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Health Care Financing in Latin America and the Caribbean — Research Report No. 2

Financing and Costs of Health Services in Belize

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FOREWORD

This is the second in a series of technical reports on Health Care Financing in Latin America and the Caribbean (HCF/LAC), produced under contract with the U.S. Agency for International Development. Its authors worked through the International Resources Group, Ltd., under subcontract to the State University of New York at Stony Brook. Research for the study was designed and carried out in close cooperation with Belizean health authorities and staff members of USAID/Belize. A first draft of the report was subjected to detailed review at the second annual HCF/LAC workshop, held in Quito, Ecuador, in April 1987. The final draft was reviewed by Mr. Sam Dowding of USAID/Belize and Mr. Douglas Fairweather, Permanent Secretary of the Belizean Ministry of Health, prior to being printed for distribution.

The design of the study (based on an exploratory report by Mr. Jeremiah Norris), implementation of field research, data analysis, and preparation of the final report represent a team effort directed by Dr. Susan Ueber Raymond, who was assisted by Ms. Barbara Lewis and Mr. Paul Meissner. Belizean authorities who advised in the design and field research for the study included (in addition to Mr. Fairweather) Sir Edney Kane, Belizean Minister of Finance; Mr. Leo J. Cuellar, Manager of the Social Security Board; and Mr. Wayne Usher, Administrator of the Belize City Hospital.

Belize City Hospital personnel who cooperated closely with the researchers in compiling data on the organization and financial management of Belize City Hospital services included Dr. Gregorio Pott, Senior Medical Officer; Mrs. Russell, Head of Accounting; Mr. Raymond Lashley, Head of Central Medical Stores, and the department heads and staff of Belize City Hospital. In addition, the team benefitted from the assistance and advice of Mr. Jorge Nabett, Finance Officer, Ministry of Health; Mr. Jose Encalada, former Administrator of Santiago Castillo Hospital; Mr. John Turnbull, PAHO consultant; Dr. Mora Reddy, Stann Creek District Medical Officer; and USAID/Belize staff members Mr. Dowding and Ms. Mary Ellen Tanamly.

The final report was edited by Dr. Gretchen Gwynne, Research Associate to the HCF/LAC project.

Dieter K. Zschock
Director, HCF/LAC

EXECUTIVE SUMMARY

Responding to a request from Belizean officials, the USAID-sponsored project "Health Care Financing in Latin America and the Caribbean" (HCF/LAC) carried out a detailed examination of costs and financing patterns in the Belize health care system. The goal of the study was to establish a cost database, primarily for the Belize City Hospital (the government's central health care provider) and secondarily for other public curative and primary care institutions in the country. This database was needed to update the public medical service tariff schedule, developed during British rule, and was also to serve as a point of departure for more efficient public/social-security/private sector linkages in the delivery of health services. The study team also addressed the management structures and policy alternatives required to successfully implement a series of cost containment and revenue expansion options.

The findings of this cost study are of particular importance at this time in Belize. A new hospital, scheduled for completion in 1989, is under construction to replace the existing structure, which dates from the 1800s. The need for baseline cost data is therefore immediate, both in terms of tariff policy and in terms of facility budgeting. Moreover, the Government of Belize has recently instituted several changes in its methods of public budget development, most notably mandating a move from line-item to program budgeting. Thus both the methods and results of this study provide the Ministry of Health with important budgeting technology for use in conforming to new public budget parameters.

The Belizean economy is one of the most open in the region, with minimal government restriction and ownership of economic production mostly in private hands. The health sector represents a mix of public and private financing. The central government budget covers 56% of health sector expenditures, with an annual budget of over BZ $10 million (1). The private sector comprises 44% of health service outlays, with estimated expenditures of BZ $8 million. Most health facilitie , however, are government owned and operated, including the central Belize City Hospital, 6 district hospitals, and 2c health centers.

The Belize City Hospital (BCH), with 186 beds, is the largest inpatient facility in Belize, providing routine medical and surgical care to Belize City and its environs and serving as the national referral center for sophisticated medical and surgical treatment. It has no tertiary capability, however, and complex cases such as burn care, cardiac surgery, and eye surgery are sent abroad to other

Central American or Caribbean facilities or hospitals in the U.S.

The key data developed for the BCH include the following:

-- Total annual cost of BCH is $6.3 million.

-- Annual operating cost is $5.4 million per year.

-- One third of total costs are absorbed by indirect departments that do not deliver direct medical care, and by overhead.

-- Since all BCH physicians are on salary, payroll costs as a percentage of operating costs are higher than is normally seen in a medical facility of this level.

-- Average total cost per patient is $896 ($147 per patient day).

-- Average operating cost per patient is $737 ($121 per patient day).

-- There are significant differences in ward occupancy, with the children's medical ward lowest (38%) and the male medical ward highest (90%). Thus, although the cost per patient in the male ward is the highest in the hospital, its cost per bed day is lowest.

-- Comparing costs across wards, it is clear that BCH has evolved into an efficient provider of obstetrical and gynecological services. Nearly half of all admissions are ob/gyn cases, with operating costs that are the lowest in the hospital. Fairly efficient organization to provide this largely routine care contributes to cost control in this ward.

-- Overall costs are being pushed up by excess capacity, which probably exceeds stand-by needs, in the post-op and children's medical wards. Moreover, diagnostic-based unit costs for maintaining capability in such infrequently-treated categories as cancer care are also inflating BCH operating costs. While the facility needs to have stand-by capacity in such areas, its managers should look more closely at demand so as to reallocate any excess capacity to other high-demand areas.

The study supplies detailed updated tariff schedules for radiology and laboratory procedures. It also supplies data on patient costs per day by hospital ward, providing a basis for government decisions on overall inpatient charges as well

as budgeting for the new hospital. Cost data for diagnostic related groups (DRGs) are also provided, although these are estimates only. More reliable DRG costs must await improvements in the BCH patient records system so as to more directly link diagnoses to individual costs.

The study also examines the six district hospitals in Belize. Using a similar step-down methodology, total annual costs per hospital average $457,000. Payroll accounts for an average of 50% of total annual costs, and operating costs average 70% of total costs. The annual cost per patient averages $339, ranging between $197 and $400. Annual cost per patient day averages $122, with a range of $73-$182. It is interesting to note that the cost per patient day at BCH falls within that of district hospitals, even though its annual cost per patient is much greater. An average length of stay at BCH, which is three times that of the districts, is largely responsible.

The district hospitals are operating significantly below capacity. Bed occupancy averages as low as 17% and, even at the busiest district facility, never more than 50%. The district hospitals thus represent serious excess capacity, as well as excess costs, for the Ministry of Health. These Ministry resources might better be spent on improved management (e.g., evening and weekend on-site administration of BCH) than on staffing and maintaining underutilized facilities at their current bed size.

The study reviews the status of the private medical sector in Belize, and the cost and finance relationship between the Social Security Board and the overall health system. The SSB makes a payment of $50,000 annually to the Ministry of Finance to cover public medical facility treatment of work-related injuries. A key policy question in Belize involves the adequacy of this payment. Since no differentiation in the use of inpatient or outpatient hospital services for Social Security beneficiaries is available, a series of simulations was prepared showing the combination of services that could be purchased for $50,000 at current public health facility costs.

A number of options were developed for the Government of Belize in which various measures to contain costs and increase the revenue base of the health sector are presented. These options were categorized as either short term (i.e., available for immediate action) or long term (i.e., requiring some amount of prerequisite policy or organizational change). More importantly, the options were grouped according to their locus of responsibility; changes within the capability of BCH or the district hospitals were separated from those requiring Ministry of Health authority, and the latter were distinguished from those requiring broader Government negotiation or policy change. The options focus on actions that can be taken by Belize itself, without additional donor

aid or further infusion of Ministry of Finance public monies.

General cost management options include:

-- reassigning responsibility for costs to the individual expense centers, so cost accountability and expenditure responsibility coincide;

-- establishing departmental budgets within BCH;

-- diffusing more cost information to departments;

-- establishing productivity goals;

-- creating incentives systems for cost containment;

-- adjusting service and bed mix to better meet demand; and

-- instituting regular patient questionnaires and follow-up to track improvements.

Within BCH, immediate opportunities exist for controlling costs via

-- contracting out auxiliary services on a fixed-cost basis;

-- reducing excessive stand-by bed capacity;

-- applying FIFO accounting procedures to the supply procurement system;

-- including a patient cost accounting sheet as part of patient records in order to match diagnosis and treatment with the unit costs of services;

-- standardizing equipment inventory with purchase cost information; and

-- attaching costs to all itemized shipments of supplies between BCH and district facilities.

Options open to the Ministry of Health include:

-- assessing the recurrent costs of all donor "gifts";

-- establishing a list of needed equipment and actively seeking specific assistance for acquiring this equipment from outside donors;

-- promoting cost accountability at the district level, especially via improved cost control training of

district medical officers;

-- negotiating with t e Ministry of Finance to retain within the Ministry of Health's account a percentage of revenue earned in Ministry facilities;

-- establishing and enforcing a tariff system for both inpatient and certain outpatient services; and

-- renting or leasing space in the new hospital to private providers, and additionally providing radiology and laboratory services to private physician users for a fully loaded fee.

The study concludes with a series of recommendations to the Government, Social Security Board, and private sector, for steps that are essential for moving forward toward a resolution of Belize's health cost/finance problems.

For the Ministry of Health, the recommendations are three-fold: first, to immediately institute a patient cost records system at BCH; to collect 6 months' worth of data from this system, and to use these data to supplement key missing cost analyses in this report, especially regarding patient diagnosis and surgery costs; second, to conduct workshops or seminars with the joint participation of all relevant health sector actors -- Ministries of Health and Finance, private sector, Social Security and major donors -- to review the study's cost findings and methods and to discuss options for joint cost control and financing efforts; and third, to carry out similar cost analyses at the Belmopan and Orange Walk Hospitals (which are to become regional facilities), so that their administrators are trained in cost analyses and data can be fed into health system budgeting when operating costs of the new central hospital begin to affect the health system.

It is recommended that the Social Security Board seek assistance in conducting a full analysis of its health finance options in anticipation of future health benefits payouts. This should include both its health services acquisition options (e.g., purchase versus equity participation) and its financing options (e.g., using reserves versus increasing pay-in rates).

Finally, two recommendations are directed to the private sector. First, major employers should examine alternate methods of providing for health care benefits, to control costs until such time as SSB benefits are expanded; and second, private providers should seek help in acquiring greater expertise in mechanisms for providing expanded services (e.g., prepayment schemes, various group practice alternatives, etc.) and for marketing services, under these new organizational modes, to major groups of purchasers (e.g., employers).

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LIST OF ABBREVIATIONS

ALOS	Average Length of Stay
BCH	Belize City Hospital
CIDA	Canadian International Development Agency
COGU	Cost of goods used
DMO	District Medical Officer
DMS	Director of Medical Services
DRG	Diagnostic related group
FTE	Full Time Equivalent
HCF/LAC	Health Care Financing in Latin America and the Caribbean
IRG	International Resources Group, Ltd.
MOF	Ministry of Finance
MOH	Ministry of Health
PNO	Principal Nursing Officer
SSB	Social Security Board
USAID	United States Agency for International Development
UNICEF	United Nations International Children's Education Fund

I. INTRODUCTION

A. Objectives

Between October 19 and November 22, 1986, a team of specialists working under the auspices of the USAID-sponsored project "Health Care Financing in Latin America and the Caribbean" (HCF/LAC) carried out a detailed examination of costs and financing patterns in the Belize health care system. The goal of the study was to establish a cost database, primarily for the Belize City Hospital (the central health care provider in Belize) and secondarily for other curative and primary care institutions in the country. This database was needed to update the public medical service 1973 tariff schedule (Government of Belize 1973), and was to serve as a point of departure for more efficient public/social-security/private sector linkages in the delivery of health services. The study team also addressed the management structures necessary to make the changes it suggested efficiently and effectively, and the options for policy reform to make all of this possible.

The study is of particular importance at this point in time in Belize. A new hospital is under construction, which will replace the existing 1800s structure by 1989. The need for baseline cost data, therefore, is immediate, both in terms of tariff policy and facility budgeting. Moreover, the Government of Belize has recently instituted program budgeting requirements for all public ministries. Thus, both the methods and the results of the study represent important budget technology tools for the Ministry of Health in conforming to these new budgeting requirements.

B. The Setting for Health Cost Analysis

It is tempting to define the major cost and finance problems in the health sector of Belize as a question of not enough money to meet too many heath care needs, and indeed there is surface evidence to support such a position. Public health budgets are stretched to meet needs, and often snap in the process. An aging main hospital struggles to keep drugs on pharmacy shelves and utility bills paid. Per capita public expenditures on health care have declined since 1981, although actual budgets have increased. A recently-established private hospital closed its doors, unable to break even let alone make an acceptable profit. Offers to sell the hospital to private physician investors were passed up for fear of a market that is seen as financially shallow, with the only purchaser of the most sophisticated hospital

facility in the country likely to be a hotel chain.

But appearances represent only a small part of reality. The Belizean economy is, by and large, relatively sound, with significant development potential. Although the country still faces some basic challenges in child health, the effects of past public health and disease control programs are taking hold. Life expectancy has increased to 66 years, 68 for women. Infant and child death rates have dropped, halved since 1970 (Table I.1).

A relatively new Social Security program has established a recurrent financing base for health services to the employed population. Employers, furthermore, have a history of providing additional health insurance benefits to their employees. Consumer expenditures for health care are common, whether within the private pharmacy sector, for the services of physicians practicing purely in the private sector, or as payment for services at public hospitals and clinics.

The public health budget totals BZ $60 (1) per capita, which amounts to 10% of the national budget (Government of Belize 1986) -- a relatively large allocation for a country at the income level of Belize. When combined with private expenditures, the figure rises to $109 per capita, or 5% of GNP.

C. Costs and Finance

Prior to the analysis contained in this report, the actual unit costs for delivering health services in Belize were unknown. As a result, neither efforts to budget more efficiently in the health sector nor to revise revenue generation approaches could be effectively pursued or evaluated. Thus, defining and analyzing these costs is a government priority. But a sophisticated knowledge of costs without an equally sophisticated knowledge of the options available for financing those costs will do little to assist Belizean health leaders, public or private, in their efforts to provide expanded quality services. A study of costs should be seen as a contribution to the creation of a viable, self-sustaining health sector.

Creating a viable, sustainable, self-supporting health system in Belize is not simply a question of spending more public money, or even necessarily of increasing donor financing for recurrent costs in the health sector (although significant basic investment roles for donors remain). Rather, it is first of all a question of channeling existing dollars more effectively, improving the tracking and management of those dollars, and appreciating the opportunities for creating new streams of revenue into health services -- public and private -- which will reduce uncontrolled public budget outflows.

This is not, admittedly, an easy task, but neither is it a task that must be undertaken in one massive step. There are many definable, isolated opportunities for improved cost control and revenue generation in the health sector in Belize. Such opportunities can be exploited quickly, while longer-term options for improving and rationalizing the overall financing of health care in Belize are designed and implemented. Providing the empirical base for analyzing and responding to such opportunities has been the goal of the study reported in this document.

TABLE I.1

REGIONAL COMPARISON OF MAJOR HEALTH INDICATORS
1983

Country	Crude birth rate (a)	Crude death rate (b)	Life expectancy at birth (c)	Infant mortality rate (d)	Maternal death rate (e)	Infant death rate from diarrheal diseases 1984 (f)	(1970) (f)
Belize	38.7	5.0**	66.1	22.7	5.0	227.6	(823.6)
Costa Rica	30.0	3.9	73.0	18.6	12.6*	161.3	(1,509.5)
Honduras	38.7	4.7	58.8	70.0	5.0	541.5	(792.7)
Guatemala	38.4	10.1	59.0	81.1	12.3	1,128.0	(1,817.8)
Mexico	32.7*	5.6*	65.7	33.0	9.1	743.1	(1,802.1)
El Salvador	30.5	6.9	64.8	43.8	7.4	N/A	(N/A)

Source: PAHO, 1986.

Notes: (a) - per 1,000 population
(b) - per 1,000 population
(c) - 1980-1985 period
(d) - per 1000 live births
(e) - per 10,000 live births
(f) - per 100,000 live births, and children under one year of age

* - 1982
** - 1984

II. BACKGROUND

A. The Belize Economy

Belize is a country with a population of only 165,000, 52% of which resides in urban areas. The country has the lowest population density in Central America, and one of the lowest in the world: 6 persons per km2 (World Bank 1984a). Its annual population growth rate of 1.9% (1970-1980) is modest, relative to the economic potential of the country and its ability to sustain a larger population, and has resulted mainly from the emigration of a considerable number of Belizeans to the U.S. With a continued high birth rate (40 per 1000), a declining death rate, and decreased emigration, the prospects are for more rapid population growth in the future.

Belize represents one of the most open economies in the region, with minimal government restriction and ownership of economic production mostly in private hands. GNP per capita is relatively evenly distributed, and both local and foreign private investment dominate the economy. Public sector activities represent about 30% of GDP (World Bank 1984a).

Since 1984, Belize has benefited from an upturn in exports, important new foreign investment, and expanded international economic assistance, all of which have given a boost to the national economy. Moreover, duty-free access to U.S. markets, via the policies of the Caribbean Basin Initiative, has helped to stimulate investment and to expand the nature and volume of exports (CCAA 1986).

