratory staff members at the surveyed clinics who were available and could carry

out the required testing. However, as the equipment survey showed, the clinics lacked even the rudimentary laboratory equipment needed to do tests (e.g., microscopes). Hence, one recommendation would be to supply higher-level clinics with enough equipment to do a few specialized tests. A centrifuge and a microscope, along with staining supplies, would make it possible to do blood tests such as cell counts, sickle cell preparations, and parasite preparations. Another possibility would be to provide simple technical equipment at the health center level, such as a glucometer used to evaluate prenatal patients for gestational diabetes.

Family Planning and Related Services

Family planning services, exclusive of minor surgical procedures, appeared to be quite adequate and well provided by public facilities. Although IUDs and diaphragms were not commonly available, this may be the most appropriate situation if complications arising from the use of these cannot be treated.

It is noteworthy, however, particularly in view of the HIV pandemic, that most clinics were not offering sexually transmitted disease services. By extending the existing family planning services, it might be possible to increase treatment of sexually transmitted diseases at a relatively low cost.

It is also worth recalling that the implications of HIV infection during pregnancy are enormous. As information becomes available about the problem in Jamaica, appropriate counseling and services may provide an important way of helping to maintain gains already made in maternal and child health. It is also likely that the National AIDS Program would have resources to contribute (16), and that projecting clinic activities into AIDS prevention and control will con-

tribute effectively to further expansion of perinatal care.

CONCLUSIONS

The general findings of the survey reported here can be summarized as follows:

Useful indexes are available for quantifying various aspects of the structural quality of health care provided by primary care clinics in Jamaica. These aspects relate to infrastructure, staffing, equipment and supplies, pharmaceuticals, diagnosis, counseling, laboratory testing, and related services such as family planning. Besides being used initially to measure the current quality of care, such indexes could be used in future follow-up studies where the cost of a comprehensive survey might be of concern.

By and large, we found that the public clinics surveyed were providing better perinatal diagnosis and counseling and family planning services than were the private facilities. However, these public facilities were generally in relatively poor repair and inadequately staffed, regardless of their level of service and location.

While the private clinics surveyed did not provide maternal and child care and family planning services as well as the public clinics, in general they had better staffing indexes and were better maintained, better able to provide timely results of laboratory testing, and better equipped and supplied than the public clinics. These latter differences were less evident between the private clinics and higher-level public clinics than they were between the private clinics and basic public clinics.

Only a few disparities were noted between the urban and rural public clinics, none of which were surprising. Specifically, it was found that the urban facilities had slightly better access to equipment, supplies, and pharmaceuticals than

their rural counterparts. On the other hand, the rural facilities tended to be in relatively better repair.

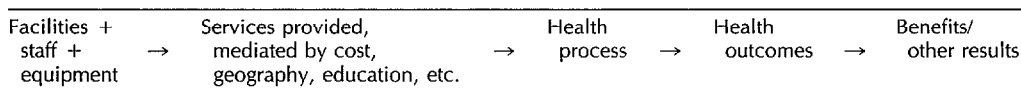
Comparing the basic and higher-level public clinics, the survey found that the basic clinics tended to be in better repair and to have a higher staffing index of combined midwife and nurse attendance than did the higher-level clinics. They also offered the same level of prenatal laboratory testing (with respect to the tests surveyed) as did the higher-level facilities. On the other hand, with respect to items covered by the survey, the higher-level facilities tended to be better equipped (with both basic and sophisticated equipment), to maintain their equipment better, to have more supplies and drugs on hand, and to obtain the results of basic laboratory tests more quickly than did the basic facilities. In sum, by and large the basic facilities appeared to provide most of the primary health care services surveyed that were provided by the higher-level clinics, but with less equipment and supplies on hand.

Maintenance and repair of medical equipment, which appears to be done relatively well in the private clinics, could be better evaluated if further information were gathered (17). Deficiencies in equipping or supplying all types of clinics can often be addressed by correcting specific isolated problems (see the Results and Discussion sections).

As distinct from various other reports on health care facilities in the developing world (3, 12), we did not find marked differences between urban versus rural and basic versus higher-level public clinics, a number of differences between the latter types being noteworthy but relatively slight. This suggests that the surveyed health care resources in Jamaica are reasonably evenly distributed to areas outside of major population centers and are not unduly concentrated in higher-level facilities. It also seems clear that pri-

vate clinics are able to provide some elements of primary health care in Jamaica, but that public clinics remain the mainstays for maternal and child health services and family planning.

In closing, it seems appropriate to recall the limited portion of the health care process examined by this survey and what this portion represents in terms of better health care outcomes. What we have been examining, in terms of the model below, falls within the realm of the column at the left.



Future studies of primary health care in Jamaica will need to determine if the measures of structural quality we have used are positively correlated with the health process and health outcomes (6). Considering the overall model, it is also possible to examine other mediating effects such as costs and education should these change in the future. Specific outcome data are already available for several elements of care, among them infant and maternal mortality, which suggests that these elements would provide good places for further research (16). Also, future efforts directed at improving health care services by raising various structural indexes could increase health facility utilization and, ideally, could help to reduce mortality. Within this context, the present survey helps to establish a baseline that could have significant long-term value in the future when primary care is improved and health outcomes change.

Despite the survey's limitations, as already seen it provides a basis for making several concrete recommendations to health authorities that could help to improve health care delivery at primary care clinics. Obviously, these recommenda-

tions need to be viewed within the larger context of the health care budget and other health care priorities being weighed by the Government of Jamaica. However, the survey's effect of setting forth specific determinants of primary health care quality provides a basis for increasing the number of targeted interventions and for trying in a reasonable manner to predict the impact these interventions can be expected to have upon primary health care in Jamaica.

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Symposium on Toxic Substances and the Nervous System

The Fifth International Symposium on Neurobehavioral Methods and Effects in Occupational and Environmental Health will be held in Cairo, Egypt, on 3–7 December 1994. It is being organized by the Egyptian Society of Pesticide Hazards and Cairo University, with the cooperation of the International Commission on Occupational Health.

The symposium is aimed at exchanging state-of-the-art information about ongoing studies regarding development and application of neurobehavioral methods and examination of the nervous system effects of occupational and environmental exposure to toxicants. Participants will also seek to develop strategies for sharing information in this field with colleagues in developing countries to aid in the design of prevention policies and clinical procedures.

Papers on relevant topics are invited. The deadline for abstracts is 11 July 1994. Additional information may be obtained from: Dr. Barry L. Johnson, Secretary for the Americas and Assistant Administrator, Agency for Toxic Substances and Disease Registry (ATSDR), Atlanta, Georgia 30333, USA; telephone 404-639-0700; fax 404-639-0744.