The major sources of revenue to the Belize government are import duties and direct taxes (2). Import duties provide 35% of total revenue, and rates are based on the Caricom Common External Tariff system. Direct taxes provide 20% of revenue. The progressive income tax system reaches a maximum of 50% on annual income of $60,000 or more. Private companies pay a flat rate of 45% on income. Land taxes are tied to the type of land, with higher rates assessed for land near publicly-maintained roads or on the coast.

Access to credit, particularly small business credit and/or long-term credit, remains a problem, as does the economy's continued dependence on international markets for its sugar and citrus exports and its lack of experienced program managers in both the public or private sectors. On the other hand, national government finances have traditionally been well managed. Belize has the lowest debt service ratio in the region -- less than 5% of domestic exports. While this will increase in the next several years,

it is expected to decrease in the late 1990s as exports grow. By then the country's balance of payments deficit is expected to have fallen to 8% of GDP.

The range of investment opportunities in Belize, the government's conscious effort to promote savings and investment, and continued policies of export promotion and high-priority public investment leave most economic observers relatively optimistic about the economic future of Belize compared to its regional neighbors. This potential economic depth and pragmatic flexibiilty provide the stage upon which the financing of health care costs can be carried out.

B. The Health Sector

1. Health Status (3). Trends in demographic structure and morbidity/mortality in Belize bode ill for future cost control in the health sector, and thus will have significant implications for health care finance. In the last 10 or 15 years, health-related parameters in Belize have shifted dramatically. While it is true that 46% of the population is under 15 years of age (down from 49% in 1970), the most serious cost implications are suggested by trends at the other end of the demographic pyramid. Life expectancy now averages over 66 years, up from 59 in 1970. Average life expectancy at birth for women is 68 years. Statistical corrections for infant and child mortality result in an average life expectancy in excess of 70 years.

The infant mortality rate has been halved since 1976. The crude death rate is down to 5.0 per 1000 population, from 6.2 in 1973. Immunization coverage of infants has doubled since 1979. Now, 81% of infants receive BCG vaccinations; 59% of children have had DPT; 61% have received OPV, and 43% have been immunized against measles, a ten-fold increase since 1979 (Smith 1986).

These factors will combine over the next 10 years to change morbidity and mortality patterns radically -- with significant implications for costs. Chronic diseases such as cardio-vascular problems, renal diseases, and cancer can be expected to increase, relative to infectious and parasitic diseases, as the population ages and the economy grows. Indeed, heart disease, other chronic diseases (bronchitis, emphysema, cancer and hypertension), accidents and trauma have begun to dominate Belize morbidity and mortality statistics, replacing such conditions as infectious diseases (see Table II.1). In turn, these disease patterns will increase the costs of treatment compared to the past, since unit costs are higher for these diseases than for prevention programs targeted at maternal/child health problems or for treatment of basic childhood diseases.

2. Organization. The health sector in Belize represents a mix of public and private services and financing sources. Pluralism in the health sector includes delivery of services and programs by the Ministry of Health, with a budget of over $10 million (see Table II.2); financing of some services for employed populations by the Social Security Board; additional financing of services by private employers (often in addition to Social Security coverage); a strong purely private medical sector (physicians, laboratories, x-ray services) which is reimbursed either via straight fee-for-service arrangements or corporate agreements and which is estimated at $8 million (Government of Belize 1981); and a growing medical supplies sector, including private pharmacies and import houses.

Most facilities are government owned and run. These include 7 hospitals and 28 health clinics (see Tables II.3 and II.4 for facility comparison). There are two additional health care clinics operated by private denominational groups. On the other hand, many medical personnel in Belize work entirely or partially in the private sector. Most pharmacists are private, and three private laboratories and several private radiology facilities also employ health personnel. The physician community includes 20 purely private physicians who operate sole practices. Of the 45 public sector physicians, most operate private practices outside of their government duties.

3. Services. General medical and surgical services predominate in the health system in Belize, with few specialties available. The Ministry of Health operates all public health programs, with special emphasis on preventive measures, especially in maternal and child health and malaria control.

The hospital facilities offer only general medicine and surgery. The largest is the Belize City Hospital (BCH), which contains 186 beds and offers general medical services and basic surgery. It does not, however, have such surgical specializations as cardiac care or eye surgery, or medical specialists in such basic areas as ENT, and is not able to deal with complex trauma such as burn care. Patients needing such services are sent abroad, usually to Guatemala, Mexico, Jamaica (University of the West Indies), Costa Rica, New Orleans, or Miami.

Physicians practicing exclusively in the private sector in Belize have no access to public hospitals. If their private patients require hospitalization, they must either be referred to a physician employed by the government who can admit them to a public hospital, or be sent to facilities outside the country. The lack of private options for hospitalization has been thought to be a function of a limited market for private medical services, given that a

private hospital designed to meet this need has recently failed. However, of greater significance is the structure of the financing arrangements in Belize, which inhibits the development of efficient private sector resources in health and medical facilities.

4. Policy. How are the Ministry of Health, and public policy in general, positioned to respond to the financial implications of this pattern? Until this study, no actor in the Belize health sector -- Ministry of Health, Social Security, Ministry of Finance, private providers, or employers -- had any empirical information on the current costs of health care -- nor, therefore, on the implications of changing utilization and disease patterns on costs and finance. Thus there is considerable work to be done in examining and adopting policy options that will allow a flexible and affordable financing response to the costs of the future.

There is one bright note, however. The official policy of the Ministry of Health acknowledges that government may not always be capable of assuming total responsibility for health care financing. It goes on to state that "efforts will therefore be made to identify alternate sources of funding to supplement government finance of health services" (MOH 1983a). Such a position presents significant opportunities for examining alternative responses to the financial implications of a better understanding of health system costs.

TABLE II.1

PRINCIPAL CAUSES OF DEATH FROM DISEASES IN BELIZE
(rates per 10,000 population)
1981 and 1984

Causes	1981			1984		
	Rank	Number	Rate	Rank	Number	Rate
Heart diseases	1	149	10.1	1	71	4.4
Bronchitis, emphysema	7	35	2.4	2	69	4.3
Malignant neoplasms	4	55	3.7	3	56	3.5
Pneumonia	3	64	4.4	4	52	3.2
Accidents	9	24	1.6	5	42	2.6
Certain conditions originating in the perinatal period	2	70	4.8	6	40	2.5
Cerebrovascular disease	5	51	3.5	7	38	2.3
Septicemia	8	28	1.9	8	34	2.1
Nutritional deficiencies	11	6	0.4	9	27	1.7
Hypertension	10	19	1.3	10	27	1.7
Infectious intestinal diseases	6	41	2.8	11	26	1.6

TABLE II.2

PUBLIC HEALTH BUDGETS
(in thousands of BZ dollars)
1984-87

	1984-85	1985-86	1986-87
Total, Ministry of Health *	10,658	10,023	10,723
Health Services	10,231	9,641	10,256
Health Services as % of Ministry	96	96	96
Ministry as % of National Budget	10	10	10

* - Includes allocations for the "Labour and Sports" Section of the Ministry of Health, Labour, and Sports.

TABLE II.3

COMPARISONS AMONG BELIZEAN HOSPITALS: FACILITIES
1985

	Belize City	Orange Walk	Corozal	Belmopan	San Ignacio	Dangriga	Punta Gorda
Population	55,100	25,800	26,800		26,500*	16,300	13,600
Beds	186	28	28	47	28	47	30
Persons/bed	296	921	957		353*	347	453
Admissions	7,572	1,842	1,030	1,483	1,216	1,215	1,104
Discharges	7,577	1,820	1,015	1,467	1,200	1,173	1,087
Deaths	255	25	17	18	19	17	14
Patient days	46,398	5,004	2,248	4,996	3,606	3,055	4,281
ALOS	6.1	2.7	2.1	3.3	2.9	2.5	3.8
Bed occupancy	70.2	48.9	21.9	29.1	35.2	17.8	39.1
Referrals ot BCH	---	142	95	22	102	118	62

	Psychiatric Hospital	Old Age Infirmary
Beds	83	48
Admissions	247	7
Patient days	32,345	12,775
ALOS	131.0	3193.8
Bed occupancy	106.8	72.9

Note: * - Both Belmopan and San Ignacio are in Cayo district.

TABLE II.4

MEDICAL FACILITY STAFFING

	Belize City Hospital	Orange Walk	Corozal	Belmopan	San Ignacio	Dangriga	Punta Gorda	Old Age Infirmary	Rockview Psychiatric Hospital
Physicians	23	2	2	2	2	2	2	-	3
Nursing staff	136	10	13	14	11	9	9	-	6
Medical Auxiliaries:									
Pharmacy	12	1	1	1	1	1	1	-	-
Laboratory	8	1	1	1	1	1	1	-	-
Radiology	7	-	-	-	-	-	-	-	-
Other	3	1	1	7	1	2	1	10	29
Domestic staff	19.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medical records	5	-	-	-	-	-	-	-	-

III. COST RELATIONSHIPS

Before turning to the central issue of service costs within major Belize medical facilities, the cost interrelationships between the Belize City Hospital, the central office of the Ministry of Health, and the district hospitals and health centers must be clarified. This chapter explains the cost trail for the districts, vertical programs, supplies, and the Belize City Hospital.

Ultimately, both the Permanent Secretary and the Director of Health Services are responsible for the activities of the public health system. Budgetary monitoring, however, is carried out by different people at different levels. At the central level, it is the Finance Officer who tracks expenditures as programs submit monthly expenditure reports. His data are only as timely or accurate as the quality of the reports he receives.

A. Belize City Hospital

Expenditure information for BCH is available from the BCH accountant's office. Personnel, food, and supplies are paid there, not only for the hospital but also for areas not directly associated with BCH: the Belize School of Nursing, the Infirmary, and Rockview Mental Hospital.

As previously mentioned, supplies costs for the whole country are monitored by the hospital accountant, as are fuel and maintenance costs for vehicles. Much of this is done on a global district basis, not on an individual program basis. Attributing supplies and vehicle expenses to actual program beneficiaries, therefore, is a significant unraveling task.

Expenditures within the hospital are broken down by individual line item, but these are not disaggregated to the program or departmental level. There are different Personnel categories: salaries for all employees grouped together by function, by service, or by position type (i.e., established or open vote) (4); subsistence for doctors, nurses, administrative staff, and medical auxiliaries; private practice allowances for physicians; overtime for physicians, drivers, nurses and medical auxiliaries; and even training costs grouped with the salaries of midwives as a separate category. General social security payments for employees is a category unto itself.

Other line items are: vehicles (broken into maintenance, fuel, and miscellaneous); food, which includes burial costs for indigents, food-related supplies, and actual food

purchases; materials, including cleaning aids, medical gases, minor repairs to the Medical Building, materials (replacement parts) for equipment, uniform allowances for nurses, and miscellaneous; stationery for administrative purposes throughout the complex; public utility, which covers costs for the hospital as well as the three previously-mentioned areas; repairs to the Medical Building (really a capital cost fund); and drugs, broken into medical and surgical, pharmaceutical, X-ray, and pathology and miscellaneous (national and international freight charges, etc.).

It is at this point that the cost trail for the hospital ends, and the task of unraveling expenditures into costs by function and department begins. The methodology used for this is described in detail in Appendix A.

B. Districts

At the district level, the District Medical Officer (DMO), a physician at the district hospital, is accountable for all expenditures incurred in his district. He is assisted by a clerk who keeps track of all expenses for the various programs operating in the district. Although accountable for all expenditures, the DMO does not control all spending decisions. This responsibility lies with individual program heads. For example, the DMO is in charge of deciding how much will be spent in the hospital, while the Public Health Nurse decides how much (and where) to spend for the maternal and child health program, and the public health inspector makes these decisions on matters relating to environmental health.

It is unusual for those who actually make expenditure decisions at this level to track budgetary consequences. The only tracking that takes place relates to the spending down of line items. What is known is simply how much of the personnel or the supplies line item has been spent during a particular month. Who spent how much and where it was spent is not recorded separately. Costs are not attached to shipments of supplies, so the only accurate cost information available is from direct billings for minor items and for personnel. Inevitably, it becomes necessary to unravel these expenditures and assign them to the actual activity category on which they were spent.

C. Vertical Programs

For individually-organized program activities, such as malaria control or environmental sanitation, responsibility and full accountability come closer together. Medical Officers of Health, who are responsible for these programs, receive budget allotments for their monthly expenses. They authorize expenditures, and their accountants are able to

track expenses as accounts are spent down. Because of the vertical structure and specific task assignment of their programs, managers know when their allotments to individual districts run out.

D. Supplies

Expenses for medical and pharmaceutical supplies represent a totally separate audit. Overall responsibility for purchasing and distributing supplies lies with the Supplies Officer in charge of Central Medical Stores, located at BCH. The dispenser in each district hospital controls requisitioning and distribution of medical supplies and pharmaceuticals for the hospital and community health programs in the district. Each vertical program requisitions its supplies through its own central office. Cost monitoring for supplies sent out to districts is not done anywhere in the system. Expenditures of Central Medical Stores at the national level are monitored by the accountant's office at BCH.

IV. ANALYSIS OF THE COSTS OF BELIZE CITY HOSPITAL

Identifying, understanding, and prioritizing the costs of the health care system has at least two important uses. First, this will aid in determining how to finance the current services and future needs of the system. Second (and of equal importance), it will enable administrators and department heads to manage their resources so as to improve the quality of medical treatment and the efficiency of service programs. Both of these issues -- the implications for financing and the implications for management -- are discussed elsewhere in this report. This chapter provides a closer analysis of the costs of the major inpatient service provider, the Belize City Hospital. (Appendix B provides definitions of the technical terms used throughout the chapter and elsewhere in this document.)

A. Caveats

Before proceeding with the cost analysis, two important caveats must be set out. First, cost assessments in this study have been made only within the BCH. No comparable data are available from similar institutions in other Central American or Caribbean countries, so no judgements are made as to the relative adequacy of BCH unit costs. For purposes of illustration, however, the analysis periodically presents similar data for community hospitals with between 100 and 199 beds in central southern states in the U.S. (AHA 1985).

Second, the hospital administration and management implications of BCH cost data are tentative. The BCH does not track cost or procedure data by patient. Until such time as a sample of such detailed data is available, pragmatic management implications in this chapter and in Chapter IX must be considered preliminary.

B. Overview

The Belize City Hospital, part of which dates from 1847, is located on the shore of the Caribbean Sea, where salt air increases facility maintenance costs. Capital valuation of the land it occupies is difficult, since this is prime real estate.

The largest inpatient medical facility in Belize, BCH reported an average occupancy rate of 70% and an average length of stay of 6.1 days in 1985 (MOH 1985a). This occupancy rate masks significant differences among wards: the children's medical ward has the lowest occupancy rate (38.5%), and the men's medical the highest (89.7%). With a

large number of geriatric cases, the latter is the only ward with occupancy in excess of 80% (BCH 1985b). The hospital serves both as the main inpatient facility for Belize City and as a referral facility for patients from district hospitals needing the wider range of services available at BCH.

Inpatient hospital services are divided into six main wards, each with approximately 25 beds, plus a 12-bed nursery and a 12- bed specialty unit (referred to as C3) for children with gastroenteritis and malnutrition. The hospital has two operating rooms, and offers laboratory, radiology, and emergency services as well as inpatient and outpatient physiotherapy. The outpatient clinics offer a range of dental, opthalmology, chest, psychiatric, pediatric, medical, surgical, and obstetric programs. For 1985 the hospital reported 7008 discharges and 62, 156 outpatient and casualty visits (MOH 1985b). The following table summarizes the basic ward data for BCH.

WARD UTILIZATION, BELIZE CITY HOSPITAL
Fiscal 1984 - 1985

	Beds	% Total Discharges	ALOS	Bed Occupancy
Female Medical	25	8.4%	9.5	66.2%
Male Medical*	17	9.4%	11.5	89.4%
Male Surgical*	11			
Children's Medical	15	2.3%	9.5	38.5%
Female Surgical	25	16.8%	5.1	70.0%
Children's Surgical*	16	15.0%	7.8	78.6%
Children's Specialty*	12			
Post-Operative	24	10.8%	7.3	69.1%
Maternity	34	30.6%	2.9	69.9%
Nursery	7	6.6%	4.0	46.5%

*ALOS and occupancy rates not available by this breakdown.

BCH functions as a secondary-level care facility, providing many of the same routine services as the district

hospitals but offering more sophisticated and specialized treatment for a number of diseases. Table IV.1 identifies five medical problems for which more than half of the patients in Belize are hospitalized at BCH. For four of them, the main treatment required is surgery. In these areas, BCH is apparently managing a sizeable number of patients referred from the other districts, in addition to patients who use it as their local, neighborhood hospital.

C. Overall Assessment

1. Overall Costs. The total expenditure for BCH in fiscal 1985/86 was $6.3 million. By definition, this sum includes annual operating costs and the annual value of land, buildings, and equipment. It reflects the amount actually expended on hospital services, exclusive of related programs such as the School of Nursing or support for the district hospitals but inclusive of administrative support from the Central Office of the Ministry of Health.

This figure contrasts markedly with the official 1985/1986 budget for the Belize City Hospital of $2,875,000 (Government of Belize 1986), because that budget does not assign supply, capital, or central support costs to BCH. For example, goods purchased for the hospital through Central Medical Stores are grouped with supplies for the overall country under budget line items for Central Medical Stores. Eighteen percent of the total, or $1,117,000, is tied up in the capital costs of equipment, buildings and land (see Table IV.2). Personnel costs accounted for 47% of total annual hospital costs, and supplies for the remaining 35% of total.

2. Payroll Costs. Payroll expenses represent 55% of operating costs. While it is true that the delivery of health care services is labor-intensive, 55% is nonetheless a relatively high proportion of resources to commit to personnel. In non-profit, 100-199 bed community hospitals in the south of the U.S., payroll accounts for 45% - 48% of operating costs, despite much higher hourly labor costs (AHA 1985).

Salaries of physician specialists and medical officers comprise 25% of BCH payroll expenses. The physician payroll alone accounts for 7% of total annual operating costs. Without physician costs, 48% of the total operating costs are payroll expenses -- a more reasonable percentage. Cost data alone do not allow one to say whether the hospital has too small or too large a medical staff. However, because the physician payroll is burdensome among the expenses of the hospital, alternate approaches to paying for medical care, discussed in the options section of this report, should be carefully studied.

Other ways to examine payroll expense are by the

investment per bed or the number of full time equivalent (FTE) staff per bed or per patient. With 186 beds, BCH committed $15,780 in payroll expense per bed. FTE ratios are 2.07 per bed and 3.47 per patient, which compare favorably to those for similarly-sized non-profit community hospitals in the U.S. (2.7 FTE/Bed and 4.1 FTE/patient) and for similarly-sized U.S. state government hospitals (2.44 FTE/bed and 3.69 FTE/patient) (AHA 1985).

3. Costs by Service Area. The total costs of BCH were analyzed by major service area (see Appendix A). Figure IV.1 presents the overall cost distribution among indirect departments, inpatient wards, outpatient programs, laboratory, radiology, and dispensary departments. Nearly one third of the hospital's total costs are related to indirect departments or overhead (Table IV.2). Nearly half these costs are personnel, supplies, and equipment for patient wards and the operating theatre. Laboratory, radiology, and dispensary accounted for 15% of indirect costs (see Table IV.3). The distribution of costs is presented in Figure IV.2, which compares the relationship between total and operating costs for each service area. In general, capital costs are about 15% of total, but the ratios for radiology (capital costs at 39%) and for laboratory (capital costs at 55%) reflect the major equipment investment in radiology and the large building assignment to laboratory.

Within each service area, the distribution among the component costs of personnel, supplies, and capital equipment were examined (Table IV.2 and Figure IV.3). Fifty-eight percent of the costs of the patient wards were composed of the personnel costs for physicians, nurses, attendants, and domestic staff. Inpatient wards, which occupy 39% of the hospital's square footage, were assigned the highest proportion of the building costs. Among indirect departments, supplies were the largest cost component, at 53% percent. A cursory examination of the components of these supply costs indicates that raw food for dietary needs, and telephone and utilities costs, are the largest line items of this 53%.

4. Ward and Diagnosis Costs Per Patient. The types of patients seen at BCH were described previously, but are briefly reviewed here within the context of the differences in costs by type of patient and by type of ward (5). Sixty-three percent of the patients were in obstetrics, gynecology, and pediatrics. Of these, 48% were in obstetrics and gynecology. Fifty six-percent of this category (27% of total patients) delivered babies, and the remaining 44% were hospitalized for pre-natal or other gynecological care (21% of total patients). No other program approached this volume of activity. The next highest proportion were digestive system disorders (ulcers, hernias, appendicitis, etc.) at 7% and orthopedic care at 6%. The most frequent reasons for hospitalization for children were perinatal problems,

gastroenteritis, pneumonia, and a variety of orthopedic problems.

The table below summarizes the various unit costs of the BCH wards. The costs per patient unit reflect a mix of severity of illness, length of stay, occupancy rate, and volume of patients.

UNIT COSTS OF BCH WARDS

Ward	Beds	Total Cost Per Patient	Cost Per Patient Day	Cost Per Bed Day
Maternity	34	$306	105.52	$ 74.48
Female Medical	25	926	97.47	85.10
Female Surgical	25	528	103.53	121.00
Male Medical*	17	2997	88.46	75.95
Male Surgical*	11			
Post Operative	24	959	131.37	129.65
Children's Medical	15	732	77.05	105.22
Children's Specialty*	12	986	82.49	84.19
Children's Surgical*	16			
Nursery	7	382	95.50	162.08

* Existing wards subdivided by disease or condition by Finance Team Specialist and hospital Chief Medical Officer. ALOS and occupancy rates not available by this breakdown.

With the highest volume of patients, short lengths of stay, and few demands on complex services, the maternity ward, at $306, had the lowest average cost per patient. Its

relatively high ward occupancy gives it the lowest bed day cost. At the other end of the spectrum, the male surgical ward, which manages cases with infections and other surgical complications, had the highest average cost per patient, $2997.

The cost per patient in surgical wards is much higher than in medical wards due to the costs of the operating theatre. Since operating theatre use was not costed by time in surgery nor by any other measure of complexity, an average cost per patient ($352) was applied to all patients in surgical wards. The base cost of the male surgical unit (about $1900 before adding the operating theatre allocation) was nonetheless significantly higher than any other patient ward, reflecting low volume, greater complexity of care, and longer lengths of stay. However, with the highest occupancy rate at BCH, the combined male medical/surgical ward had one of the lowest costs per bed day.

Volume and complexity of care again played an important role in comparing the costs of the female medical ward with the female surgical ward. Given its higher volume (two and a half times the number of patients), the per-patient costs of the female surgical ward ($528) remained lower than those of the female medical ward ($926). This pattern is in contrast to that of the equivalent male wards because so many of the female surgical cases are routine Caesarian sections, without the demand for services and longer lengths of stay that characterize the male surgical unit.

The children's wards for medical care and specialty treatment of malnutrition and infectious diseases were below average at $682 and $714, and the children's surgical ward was above average at $1016. Again, the effect of occupancy can be seen; low occupancy rates change these average cost levels to some of the highest at the BCH per bed day. This phenomenon is relatively recent. New programs in immunization and oral rehydration have significantly reduced pediatric admissions, and in this new situation excess capacity is reflected in high bed day costs to maintain unoccupied capacity.

5. Discharge Costs. BCH reported 7008 discharges in 1985, or $896 per patient in total hospital costs and $737 per patient in total operating costs. This averages $147 per patient day in total costs, or $121 in operating costs. Both figures are significantly higher than the costs per patient at district hospitals (see Chapter V), even given the sheer volume of patients treated at BCH. Part of the difference lies in the broader range of types of cases treated at BCH, and part in the much more sophisticated surgical services available in the city. The following table illustrates the

differences between BCH costs and those of other institutions.

COST COMPARISONS: BELIZEAN HOSPITALS

	Total Cost Per Patient	Operating Cost per Patient
Belize City Hospital	$896	$737
Belmopan	377	303
Orange Walk	197	146
Corozal	383	296
San Ignacio	290	213
Dangriga	388	313
Punta Gorda	400	317

D. Tariff Update

One of the factors that motivated this cost analysis was the Government's need to update its hospital tariff schedules. Tables IV.4, IV.5, and IV.6 provide the costs per disease, per radiology examination, and for specific, frequently-performed laboratory tests.

The costs for radiology examinations and laboratory tests were prepared separately. These costs are not included in the cost per patient diagnosis because the available data did not allow a clear link between the diagnosis and the number and types of examinations performed. More specific data, such as that provided by a patient cost tracking records sytem (see Chapter IX), would be necessary to develop a comprehensive cost picture for an individual patient.

1. Radiology and Laboratory Tariff Schedules. The revised tariff schedules in Tables IV.5 and IV.6 provide initial cost recovery parameters for these two potential hospital revenue centers. Recovering full costs in radiology would normally mean charging between $20 and $35 per procedure. The three radiology tests most radically out of line with these costs are barium procedures ($74 for barium enema, $57 for barium meal) and IVUs ($66 per procedure). Routine laboratory test costs, in contrast, display a greater range due to the complexity and costs of materials involved (see Table IV.6). Simple hematology tests can be performed for as little as $0.01 to $0.05 per test, while more complex cytology or blood chemistry can cost between $2.60 and $8.60 per test. Inclusion of these radiology and laboratory units costs on the patient cost tracking sheets described in Chapter IX might contribute to greater physician care in prescribing the most expensive tests.

2. Costs per Diagnosis. Two caveats should be kept in

mind when per-diagnosis costs are calculated. First, the absolute dollar amounts are very dependent on the number of patients with each diagnosis in each ward. Since no cost data are currently collected per patient, data were reconstructed from medical records, medical statistics, and physician experience. More precise counts of diagnoses by ward would improve the accuracy of these figures. Second, the costs of the operating theatre were allocated by average costing, which overstates the cost of minor surgery and understates the cost of major surgery. Again, greater precision could be reached with more precise data.

With these caveats in mind, some specific observations can be made regarding the results. The least expensive diagnostic category is obstetrics and gynecology, where the low cost per patient can be attributed to a high volume of service, less complex service use, and short lengths of stay. This cost schedule does not distinguish normal deliveries from Caesarian sections. However, using a standard 15% Caesarian section rate it can be estimated that 296 mothers delivered by Caesarian section. Augmenting their costs by the operating theatre rate of $285 would yield a cost of $694 per Caesarian section case.

Significant expense is associated with use of the operating theatre. The high cost of patients treated for diseases of the skin ($1172) and orthopedics and trauma ($1053) derives from these patients' being hospitalized in surgical wards and allocated operating theatre costs. Medical categories had noticeably lower costs (e.g., infectious diseases average $604; respiratory diseases $674, and malnutrition, diabetes and other metabolic disorders $733).

The three factors with the greatest influence over the relative costliness of a disease category are: 1) the use of the operating theatre; 2) personnel and supplies for particular wards; and 3) volume of service. Table IV.4 sequences the cost schedule by volume of patients in each category. As mentioned above, ob-gyn has both the lowest average cost and the highest volume of cases. Ill-defined conditions are the second highest volume category, but because these patients had to be assigned to all wards irrespective of actual service use, the cost is high. Efforts to diagnose and code these patients more precisely would result in a more meaningful cost figure. Orthopedic and trauma is the third highest volume category, with high costs due to use of the operating theatre.

E. Cost Management and Containment

In order to identify hospital costs by type of patient, costs have been disaggregated and regrouped in several different ways. (Details are provided in Appendix A.) Each

stage in that process provides hospital managers with information with which to evaluate departmental performance and to set goals for productivity and improved efficiency in managing expenses.

First, hospital costs were reorganized by department responsible and accountable for the expenditure. Each department has a set of units (number of staff, number of tests, number of meals) by which its productivity can be measured and improved. Improving the efficiency of the highest-cost departments will impact most significantly on total operating costs, so these departments should be targeted first. The extent to which the costs of these departments can be reduced by internal efficiencies should be evaluated against the alternative of directly purchasing these services from a vendor specializing entirely in providing that service as efficiently as possible (see Chapter X).

Next, departments were categorized into direct and indirect, and the costs of the indirect departments assigned to those departments providing diagnosis and treatment to patients. An obvious area in which to develop productivity goals would be the four departments or direct treatment centers (dispensary, laboratory, radiology and operating theatre) that account for almost 30% of the costs (see Appendix Table A.13). Three of these centers (all but the operating theatre) currently compete with private services, and are obligated to perform more expensive tests and services while their competitors focus on low-cost, high-volume services. Given the high cost of their services, their potential as revenue centers for the hospital, and the competition they face, these departments should be given priority as much for their revenue potential as for their costs.

Finally, costs were examined by patient diagnosis. A key factor in on-going cost management at BCH will be the extent to which it can concentrate its resources on relatively high-volume programs. Clearly, the hospital has to provide services not available at the district hospitals. However, because the hospitalization rate for these specialties is relatively low, BCH is paying high "stand-by capacity" costs in order to make these services available. Examples of low-volume, specialized demand might include treatment of burns, congenital anomalies, and cancers.

The issue of the expense of stand-by capacity should be weighed against the costs of under-utilized routine programs. For example, the post-operative ward is used for relatively high- volume routine surgery, yet the occupancy rate of this ward is an objectively low 69% and the average cost per patient day is the highest in the hospital ($131), with the cost per bed day ($129) the second highest.

Ideally, the cost of each patient should reflect his/her actual use of resources. Patients in high-volume, low-unit-cost, routine programs should not be made to subsidize expenses required for BCH to meet the national demand for access to certain more complex treatment programs such as congenital anomalies or cancer management. At the same time, it might be expedient and improve operating efficiencies for BCH to build and market certain patient programs more aggressively. By concentrating services on routine care, the hospital can use its resources more effectively. As it acquires a more sophisticated cost database by which to more accurately determine the detailed, itemized cost per patient, it will be able to assess which programs should be de-emphasised and which programs (such as orthopedics or digestive system disorders) expanded to provide more efficient use of available resources.

F. Summary

The following key data summarize the major aspects of the BCH cost structure:

- total annual cost of BCH is $6.3 million
- total operating cost per year is $5.4 million
- one third of total costs are absorbed by indirect departments and overhead
- payroll costs as a percentage of operating costs are higher than normal, because all BCH physicians are on salary
- average total cost per patient is $896 ($142 per patient day)
- average operating cost per patient is $737 ($121 per patient day)
- there are significant differences in ward occupancy, with the children's medical ward being lowest (38%) and male medical being highest (90%). Thus, although the cost per patient in the male medical ward is the highest in the hospital, its cost per bed day is lowest
- nearly half of all BCH use is accounted for by the obstetric/gynecology service. Its unit operating costs are the lowest in the hospital

TABLE IV.1

BELIZE CITY HOSPITAL PATIENT VOLUMES
(as percent of country totals)

Disease classification	Country total (volume)	Belize City Hospital (volume)	Belize City Hospital (percent)
Perinatal diseases	470	353	75.1
Cancers	212	140	66.0
Minor surgery	243	157	64.6
Ob. and Gyn.	6,380	3,361	52.7
Anemia	293	154	52.6
Digestive system	967	479	49.5
Orthopedic and trauma	1,223	540	44.2
Malnutrition and metabolic	324	139	42.9
Circulatory system	572	233	40.7
Ill-defined conditions	1,462	547	37.4
Kidney and urinary tract	366	135	36.9
Burns	70	22	31.4
Respiratory diseases	1,062	319	30.0
Diseases of the skin	319	81	25.4
Central nervous system	126	27	21.4
Infectious diseases	1,346	284	21.1
Mental diseases	206	38	18.4
Total	15,641	7,009	44.8

TABLE IV.2

ANNUAL COST BY INPUT FOR BELIZE CITY HOSPITAL
(in percentages)

Department	Input category				Total
	Personnel	Supplies	Building*	Equipment	
In-patient	57.8	37.8	39.3	41.4	47.5
Out-patient	13.3	3.0	9.0	6.7	8.7
Radiology	2.1	3.2	2.2	19.8	3.5
Laboratory	2.9	3.1	17.4	16.5	5.5
Dispensary	3.4	0.0	2.6	0.0	1.9
Indirect depts.	20.6	52.8	29.6	15.6	32.8
Total, vertical	100.0	100.0	100.0	100.0	100.0
Total, hospital	46.7	35.5	12.3	5.5	100.0

* Includes land

TABLE IV.3

INDIRECT COSTS ATTRIBUTED TO PATIENT WARDS AND DIRECT DEPARTMENTS

In-patient wards and departments	Indirect costs	
	Amount	Percent
Dispensary	$72,863	2.8
Laboratory	$265,251	10.2
Radiology	$75,237	2.9
Operating theater	$114,328	4.4
Maternity	$282,553	10.8
Female medical	$271,393	10.4
Female surgical	$247,144	9.5
Male medical	$138,742	5.3
Male surgical	$105,109	4.0
Post-operative	$225,383	8.6
Childrens surgical	$125,024	4.8
C3	$89,964	3.4
Childrens medical	$84,060	3.2
Nursery	$46,667	1.8
Total, in-patient	$2,143,718	82.1
Out-patient	$468,465	17.9
Total	$2,612,183	100.0

TABLE IV.4

UNIT COSTS BY DISEASES FOR BELIZE CITY HOSPITAL
(in descending order by volume of patients)

Disease classification	Volume	Percent	Unit cost	
			Operating	Total
Ob. and Gyn.	3,361	48.0	$342	$409
Caesarian section	---	---	---	$694
Ill-defined conditions	547	7.8	$706	$826
Orthopedic and trauma	540	7.7	$893	$1,053
Digestive system	479	6.8	$821	$970
Perinatal diseases	353	5.0	$596	$669
Respiratory diseases	319	4.6	$571	$674
Infectious diseases	284	4.1	$810	$864
Circulatory system	233	3.3	$640	$768
Minor surgery	157	2.2	$685	$808
Anemia	154	2.2	$680	$803
Cancers	140	2.0	$932	$1,108
Malnutrition and metabolic	139	2.0	$612	$733
Kidney and urinary tract	135	1.9	$778	$918
Diseases of the skin	81	1.2	$994	$1,172
Mental diseases	38	0.5	$643	$773
Central nervous system	27	0.4	$627	$738
Burns	22	0.3	$846	$988
Total	7,009	100.0	$676	$832

TABLE IV.5

RADIOLOGY TARIFF SCHEDULE

Examination	Operating cost	Total cost
Abdomen	$12.49	$26.57
Ankle	$5.98	$20.06
Barium enema	$60.41	$74.50
Barium meal	$43.26	$57.35
Chest	$9.23	$23.31
C. spine	$12.21	$26.29
Elbow	$4.77	$18.85
Femur	$5.53	$19.61
Foot	$7.03	$21.11
Forearm	$5.53	$19.61
Hand	$5.53	$19.61
Hip	$11.04	$25.12
Humerus	$5.53	$19.61
IV uro	$52.20	$66.29
Knee	$6.28	$20.36
Leg	$8.68	$22.76
LS. spine	$19.92	$34.00
Miscellaneous	$10.04	$24.12
Oral chole	$20.25	$34.33
Pelvis	$12.49	$26.57
Ribs	$12.49	$26.57
Skull	$16.57	$30.65
Sternum	$11.04	$25.12
Shoulder	$7.03	$21.11
T. spine	$18.47	$32.55
Wrist	$4.44	$18.52

TABLE IV.6

LABORATORY TARIFF SCHEDULE

Test	Cost
Chemistry:	
Blood sugar	$0.05
Uric acid	$0.05
Bilirubin	$0.37
Alkaline phosphates	$8.60
Blood urea	$5.39
Hematology:	
Hemoglobin	$0.05
PCV	$0.05
White blood-cell count	$0.01
Differential count	$0.24
Sickle cell	$0.02
Immunohematology:	
Groupings	$0.50
Cross-match	$0.46
Blood transfusion set and bags	$11.77
Microbiology:	
VDRL	$0.53
Complete urinalysis	$0.27
Ovum parasites	$0.47
Cultures (assorted)	$1.60
Cytolgy:	
Pap smear	$2.60
Histology	$2.79

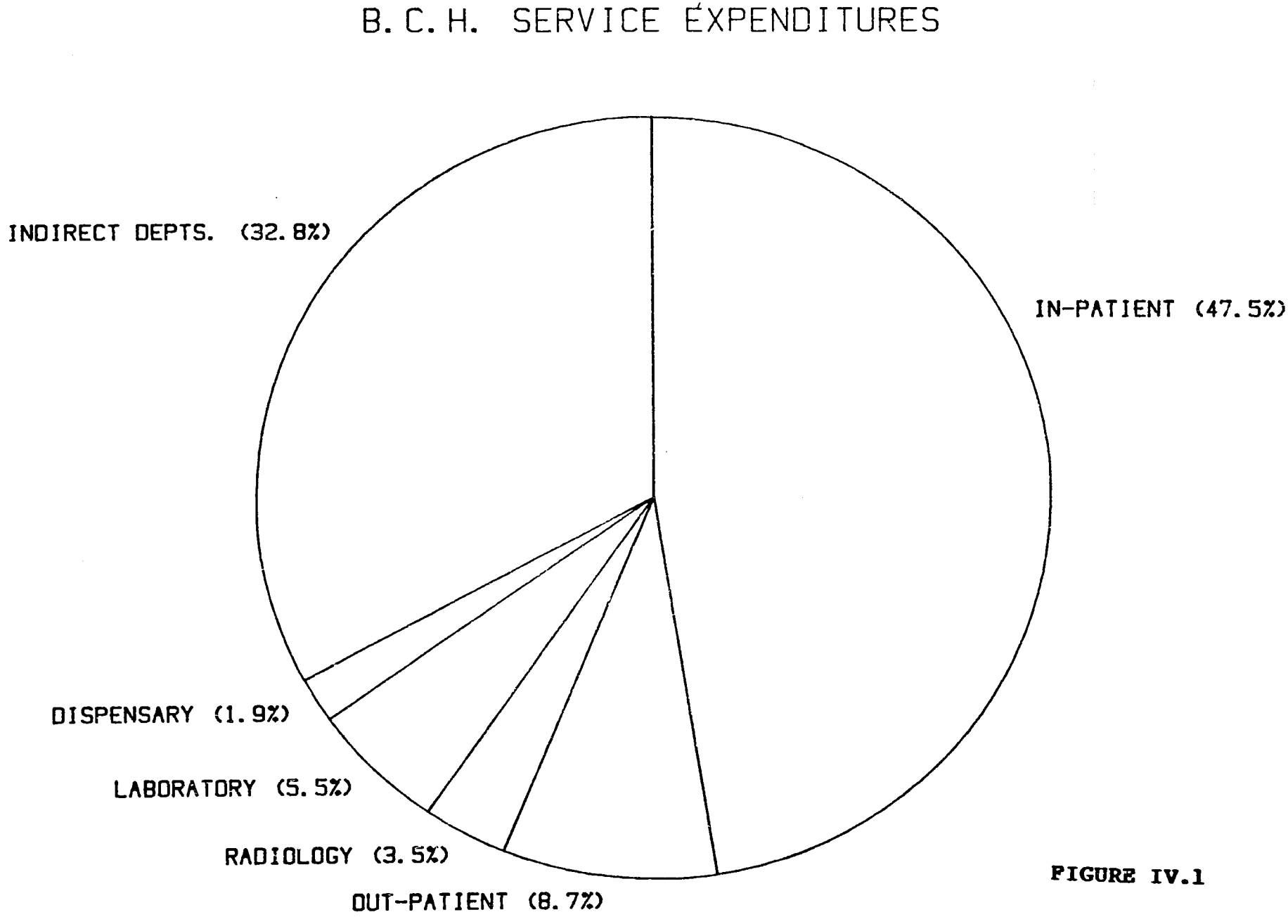

B. C. H. SERVICE EXPENDITURES
INDIRECT DEPTS. (32.8%)
IN-PATIENT (47.5%)
DISPENSARY (1.9%)
LABORATORY (5.5%)
RADIOLOGY (3.5%)
OUT-PATIENT (8.7%)

FIGURE IV.1

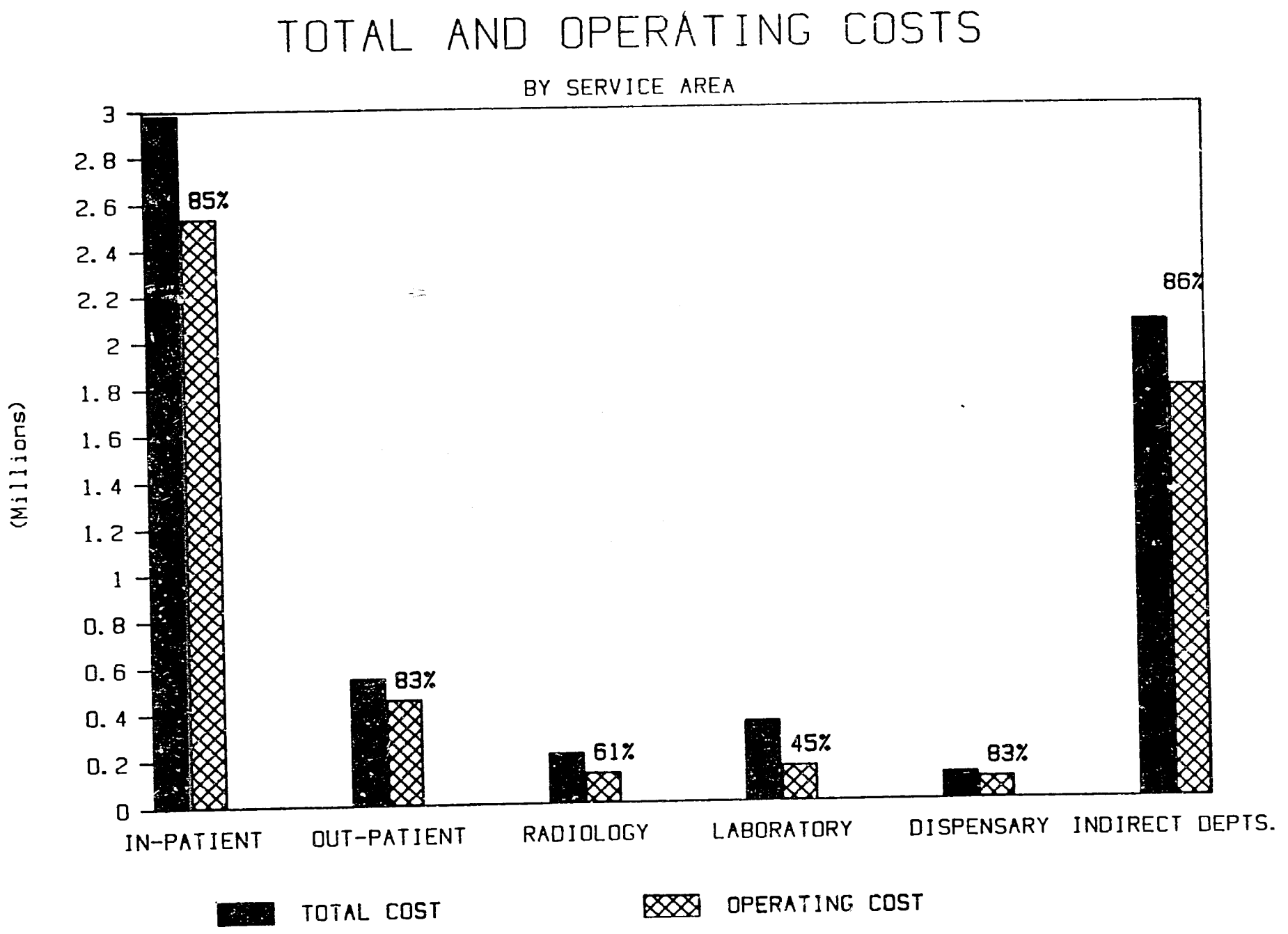

TOTAL AND OPERATING COSTS
BY SERVICE AREA
(Millions)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
85%
83%
61%
45%
83%
86%
IN-PATIENT
OUT-PATIENT
RADIOLOGY
LABORATORY
DISPENSARY
INDIRECT DEPTS.
TOTAL COST
OPERATING COST

FIGURE IV.2

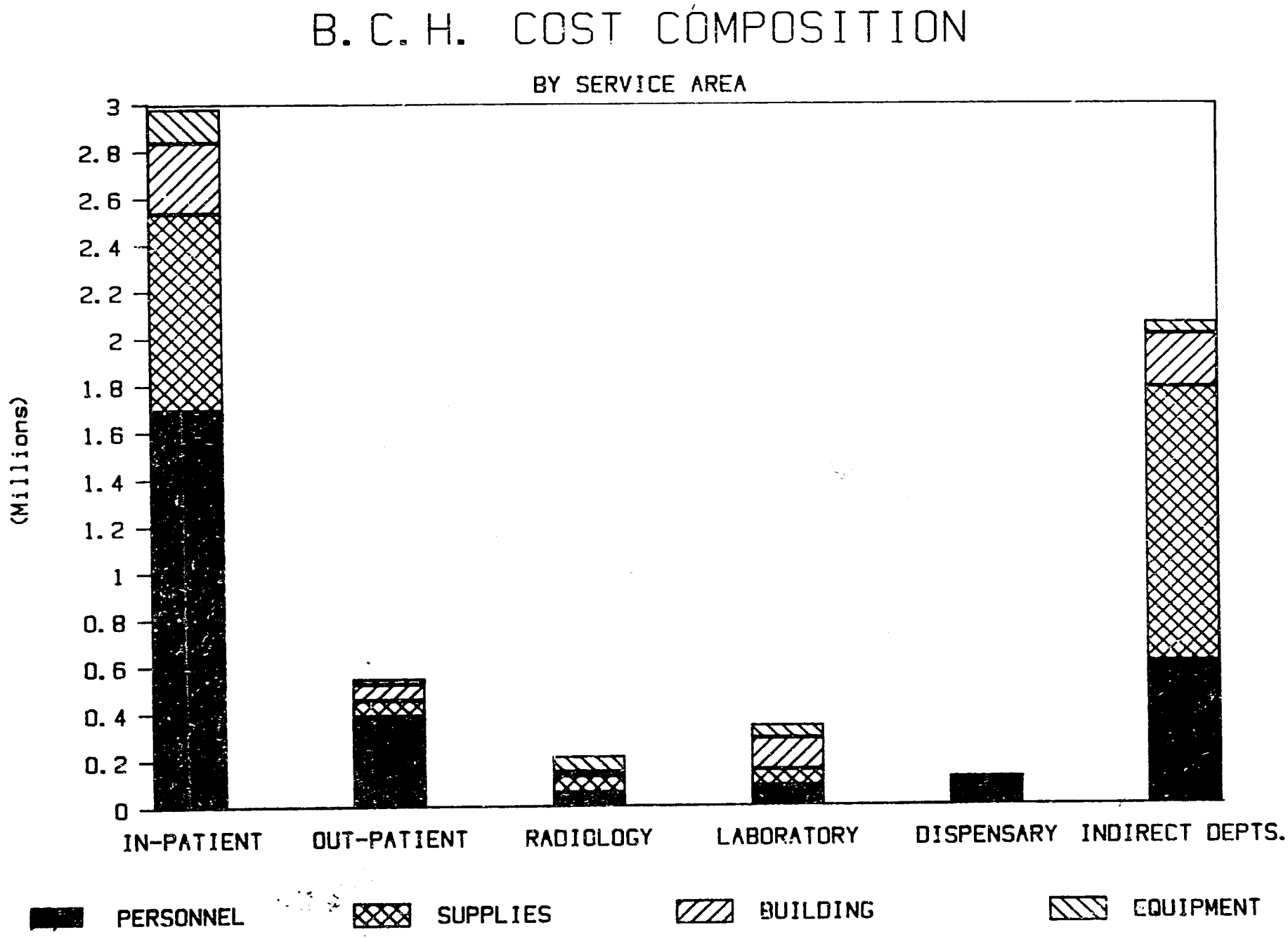

B. C. H. COST COMPOSITION
BY SERVICE AREA
(Millions)
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
IN-PATIENT
OUT-PATIENT
RADIOLOGY
LABORATORY
DISPENSARY
INDIRECT DEPTS.
PERSONNEL
SUPPLIES
BUILDING
EQUIPMENT

FIGURE IV.3

V. COSTS AT DISTRICT HOSPITALS AND HEALTH CENTERS

A. Introduction

This chapter provides estimates of the costs of health care at hospitals and health centers outside of Belize City (see Appendix D). It should be noted that the major foci of data collection for this study were BCH and district hospitals; data for district health centers were collected as opportunities presented themselves. Thus, these data and the associated analyses will not parallel those for the BCH. Rather, they represent a set of cases that compare and contrast the different characteristics of selected district health facilities (6).

Each of the six districts has one hospital, with the exception of Cayo, which was two -- Belmopan and San Ignacio. Belmopan and Dangriga hospitals have 47 beds each; Punta Gorda has 30, and Corozal, Orange Walk and San Ignacio have 28 each. Each hospital is staffed by two medical officers, a dispenser, an average of 9 nurses, and a laboratory technician. Except for San Ignacio, all offer radiology services, while Belmopan is additionally staffed with a full surgical team.

District hospitals provide basic medical and surgical services, maternity and pediatric care, and some laboratory testing and radiology services, as well as acting as referral points for BCH. Each has a casualty department served by an ambulance for emergencies and patient transfers.

The pattern of health center development is more varied. Each district has an urban central health center (Belize and Cayo have two), which coordinates the activities of outlying rural centers and mans a mobile clinic. Belize district has 6 rural health centers; Orange Walk 3, one of them privately financed and run by the Mennonite community; Corozal 2; Punta Gorda 4; Dangriga 6; and Cayo 3, including the Jesuit-built but government-run Mopan clinic and the Valley of Peace center, operated mainly for refugees. Due to renovation activities, not all of the 7 urban and 24 rural health centers were operating during 1985.

Each urban health center is staffed by a public health nurse, a rural health nurse, and a caretaker, while rural health centers generally have a rural health nurse and a caretaker. Traditional birth attendants from surrounding communities coordinate activities with rural health centers.

Health centers provide basic maternal and child health services, special outpatient clinics for problems such as

diabetes and hypertension, communicable disease investigations and home visits, and general curative procedures. In addition, rural health nurses, in conjunction with traditional birth attendants, accompany district personnel on regularly-scheduled mobile outreach visits to surrounding communities. Mobile clinics focus on immunizations and maternal and child health activities.

B. Hospital and Data Analysis

Table V.1 and Figure V.1 show the cost components and annual cost for each hospital. Figure V.1 omits national support costs, but includes personnel, supplies, dietary, equipment, building and vehicle costs. Some observations based on the analysis of operating and capital costs are as follows:

1. Personnel. The average personnel cost of $229,232 accounts for an average of 50% of annual cost and 65% of operating costs. Only Belmopan's is significantly higher, due in large part to the additional surgical personnel stationed there. Average cost per bed is approximately $1,100.

2. Medical and Other Supplies. Average supplies cost is $39,336. Dangriga's is highest, which is surprising since its utilization is lowest of any district hospital. Supplies account for an average of 9% of annual cost and 11% of operating cost.

3. Dietary. Average is $40,660. All are similar, which again is surprising since occupancy rates vary considerably among facilities (see below).

4. Equipment and Building. The average here is artificial due to sampling constraints.

5. National Support Costs. These average 10% of annual costs and 13% of operating costs.

Total annual costs per hospital (including national support costs) are quite evenly distributed across districts, as shown in Figure V.2. District hospitals account for approximately 26% of national health care costs, or $2,745,979. District health centers utilize approximately 11%, and Belize City Hospital the majority or 63% of the costs. (Not included in these calculations are the costs of vertical programs and those associated with the Belize School of Nursing, the Infirmary, and Rockview Mental Hospital.)

Looking at the utilization side, however, the district cost profile shifts dramatically. Table V.2 shows that total patient discharges range between Corozal's 1092 and Orange

Walk's 2323, and average 1439. (Appendix A details the medical classification of each discharge.)

Occupancy is low at all district hospitals, with Orange Walk having the highest occupancy rate at only 46.5%. Indeed, in Dangriga (17.8%) and Corozal (21.9%), any rationale for 47 and 28 bed hospitals (respectively) might be questioned.

The following summary table illustrates the effect of low occupancy on unit costs.

ANNUAL DISTRICT HOSPITAL UNIT COSTS

	TOTAL COSTS			OPERATING COSTS		
	Annual per patient	Total per patient day	Costs per bed day	Annual per patient	Operating per patient day	Costs per bed day
Belmopan	377	114	112	303	92	90
Orange Walk	197	73	91	146	54	68
Corozal	383	182	186	296	141	144
San Ignacio	290	100	124	213	73	91
Dangriga	388	155	146	313	125	118
Punta Gorda	400	105	98	317	84	78

It is clear that central public health managers need to look closely at resource allocations to Corozal, San Ignacio, and Dangriga, since it is costing the system considerably more per patient and per occupied bed to maintain the full capacity of these institutions. Some regionalization of services, with only 8-bed overnight facilities at a health clinic at these three sites, might be called for to reduce the over-bedding that escalates costs.

Table V.3 details the ranking of services utilized in each hospital, and Table V.4 provides the actual percentage distribution of the disease categories by hospital. The most common service provided by each hospital is maternity, while burns are the least common afflictions. Nationwide, the first five high-volume diagnostic categories account for 73% of all discharges from hospitals. Forty-one percent are grouped in a single category, maternity and gynecology.

It is not surprising that, with a birth rate of

43.1/1000 in 1984, maternity and related services are the highest-volume programs for each hospital in Belize, ranging from 28-41% of hospital discharges among the districts. BCH reported the highest percentage of total discharges at 51%. These volume statistics suggest more extensive use of traditional birth attendants and home deliveries in rural areas, resulting in somewhat lower ob-gyn percentages in the district hospitals. It is also likely that BCH manages some complicated pregnancies referred in from district hospitals, which would explain the somewhat higher ob-gyn percentage at that hospital.

The second highest-volume category is ill-defined conditions, combining diseases for which signs and symptoms remained undiagnosed with cases in which patient records were improperly completed. San Ignacio and Punta Gorda hospitals report a notably lower percentage of ill-defined conditions.

The significantly lower ranking of infectious disease at BCH raises the interesting possibility that malaria, tuberculosis and gastroenteritis are managed well locally at the district hospitals, so that fewer cases are referred to BCH. It further suggests that the incidence of these infectious diseases is higher per 1000 population in the districts than in the large urban center.

There are other observations from these tables, which may be data discrepancies for 1985 or may relate to environmental conditions or service or delivery capabilities, which this report does not explore but which are nevertheless of interest. For example, it would appear that a relatively high percentage of circulatory illness is diagnosed in Dangriga, and that a higher proportion of minor surgery (eye or ear surgery, or surgery to remove foreign bodies in the respiratory or digestive tract) is performed at BCH.

It is interesting to note how BCH affects the country's overall rankings. The wide scatter of perinatal disease throughout the country illustrates how BCH's high volume can pull a ranking upwards. However, the districts do substantially influence the country rankings. For example, infectious disease ranks sixth for BCH and either second or third for each district, thus pulling the country ranking up for this category. It is noteworthy that the volume of these services in the districts, especially in Orange Walk, approaches that of Belize City. The only example of a district hospital providing a greater volume of a particular service than Belize City is Orange Walk for diseases of the skin.

As for service utilization in district hospitals, San Ignacio, Belmopan, Orange Walk, and Corozal share the same first 5 services, albeit not in the same order. San Ignacio and Punta Gorda have relatively fewer ill-defined conditions. Dangriga deals less with respiratory ailments than the

others, while skin diseases seem to be fewer in Corozal. Mental health services are of greater importance in Corozal and San Ignacio, while disgestive and circulatory system ailments are consistently in the middle of the pack for each district.

These disease rankings, and the fact that average lengths of stay range from 3.8 days to 2.1 days, have special implications for tariff scheduling. It might be inappropriate to base tariffs on utilization and length of stay patterns generated from BCH. Adjustments reflecting district utilization as well as other factors, such as a differential ability to pay in the districts, is advisable.

Combining cost and utilization, as in Figures V.3 and V.4, reveals that there is no relationship between the two. Therefore, the marginal cost of delivering additional services in districts is negligible, which confirms the impression that resources are underutilized. This might be due to a variety of factors, ranging from inaccessibility to an increasingly healthy population (as the significant increase in life expectancy would suggest).

The implications of underutilization are varied. On the one hand, a policy to increase awareness of services might be undertaken; nurses in the field report that as a consequence of propaganda for the immunization campaign, service utilization increased dramatically. On the other hand, increased utilization and conservation of resources can be achieved by consolidating service delivery points even further. (More specific discussion of available options appears below.)

C. Health Centers

Case studies of 3 districts (Cayo, Dangriga, and Orange Walk) at the health center level provide data on costs at this level (see Appendix D). Personnel costs are once again the largest operating components, followed by buildings as the capital component with the greatest contribution to each health center's cost.

Coverage areas compared to cost show that operating costs are $7/person, $3.61, and $2.76, while total annual costs are $10.22, $8.04, and $4.15, for Dangriga, Cayo, and Orange Walk, respectively. Differences similar to these show up in other areas of interest, such as unit costs of services delivered. Note, however, that these numbers are based upon the percentage of total activity corresponding to each service, and not upon any personnel-time relationship to volume. The numbers are therefore only rough approximations.

Statistical data on service provision was aggregated into 6 basic categories: child health, maternal health,

deliveries, special clinics, communicable diseases, and curative procedures. Cayo provides the greatest volume of both maternal and child health services, Orange Walk attends more deliveries and performs more curative procedures, while Dangriga sees more people for special clinics and investigates more communicable disease concerns. Unfortunately, comparable data for the other 3 districts are not available at any central collection point. These statistical differences are due in part to uneven reporting frequencies and lack of collection incentives.

It seems that some districts are able to deliver greater volumes of services for less cost per service than others. For child health, for example, Orange Walk uses the same percentage of its money to provide a greater volume of services than Dangriga. The same relationship holds true for maternal services and special clinics in Orange Walk and Cayo. This perhaps indicates greater efficiency, but given the data available it is hazardous to propose specific explanations. Overall operating cost per service unit delivered is consistently lowest for Orange Walk and highest for Dangriga. Only for communicable disease does Cayo supplant Dangriga as costliest. In annual costs, Cayo is costliest and Orange Walk cheapest for all services, a pattern that may be due to Orange Walk's utilizing volunteer labor for some of its services and to the inclusion of the expensive Nazarean-built Mopan clinic in Cayo's building costs.

The system-wide implications of these cases are unclear. Orange Walk and Cayo may not be representative of the other districts; perhaps the others are similar to Dangriga. If this were so, one of the reasons for the high service delivery costs could be the proximity of district health centers to district hospitals. These health centers principally provide maternal and child health services, and do not perform many curative functions. Their main role is to support mobile clinics in those areas not within the local clinic's catchment area. The policy alternatives, to be further discussed in Chapter X, are (1) to shift outpatient care to the health centers, or (2) to invest additional resources in providing reliable transportation to district health personnel, so they can concentrate on outreach activities to isolated communities on a regularly-scheduled basis.

TABLE V.1

DISTRICT HOSPITAL COSTS
(for FY 1985-86)

	Direct costs (A)			Indirect costs (B)			(A+B)	(C)	(A+B+C)
Hospitals	Personnel	Medical & other supplies	Dietary	Equipment	Building	Vehicles	Sub-total	National support costs	Total annual costs
Belmopan	$312,088	$35,956	$44,453	$28,533	$65,277	$16,454	$502,762	$53,775	$556,537
Orange Walk	$224,189	$43,681	$26,345	$22,310	$83,477	$12,837	$412,838	$44,157	$456,995
Corozal Town	$215,361	$16,852	$51,114	$28,533	$65,277	$583	$377,721	$40,400	$418,121
San Ignacio	$214,271	$36,825	$31,332	$38,393	$58,082	$21,939	$400,842	$42,873	$443,716
Dangriga	$205,674	$69,966	$45,718	$24,896	$54,273	$7,644	$408,171	$43,657	$451,828
Punta Gorda	$203,808	$32,738	$44,939	$28,533	$65,277	$2,917	$378,273	$40,459	$418,733
Total	$1,375,391	$236,018	$243,961	$171,198	$391,664	$62,375	$2,480,607	$265,322	$2,745,929
Average	$229,232	$39,336	$40,660	$28,533	$65,277	$8,911	$413,435	$44,220	$457,655

TABLE V.2

PATIENTS BY DISEASE CATEGORY
FOR ALL HOSPITALS
1985

Disease classification	Belize City	Corozal	Orange Walk	Belmopan	San Ignacio	Dangriga	Punta Gorda	Total
Infectious diseases	284	71	279	230	208	82	192	1,346
Cancers	140	12	17	14	9	8	12	212
Malnutrition and metabolic	139	23	31	30	30	31	40	324
Anemia	154	10	55	18	12	12	32	293
Mental diseases	38	30	28	27	40	16	27	206
Central nervous system	27	9	22	20	26	10	12	126
Circulatory system	233	52	54	57	75	60	41	572
Respiratory diseases	319	67	227	177	162	30	80	1,062
Digestive system	479	47	155	73	88	49	76	967
Kidney and urinary tract	135	36	99	27	26	23	20	366
Ob. and Gyn.	3,361	556	789	420	540	414	300	6,380
Perinatal diseases	353	15	39	18	35	1	9	470
Diseases of the skin	81	5	84	48	44	27	30	319
Orhtopedic and trauma	540	65	201	138	123	70	86	1,223
Burns	22	4	16	16	7	4	1	70
Minor surgery	157	9	21	23	14	6	13	243
Ill-defined conditions	547	81	206	139	91	323	75	1,462
Total	7,009	1,092	2,323	1,475	1,530	1,166	1,046	15,641

TABLE V.3

DISEASE RANK BY HOSPITAL

Disease classification	Country rank	Belize City	Corozal	Orange Walk	Belmopan	San Ignacio	Dangriga	Punta Gorda
Ob. and Gyn.	1	1	1	1	1	1	1	1
Ill-defined symptoms	2	2	2	4	4	5	2	6
Infectious diseases	3	7	3	2	2	2	3	2
Orthopedic and trauma	4	3	5	5	5	4	4	3
Respiratory diseases	5	6	4	3	3	3	8	4
Digestive system	6	4	7	6	6	6	6	5
Circulatory system	7	8	6	10	7	7	5	7
Perinatal diseases	8	5	11	11	14	10	17	16
Kidney and urinary tract	9	13	8	7	10	12	10	12
Malnutrition and metabolic	10	12	10	12	9	11	7	8
Diseases of the skin	11	14	16	8	8	8	9	10
Anemia	12	10	13	9	15	15	12	9
Minor surgery	13	9	14	15	12	14	15	13
Cancers	14	11	12	16	17	16	14	15
Mental diseases	15	15	9	13	11	9	11	11
Central nervous system	16	16	15	14	13	13	13	14
Burns	17	17	17	17	16	17	16	17

TABLE V.4

DISEASE CLASSIFICATIONS AS PERCENTAGES OF HOSPITAL SERVICE DELIVERY

Disease classification	Belize City	Corozal	Orange Walk	Belmopan	San Ignacio	Dangriga	Punta Gorda	Total
Infectious diseases	4.05	6.50	12.01	15.59	13.59	7.03	18.36	8.61
Cancers	2.00	1.10	0.73	0.95	0.59	0.69	1.15	1.36
Malnutrition and metabolic	1.98	2.11	1.33	2.03	1.96	2.66	3.82	2.07
Anemia	2.20	0.92	2.37	1.22	0.78	1.03	3.06	1.87
Mental diseases	0.54	2.75	1.21	1.83	2.61	1.37	2.58	1.32
Central nervous system	0.39	0.82	0.95	1.36	1.70	0.86	1.15	0.81
Circulatory system	3.32	4.76	2.32	3.86	4.90	5.15	3.92	3.66
Respiratory diseases	4.55	6.14	9.77	12.00	10.59	2.57	7.65	6.79
Digestive system	6.83	4.30	6.67	4.95	5.75	4.20	7.27	6.18
Kidney and urinary tract	1.93	3.30	4.26	1.83	1.70	1.97	1.91	2.34
Ob. and Gyn.	47.95	50.92	33.96	28.47	35.29	35.51	28.68	40.79
Perinatal diseases	5.04	1.37	1.68	1.22	2.29	0.09	0.86	3.00
Diseases of the skin	1.16	0.46	3.62	3.25	2.88	2.32	2.87	2.04
Orhtopedic and trauma	7.70	5.95	8.65	9.36	8.04	6.00	8.22	7.82
Burns	0.31	0.37	0.69	1.08	0.46	0.34	0.10	0.43
Minor surgery	2.24	0.82	0.90	1.56	0.92	0.51	1.24	1.55
Ill-defined conditions	7.80	7.42	8.87	9.42	5.95	27.70	7.17	9.35
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

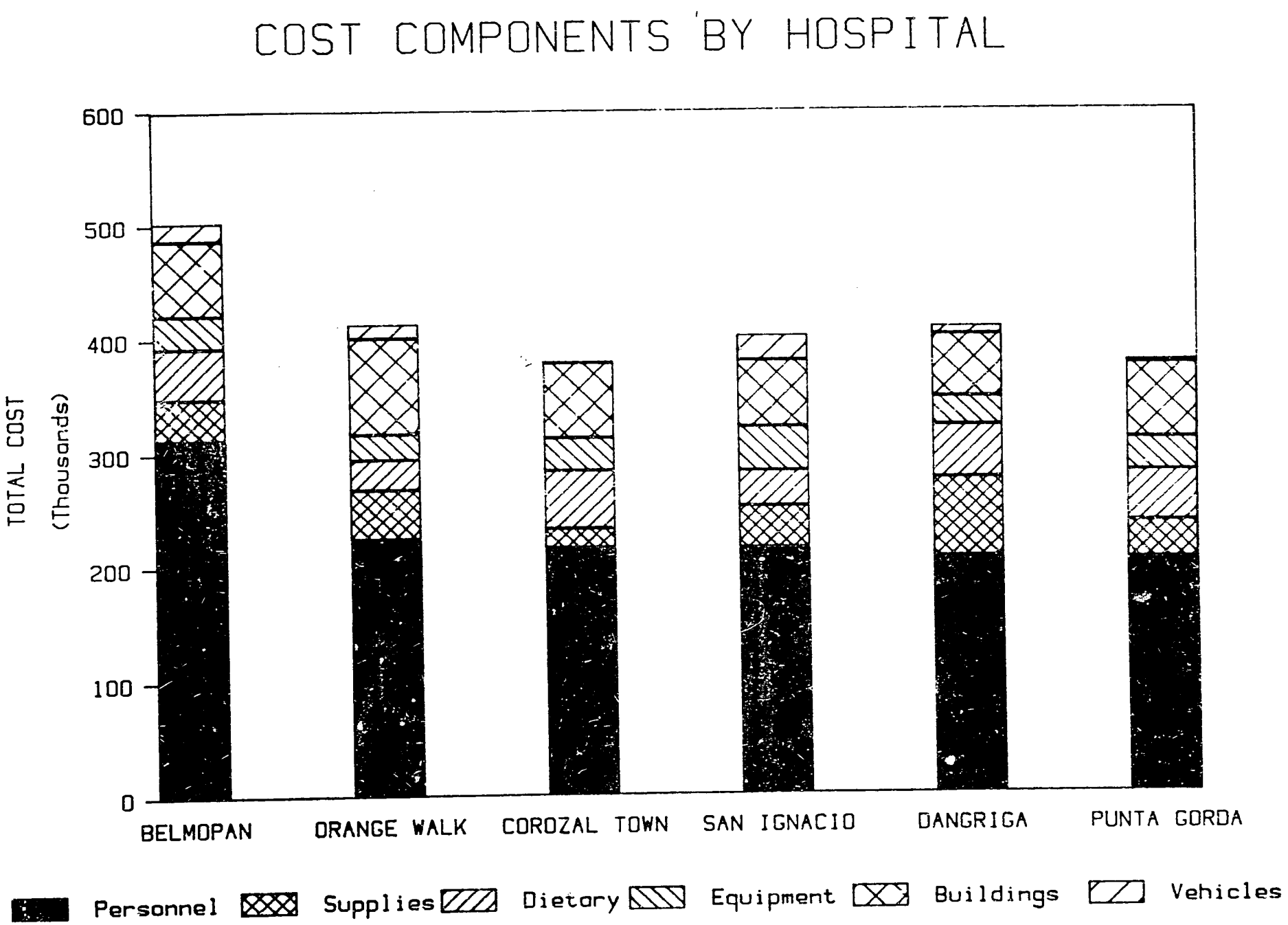

COST COMPONENTS BY HOSPITAL
TOTAL COST
(Thousands)
600
500
400
300
200
100
0
BELMOPAN
ORANGE WALK
COROZAL TOWN
SAN IGNACIO
DANGRIGA
PUNTA GORDA
Personnel
Supplies
Dietary
Equipment
Buildings
Vehicles

FIGURE V.1

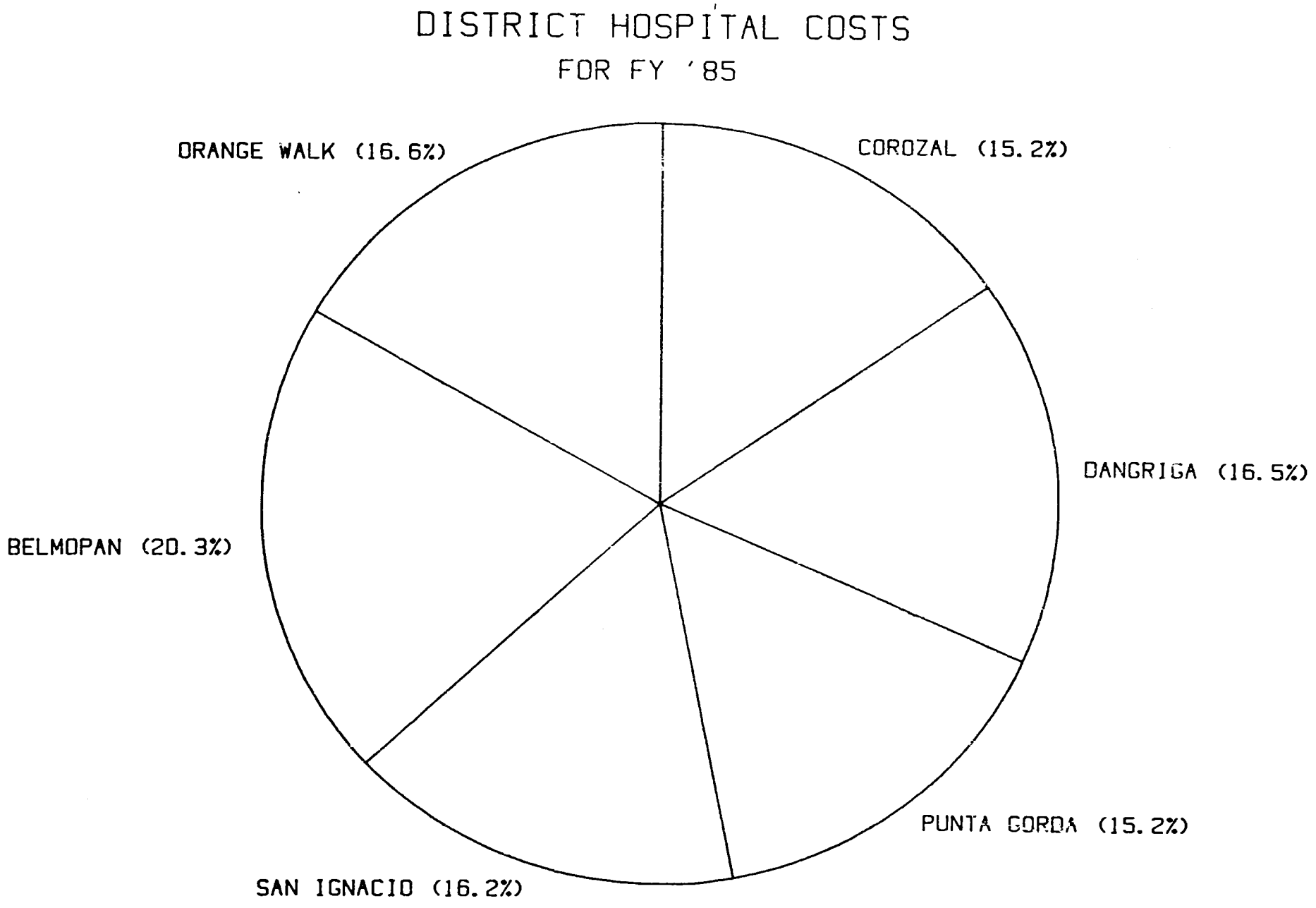

DISTRICT HOSPITAL COSTS
FOR FY '85
ORANGE WALK (16.6%)
COROZAL (15.2%)
DANGRIGA (16.5%)
PUNTA GORDA (15.2%)
SAN IGNACIO (16.2%)
BELMOPAN (20.3%)

FIGURE V.2

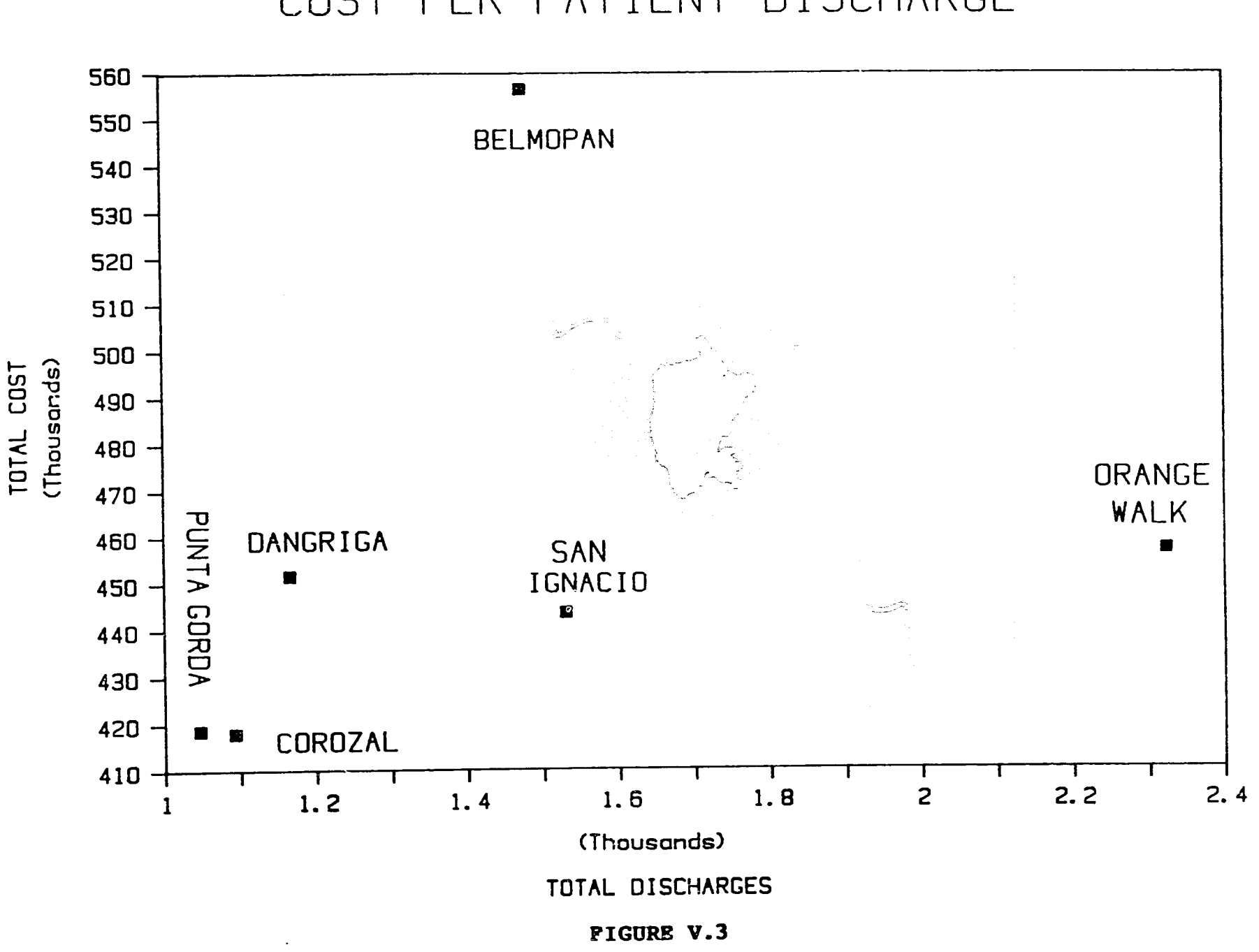

COST PER PATIENT DISCHARGE
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
TOTAL COST
(Thousands)
BELMOPAN
ORANGE
WALK
DANGRIGA
SAN
IGNACIO
PUNTA GORDA
COROZAL
1
1.2
1.4
1.6
1.8
2
2.2
2.4
(Thousands)
TOTAL DISCHARGES

FIGURE V.3

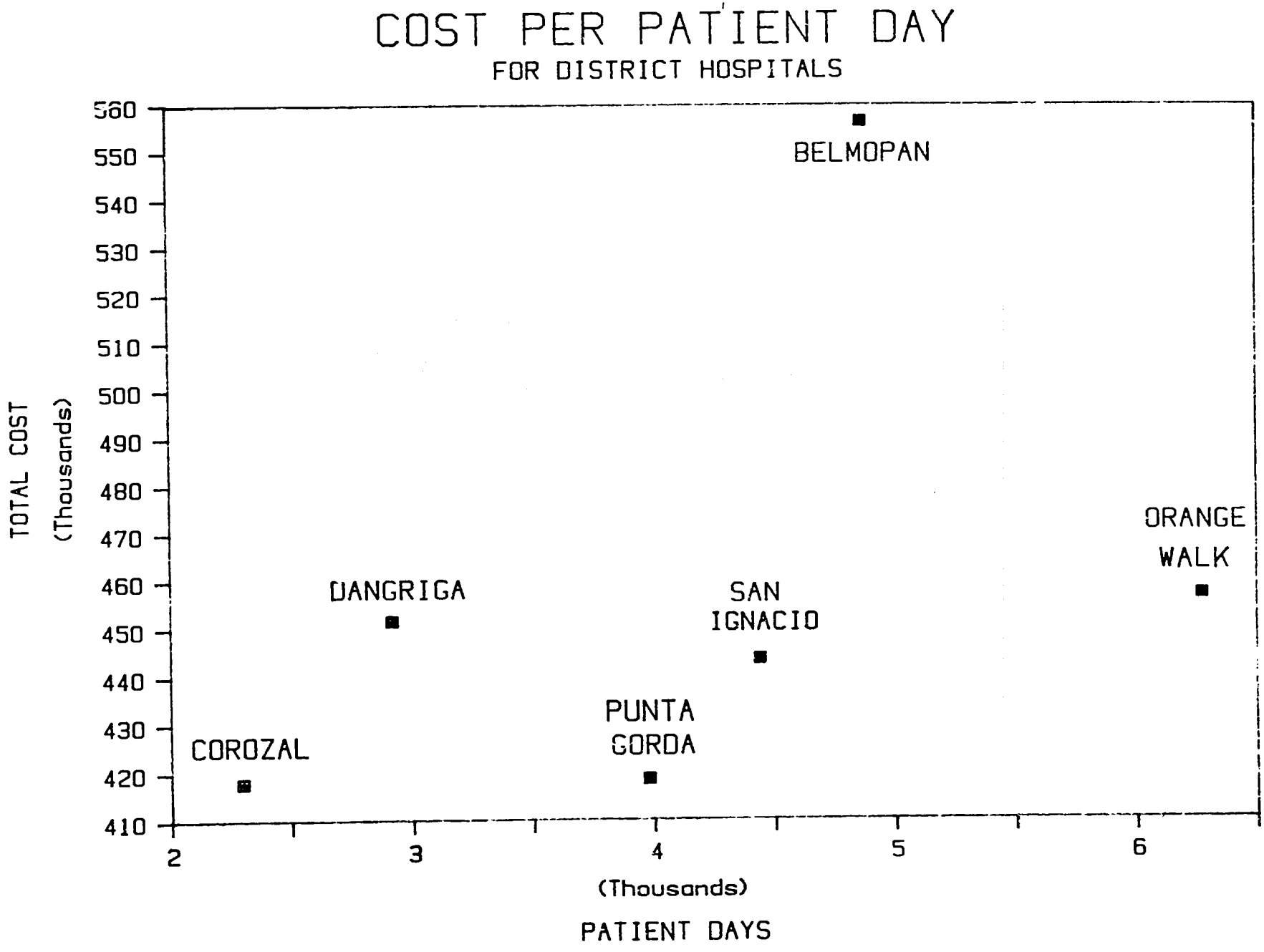

COST PER PATIENT DAY
FOR DISTRICT HOSPITALS
TOTAL COST
(Thousands)
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
BELMOPAN
ORANGE
WALK
DANGRIGA
SAN
IGNACIO
PUNTA
GORDA
COROZAL
2
3
4
5
6
(Thousands)
PATIENT DAYS

FIGURE V.4

VI. SOCIAL SECURITY AND PRIVATE HEALTH SECTORS

This chapter recaps the public sector health cost analysis, and links the results to what is understood about Social Security and the private sector. We present scenarios that might be applicable to both the expenses of Social Security and the costs associated with private hospital care, as derived from the records of the now-defunct Santiago Castillo Hospital in Belize City.

A. Review of Public Sector Costs

The total annual cost of public hospitals and health centers in Belize is approximately $10 million, a figure only coincidentally the same as the annual health budget of the Ministry of Health. Of that total, 63% is spent for BCH, for a total of $6.3 million; 26% for district hospitals, or $2.7 million; and 11% for district health centers, or very approximately $1,000,000 (see Figure VI.1).

The average annual cost per in-patient is $896 at BCH. In the districts it ranges from a high of $400 at Punta Gorda to a low of $197 at Orange Walk (see table in Section V.B: "Annual District Hospital Unit Costs"). AT BCH the cost per patient day is $147, and for the districts it ranges from Orange Walk's $73 to Corozal's $182. When length of stay is taken into account, however, the BCH annual cost is close to the median for public hospitals nationwide. This is also true of operating costs. The BCH annual operating cost per patient is $737, and the cost per patient day $121; in the districts there is a wide range of costs, from Orange Walk's low of $146 per patient (and $54 per patient day) to Punta Gorda's per patient cost of $317 (Table VI.1 details costs by facility).

The average annual cost per patient for the entire country is $419, with BCH, at $897, differing significantly from the average. This is also true of the annual operating cost per patient, where the average is $332 and the BCH figure $737. In the districts, the average annual cost per patient is $339 and the average annual operating cost $265. In both cases, Orange Walk is significantly below the average cost. For annual and annual operating costs per patient day, there is no difference between national and district averages (Table VI.1).

Two conclusions can be drawn. First, if the severity of cases attended, as reflected by differences in ALOS, is considered, the cost per patient day at BCH is consistent with the rest of the country. Second, Orange Walk is delivering more care for less money than any institution in the country. This hospital is seeing more patients, yet moving them as efficiently through the system as its sister

hospitals, at virtually the same annual operating cost (see Table VI.1) and a significantly lower cost per patient. The figures for Orange Walk need to be carefully compared to those of the other districts to determine what accounts for Orange Walk's efficiency.

B. Social Security

In 1984, Social Security, which pays $50,000 annually for hospital care for worker injuries, reported 713 work-related injury claims (7) -- the only form of direct use of medical care reported by Social Security (SSB 1984). This volume of claims amounts to $70 per claim. However, Social Security statistics do not differentiate between outpatient and inpatient claims. The actual use of hospital services by Social Security is some combination of inpatient and outpatient services.

Since neither Social Security nor hospital records were able to provide a breakdown, differentiating between in- and outpatient settings, of the use of hospital services by Social Security recipients, simulations were prepared to show the combinations of inpatient and outpatient care that could be purchased for $50,000. First, it was assumed that all 713 Social Security patients received inpatient care, with ALOS similar to hospital averages, and that each hospital case was treated in the district in which the claim was made. Multiplying the number of claims reported for each district by the average annual hospital cost in each district (Table VI.1), the total hospital cost of servicing Social Security claims came to $219,848 in operating expenses and $276,736 in total annual expense. Next it was assumed that the injury claims represented some mix of in- and outpatient care, not specific to any hospital or district. Since outpatient visits at all Belize hospitals range from $15-20 per visit, cost per outpatient visit was set at $20. Two different estimates of the average cost of inpatient care were used, one ($197) based on the lowest reported average cost per case, and the other ($419) on the national average cost per case (see Table VI.1).

Figure VI.2 shows the result of these simulations. The line labelled "lowest cost" is based on the assumption that all Social Security patients were referred to the lowest-cost hospital in Belize. The results range from 2500 outpatients and 0 inpatients to 0 outpatients and 250 inpatients. Since 10 outpatient visits can be provided for every inpatient treated, the line slopes fairly dramatically. The line labelled "average cost" is predicated on the average cost per case of $419. Using this national average, the maximum number of inpatients who could be treated decreases to 120 cases, while the maximum number of outpatients remains the same. Finally, the line labelled "claims combinations" represents the different combinations of inpatients and outpatients who

could account for the 713 claims. The intersections represented by points A and B give the optimum number of inpatients and outpatients who could be seen under each scenario without over-spending the budgeted amount. For the lowest-cost scenario, approximately 200 inpatients and 513 outpatients could be seen (Point B), while at the national average cost 90 inpatients and 623 outpatients would be the most efficient combination (Point A).

In all likelihood, over 200 of the 713 Social Security claims required inpatient hospitalization; Social Security patient day records suggest the volume of inpatients to be 250-500. While it is highly unlikely that all Social Security inpatient treatment was provided at the lowest cost facility, these simulations do provide a framework for assessing the range of services that can be provided to Social Security for its payment. It is clearly in the interest of the Ministry of Health to substantiate Social Security utilization of services properly, and for the SSB to ensure utilization of inpatient services at least-cost district hospitals and to emphasize outpatient care whenever possible. Given unit costs in the public hospitals, only such a strategy will stretch social security's $50,000 pay-in to cover the actual costs of services. The alternatives are for SSB to seek services for its injury claims in some setting with lower unit costs, or to increase its budget allocation for the costs of injury-claim health services.

C. Private Sector

In 1984-1985, health care in the private sector was provided through one privately-owned hospital facility (the Santiago Castillo Hospital), through approximately 20 physicians practicing solely in the private sector, and through several privately-owned pathology laboratories and pharmacies located in major urban centers.

Very little is known about the volume of service or revenue generated through the physicians' private practices and the private laboratories and pharmacies. It is known that government-salaried physicians also, unofficially, bill for their services, but no estimates are available on the dollar amount or volume of this activity. Fully private physicians in Belize City bill between $20-30 per clinic visit.

The Santiago Castillo Hospital closed in May 1986, but hospital records for the previous fiscal year provide some estimates of the volume of business that can be and, in the past, has been conducted in the private hospital sector (8). Santiago Castillo was a 16-bed hospital with radiology and laboratory facilities and an operating theatre, which employed 12 professional nurses and one resident physician. Surgeries were mainly routine Caesarean sections, hernias,

wound repairs, and other minor procedures. As in other Belize hospitals, maternity was the highest-volume single service. Total discharges for the fiscal year 1984-1985 were reported as 1,693, and ALOS as 1-2 days. The hospital offered three levels of accommodation -- the general ward at $60 per day, semi-private rooms at $75 per day, and fully private rooms at $100 per day.

For 1984-1985 the hospital reported revenue in the amount of $512,870 and expenses of $454,000, which yields an 11% operating margin. An estimated 25% of the hospital's revenue was from outpatient services, including outpatient radiology and laboratory; 30% was from inpatient room rates; 14% was from operating room and delivery room charges; and the remaining 31% was from inpatient use of drugs, radiology and other services. With this distribution of revenue, the hospital was able to break even with an occupancy rate of 42-45%. This compares to occupancy rates of 70% at the BCH and 28-48% at the district hospitals.

The average operating cost per patient day at the hospital, for 1,693 discharges with a 1.5-day length of stay, was $178. Total annual operating cost per bed day was $138. The total capital cost for the hospital, including land, building, and equipment, is estimated at $1,000,000, which amounts to $214,500 per year when annuitized at 8% over a 20-year period. On this basis, total cost per patient day came to $263. Total cost per patient was $395, and operating cost per patient was $268. These figures are higher than the government's district hospitals, but lower than BCH's.

The problems encountered at Santiago Castillo were not cost problems; private services <u>can</u> be offered competitively in the Belize market. Rather, the hospital's problems were generated by the medical system, which limited the hospital's access to physicians and patients. Moreover, lack of an extensive insurance system in Belize and/or group purchase or prepayment systems (such as might emerge if the SSB or a major employer like the Banana Control Board were to enter the health market) left the hospital dependent on individual patient collections at discharge. This in turn meant large recurrent receivables, which affected short-term cash flow and ultimately made the hospital investment less financially attractive to its owners.

TABLE VI.1

SELECTED HOSPITAL UTILIZATION STATISTICS FOR BELIZE
(1985)

Hospitals		Total discharges	Average length of stay	Patient days	Beds	Annual cost			Annual operating cost				
						Amount	per patient	per patient day	Amount	per patient	per patient day	per bed	percent of total
Corozal	COR	1,092	2.1	2,293	28	$418,121	$383	$182	$323,727	[illegible]	$141	$11,562	77.4
Dangriga	DAN	1,166	2.5	2,915	47	$451,828	$388	$155	$365,016	$313	$125	$7,766	80.8
Punta Gorda	P.G.	1,046	3.8	3,975	30	$418,733	$400	$105	$332,005	$317	$84	$11,067	79.3
San Ignacio	S.I.	[illegible]	2.9	4,437	28	$443,716	$290	$100	$325,301	$213	$73	$11,618	73.3
Belmopan	BEL	1,475	3.3	4,868	47	$556,537	$377	$114	$446,272	$303	$92	$9,495	80.2
Orange Walk	O.W.	2,323	2.7	6,272	28	$456,995	$197	$73	$338,371	$146	$54	$12,085	74.0
Belize City	B.C	7,009	6.1	42,755	186	$6,287,984	$939	$154	$5,368,602	$766	$126	$28,863	85.4
Total, country		15,641		67,515	394	$9,033,914			$7,499,294				83.0
Total, districts		8,632		24,760	208	$2,745,930			$2,130,692				77.6
Average, country		2,234	3.34	9,645		$1,290,559	$425	$126	$1,071,328	$336	$99	$13,208	
Average, districts		1,439	2.88	4,127		$457,655	$339	$122	$355,115	$265	$95	$10,599	

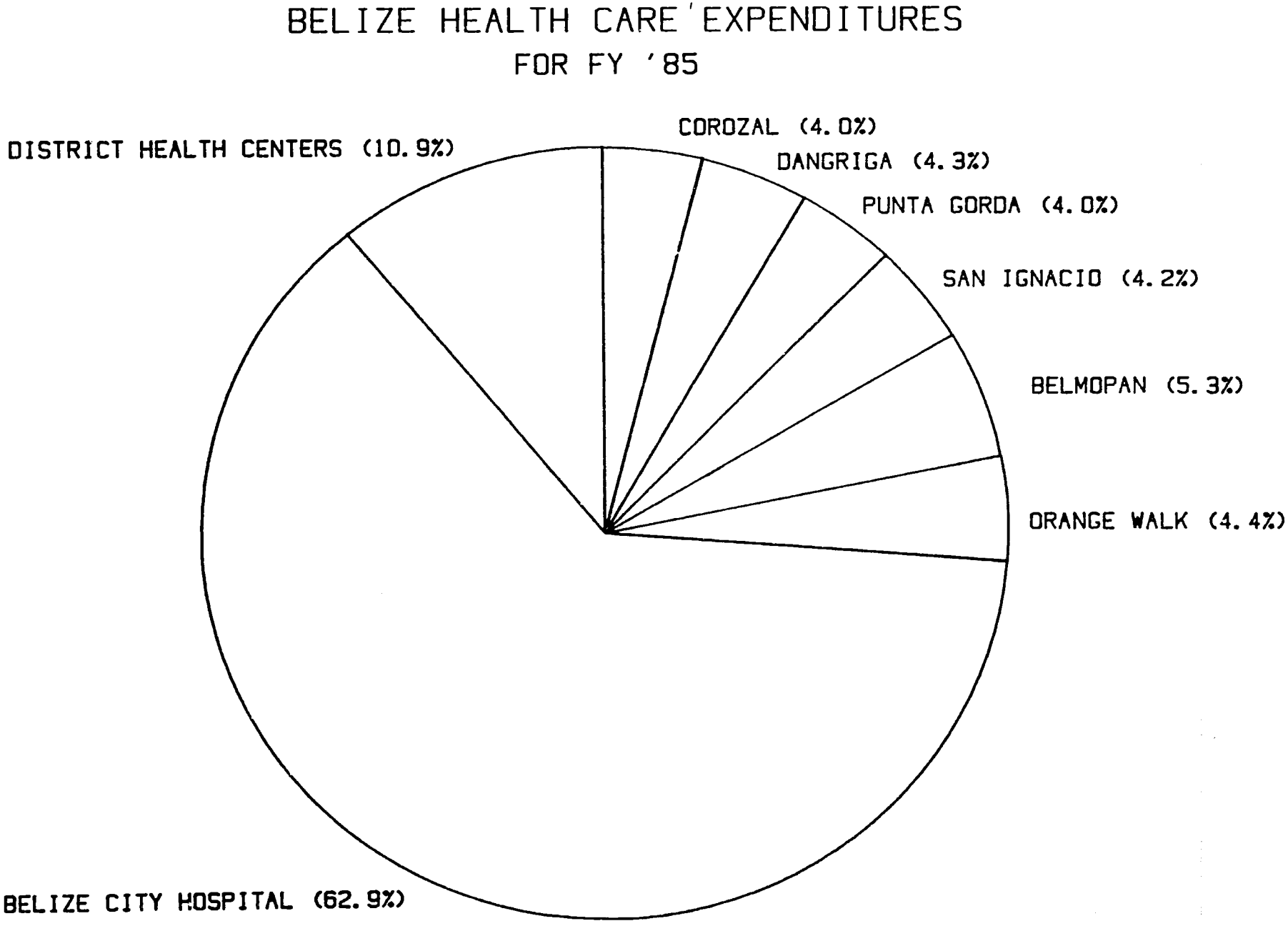

BELIZE HEALTH CARE EXPENDITURES
FOR FY '85
COROZAL (4.0%)
DANGRIGA (4.3%)
PUNTA GORDA (4.0%)
SAN IGNACIO (4.2%)
BELMOPAN (5.3%)
ORANGE WALK (4.4%)
DISTRICT HEALTH CENTERS (10.9%)
BELIZE CITY HOSPITAL (62.9%)

FIGURE VI.1

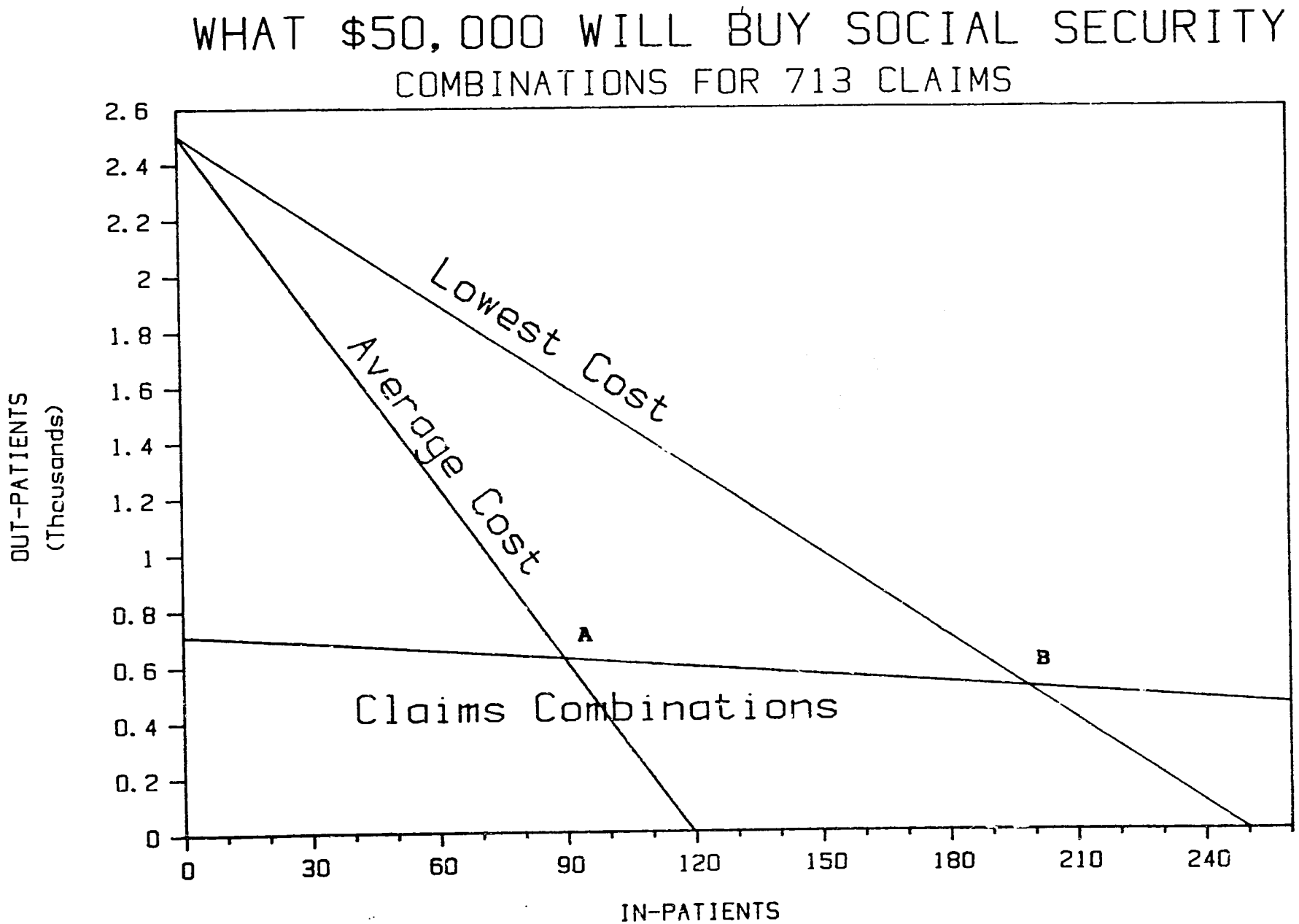

WHAT $50,000 WILL BUY SOCIAL SECURITY
COMBINATIONS FOR 713 CLAIMS
OUT-PATIENTS
(Thousands)
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Lowest Cost
Average Cost
A
B
Claims Combinations
0
30
60
90
120
150
180
210
240
IN-PATIENTS

FIGURE VI.2

VII. SYSTEM OF FINANCE

This section details the interests and roles of the major financial actors in the Belizean health care system. Chart VII.1 depicts the actors involved and the direction of financial flows within the system.

A. Ministry of Finance

The MOF is the sole conduit of government finance into public health services, providing the Ministry of Health with a budget of $10 million -- a budget that has not increased in real terms since 1982. The MOF finances its health sector allocations (and other public services) via import duties (35% of current revenues), direct taxes (20% of current revenues), and other excise, export, and stamp taxes (World Bank 1984b). In the case of health, the MOF also receives the $50,000 annual transfer from the SSB discussed earlier.

B. Social Security Board

1. Revenue and Surplus. The SSB was created in 1981 to provide death and disability benefits to the employed population of Belize, and a retirement fund for qualified subscribers. Both private and government workers are covered under the fund. SSB income originates from employer contributions (6% of payroll), employee contributions (1% of payroll), and income from investment of surpluses. Total SSB income in 1984 was $10.6 million, 85% of which came from employer/employee contributions (SSB 1984).

Since the SSB is young, it is accumulating considerable surpluses against future disbursement commitments. In 1984, only $1.65 million in benefits and expenditures was charged against income, leaving a surplus of $8.9 million (SSB 1984). Since its inception, SSB has generated $25.5 million in revenue, and has paid out only $4.8 million in benefits and expenses (SSB 1982, 1983, 1984). The surplus of $21.7 million represents 85% of total revenue. Aside from a small liquid operating fund, this surplus is invested exclusively in short-term paper, held in a combination of certificates of deposit in commercial banks (46%), deposits with the Central Bank of Belize (21%), Government of Belize treasury bills (22%), and Government of Belize debentures (13%).

Since 1981, interest on SSB investments has exceeded benefits payouts by 24%, and can cover nearly 75% of SSB total expenses. Indeed, as surpluses have grown, the coverage has become even higher. In 1984, interest alone could have covered 91% of total SSB benefits and operating

expenditures.

2. Benefits. The SSB program provides three types of benefits to enrollees (Government of Belize 1979). Employment injury benefits provide payment to insured persons injured during the course and as a result of insurable employment. SSB becomes liable for payment of medical care, temporary and permanent disability, death benefits, and funeral grants. Short term benefits consist of sickness benefits reimbursing enrollees for work days lost due to illness; maternity allowance for days of work lost due to maternity leave; and maternity grants, payable to wives of enrolled male workers or to enrolled women at the rate of $50 per grant. Long term benefits encompass retirement, invalidity and survivors' benefits, and funeral grants.

In 1984, total benefits expenditures were $942,641, of which 54% were in short term benefits (56% of these for maternity benefits), 7% for long term benefits (59% for retirement payments), and 40% for employment injury benefits (fairly evenly distributed between disablement grants and pensions, death benefits, and medical expenses related to employment injuries).

3. Medical Financing Transfers. The SSB intersects with the Belize health financing system at two main points. The first is the annual transfer of $50,000 from SSB funds to cover estimated use of MOH medical services by injured SSB employees. This transfer is made to the general accounts of the Ministry of Finance, not directly as revenue to the MOH. Second, SSB also finances the medical care of injured workers sent to foreign facilities for conditions not treatable in Belize. In 1984, five such cases were financed, largely for major surgical procedures or burn treatment. Total cost of these cases to SSB was approximately $60,000 (SSB 1984).

There is also a third and more removed resource transfer: part of the benefits payments for work days lost due to sickness or childbirth might be transferred by beneficiaries to public health institutions as payment for services rendered. In reality, however, fees are usually not collected by public institutions and, if collected, are transferred to general MOF funds, not directly as revenues to the Ministry of Health. To the extent that beneficiaries use private services -- or public health physicians in their private capacities -- and pay private fees, a portion of the sickness and maternity benefits compensation probably does make its way into the private stream of health finance flows.

C. Ministry of Health

1. Revenues. The MOH has two main sources of direct revenue to meet its recurrent costs. First, as noted above, the Ministry of Finance is the source of the annual operating

budget of the Ministry of Health, and the Ministry also benefits from the services of volunteers to its health system. The total value of such services is estimated to be $100,000 per year. Second, the Ministry of Health generates approximately $11,000 per month in revenues, principally from fee collections at BCH (although this represents only a small portion of fees/tariffs that could be but are not collected). This total of $132,000 per year (approximately 1% of the MOH operating budget), however, is not a direct income stream to the MOH, since collections are transferred directly to the consolidated funds of the Ministry of Finance.

Revenues for the capital costs of the MOH are, for the most part, received from major donor agencies. The total for such capital budget support is approximately $1.25 million. Given the way in which donor contributions are made and tracked, however, an exact calculation of the value of donor programs in the Ministry of Health financial system is difficult to compute (9).

2. Expenditures. The MOH authorizes budgetary support to all public health programs and facilities in Belize. The process by which costs incurred are actually financed in public health programs and services, however, is complex. In essence, there are four cost or finance centers in the government health system.

The first such center is the Ministry headquarters in Belmopan, where the costs of personnel, overhead, and supplies are handled (see Chart VII.2). The MOH headquarters has an authorized budget with the Ministry of Finance, and receives monthly allocations for expenses. It draws down these accounts as finances are expended to meet costs. The accounts are then replenished by the Ministry of Finance. Cost are met via the issuance of vouchers for payment to regular suppliers with whom the Ministry has credit arrangements, and -- for very small expenditures -- via payouts from petty cash.

The second cost center in the health system is BCH, a center not only for its own operations but also for those of affiliated public health services in Belize City and for certain of the purchasing needs of district hospitals and health centers (see Chart VII.3). BCH has an authorized budget from the central Ministry, and a monthly account with the MOH against which it draws and which is replenished by the Ministry of Finance through the MOH. Within this system, specific services of the hospital and related programs have financing accounts, although service or program heads are not regularly apprised of the surplus/deficit status of their individual accounts. The BCH accountant is responsible for all cost tracking and management of expenditures. Accountant records are reported to the MOH, which then reports expenditures on to the Ministry of Finance on a monthly basis.

Expenditures from BCH accounts are carried out in three ways. Salaries are paid regularly via government voucher, and are debited to the BCH account at Finance. For medical supplies, orders are placed by Central Medical Stores, suppliers invoice the hospital, and payments are made by voucher from the BCH accounting office. This process also applies to supplies ordered and paid for by BCH but destined for district health facilities or programs. Finally, BCH jobbers (e.g., suppliers of food, maintenance services, gasoline, etc.) are paid by voucher. These expenditures are debited to the accounts of the appropriate programs or services. A cashier's window at BCH receives revenue from patient payments.

A third set of cost centers are the individual public health districts. At each district hospital the District Medical Officer and a bookkeeping clerk are responsible for both the expenditures of the hospital and those of other facilities and programs in the district. The non-hospital district facilities have budget accounts with the district hospital, in a relationship similar to the one between individual hospital services and the BCH accounting office (see Chart VII.4). The District Medical Office expends against authorized accounts, and is replenished from the MOH. Again, managers below the district hospital level have no regular information as to the status of their accounts or finances. Indeed, the entire bookkeeping process at the district hospital level is often in disrepair.

The process of expenditures at the district level is similar to that at BCH: vouchers are used for salaries and major vendors, and cash is used for minor purchases.

Finally, vertical programs, such as malaria control, environmental health, etc., represent the fourth set of cost centers in the government health system. Financing vertical programs presents a major complication in the management of costs and expenditures in the public health system. Such programs have a budgetary account at the central Ministry headquarters, and most costs are authorized and met at that level. However, because programs are operated in the field, and thus rely on at least some services and facilities at the district level, there is also some expenditure of district funds allocated to vertical program costs.

Overall, the process of authorizing, tracking, and evaluating financial expenditures to meet incurred costs in the public health sector is not well matched to the loci of program responsibility, or to the cental monitoring needed to institute reforms in cost control (see below).

D. Employers

Major employers are also important sources of finance in the Belize health care system. They are, of course, the major source of revenue to the Social Security Board. Currently, however, many major employers, dissatisfied with services provided by public facilities and covered under the SSB program, provide additional coverage to their employees for health services, having initiated relationships with purely private physicians who treat employees, bill the employers as clients, and are paid by corporate check. Employees receive cash from employers to pay for any medications or prescriptions authorized by attending physicians.

The SSB is currently considering formalizing its own relationships with the private sector in a similar way (Cuellar 1986). Given employer dissatisfaction with the health services received in the public sector compared to the amounts paid to the SSB for such services, the SSB has approached its Board of Directors and private physicians about establishing fee-for-service agreements in the private sector. Private physicians interviewed expressed interest, but also some concern as to whether the prompt billing/payment experience they have with private employers would be replicated in SSB relationships. For its part, SSB's concern is that fee arrangements be justified in terms of treatment costs, data on which have been unavailable prior to this study.

E. Private Providers

The distinction between private and public physicians is blurred in Belize, since most physicians employed by the MOH also operate private practices operate during evening hours.

Both wholly private and quasi-private physicians are paid on a fee-for-service basis by private patients. While this financing arrangement is fairly simple for the purely private practice of medicine, its regulatory aspects are more complex for services provided in public facilities. According to Belize law (Government of Belize 1984), physicians employed by the government (although they do receive a private practice allowance as part of their salaries) can admit private patients to public hospitals. They are permitted to charge their own fees in these cases, however, only if it can be demonstrated that no private alternative for hospital services exists. Prior to the closing of the private Santiago Castillo Hospital, this kept public physicians from utilizing public hospital privileges to access private patient fees. Now, on the other hand, such charges are permissible, and are usually paid in cash upon discharge.

F. Private Ancillary Services

Aside from government hospital pharmacies, pharmacy services in Belize are provided by the private sector. Financial flows into this sector are via direct payment for goods. Historically, phamacists -- when asked by patrons to prescribe medication -- have attached a fee to the price of drugs to cover prescribing services. Recently, however, the government has informed private pharmacies that this practice is illegal. This policy has generated considerable opposition from private pharmacists.

In addition to direct purchases by consumers, private pharmacies also supply government hospitals with drugs in stock-out situations. The MOH financing process reimburses private pharmacies for these commodities.

A second category of ancillary services is provided by two private laboratories and three private radiology services. As in the case of pharmacies, resource flows to these providers are both from individual private consumers (via physicians) and from MOH use of the special capabilities of these facilities.

G. Foreign Facilities

There is considerable leakage of Belize health sector finances to foreign medical facilities that provide services for conditions not treatable in Belize hospitals. They also service private patients referred by local physicians for reasons of medical sophistication, because of patient preference, and/or because of the desire of physicians not to turn private patients over to other (quasi-private) physicians with privileges at government hospitals.

Government financing of treatment abroad originates at three points. First, the SSB, as noted above, spent $60,000 for such care in 1984 (SSB 1984). Second, in 1984 the "Official Charities Fund" of the national government financed $20,000 in foreign medical care for Belizeans unable to afford such care (Government of Belize 1986). And third, the MOH also makes use of foreign facilities, having financed a total of $19,000 in travel for such services in 1985 (Government of Belize 1986). No data are available on the total costs of private citizens financing their own health care needs in non-Belize facilities.

H. International Donors

An important source of capital and commodities financing in Belize is the international donor community. Major donors in the health sector are USAID, UNICEF, PAHO, the Peace

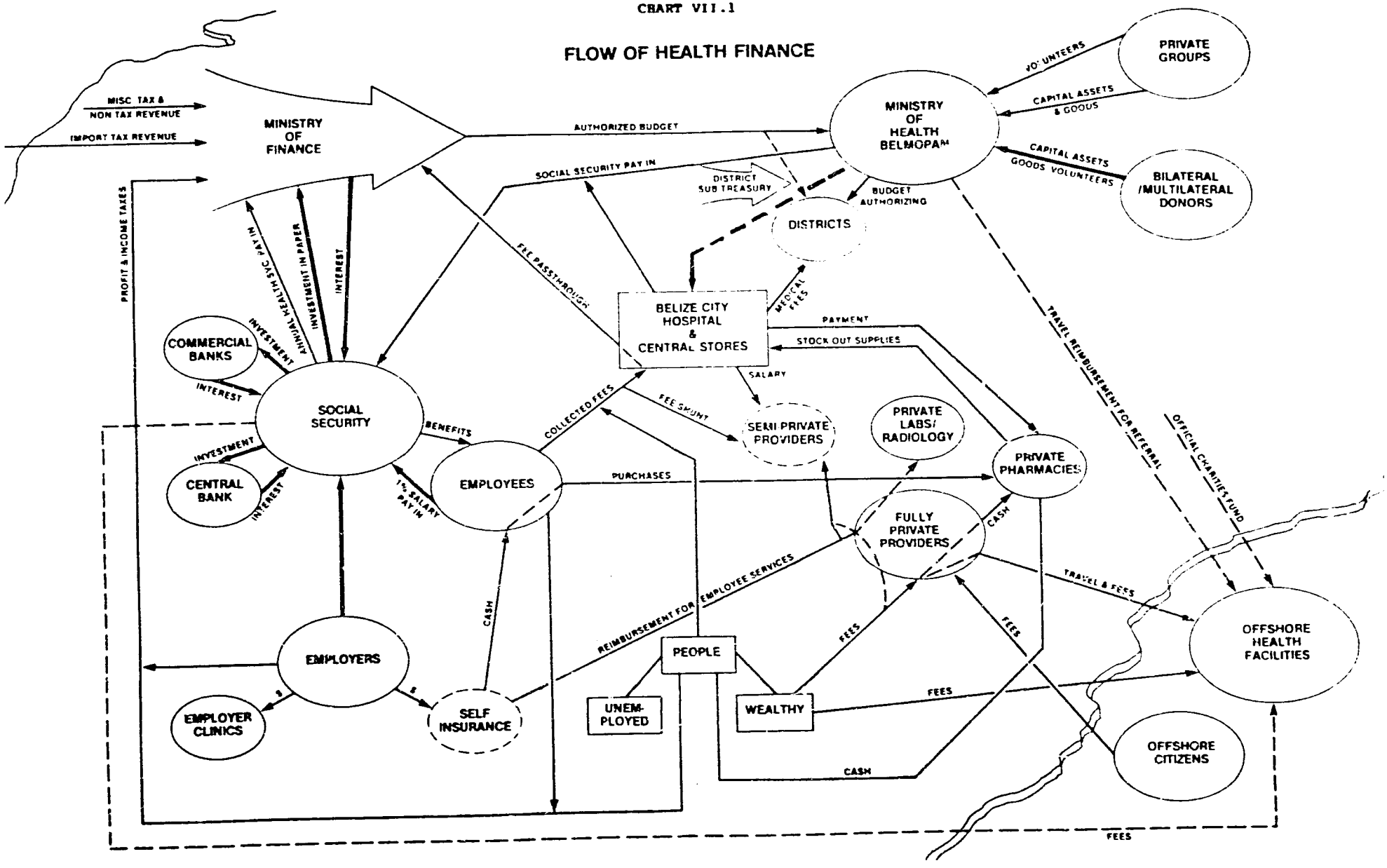
Corps, the British military, CIDA (Canada), and the Japanese and Korean aid agencies. In addition, the public health sector regularly receives unannounced gifts of medical supplies and equipment from religious and philanthropic groups, which donate privately- acquired items to the MOH or directly to individual facilities. These donations (usually of drugs or hospital supplies), delivered by the individual groups, may or may not meet health services needs. Often they are not catalogued or inventoried by the MOH, and may simply be added to BCH supplies in Central Medical Stores or, more often, be left sitting in boxes in corners of the hospital. The total value of such in-kind finance is unknown.

Indeed, the total value of official international donor grants and goods to the public health sector is difficult to determine. Donor agencies make grant or loan commitments for health programs, but carry out the procurement of capital equipment and supplies themselves. The total value of this procurement is not necessarily communicated to the Ministry of Finance or the Ministry of Health.

In addition to bilateral and multilateral international donors, a variety of voluntary non-profit organizations operate officially and regularly in Belize. Several of these are active in the health sector, including Project Hope, CARE, Wings of Hope, Rotary International, Project Concern, Volunteers in Service Overseas, the Mennonite Central Committee, and the Society of Jesus (Jesuits). These organizations provide both volunteer personnel and supplies to the health system. Two of them -- the Mennonites and the Jesuits -- are involved in actual regular service provision, although the MOH provides supplies and equipment.

CHART VII.1

FLOW OF HEALTH FINANCE



HEADQUARTERS COST/FINANCE CENTER

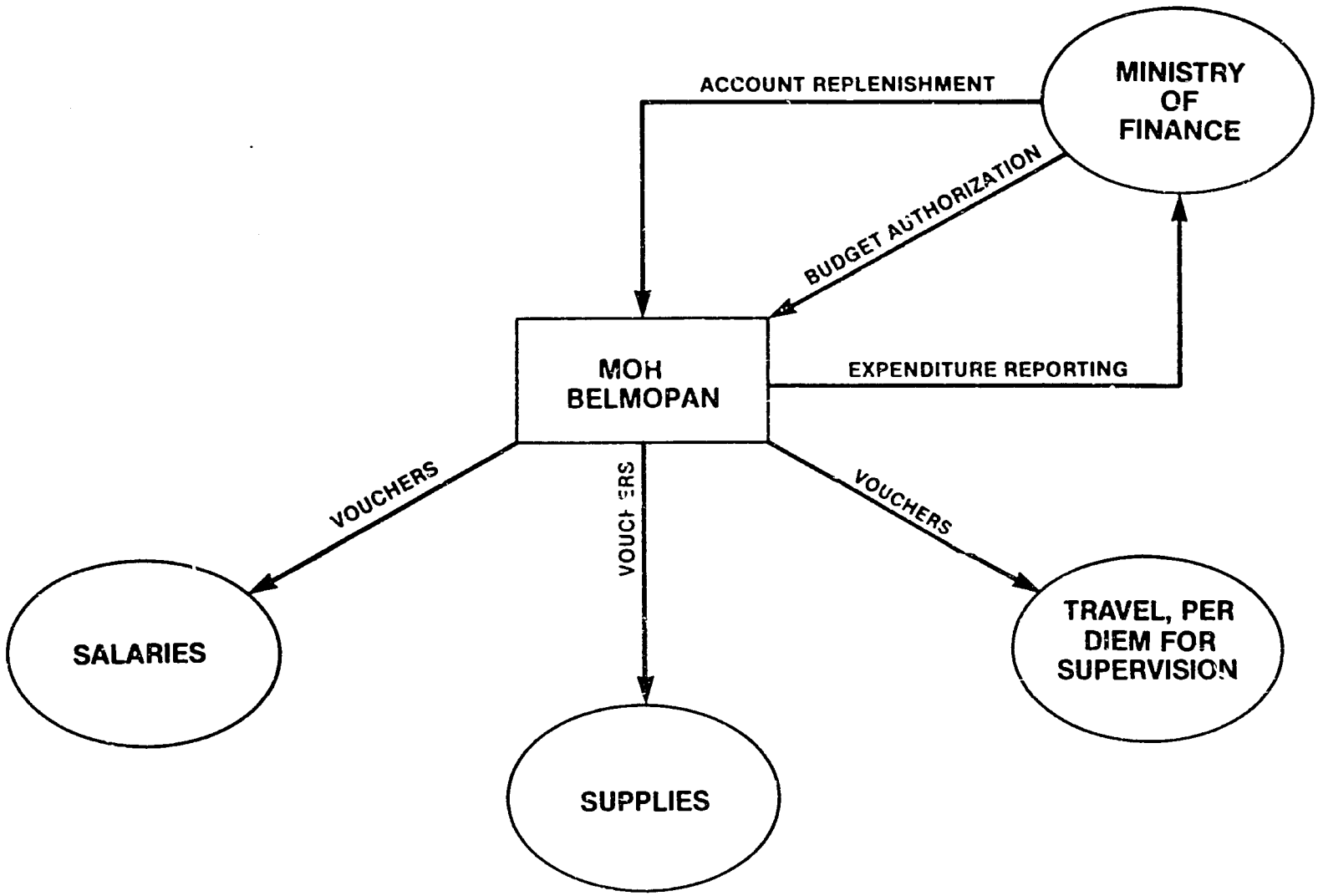


CHART VII.2

BELIZE CITY HOSPITAL—
COST/FINANCE CENTER

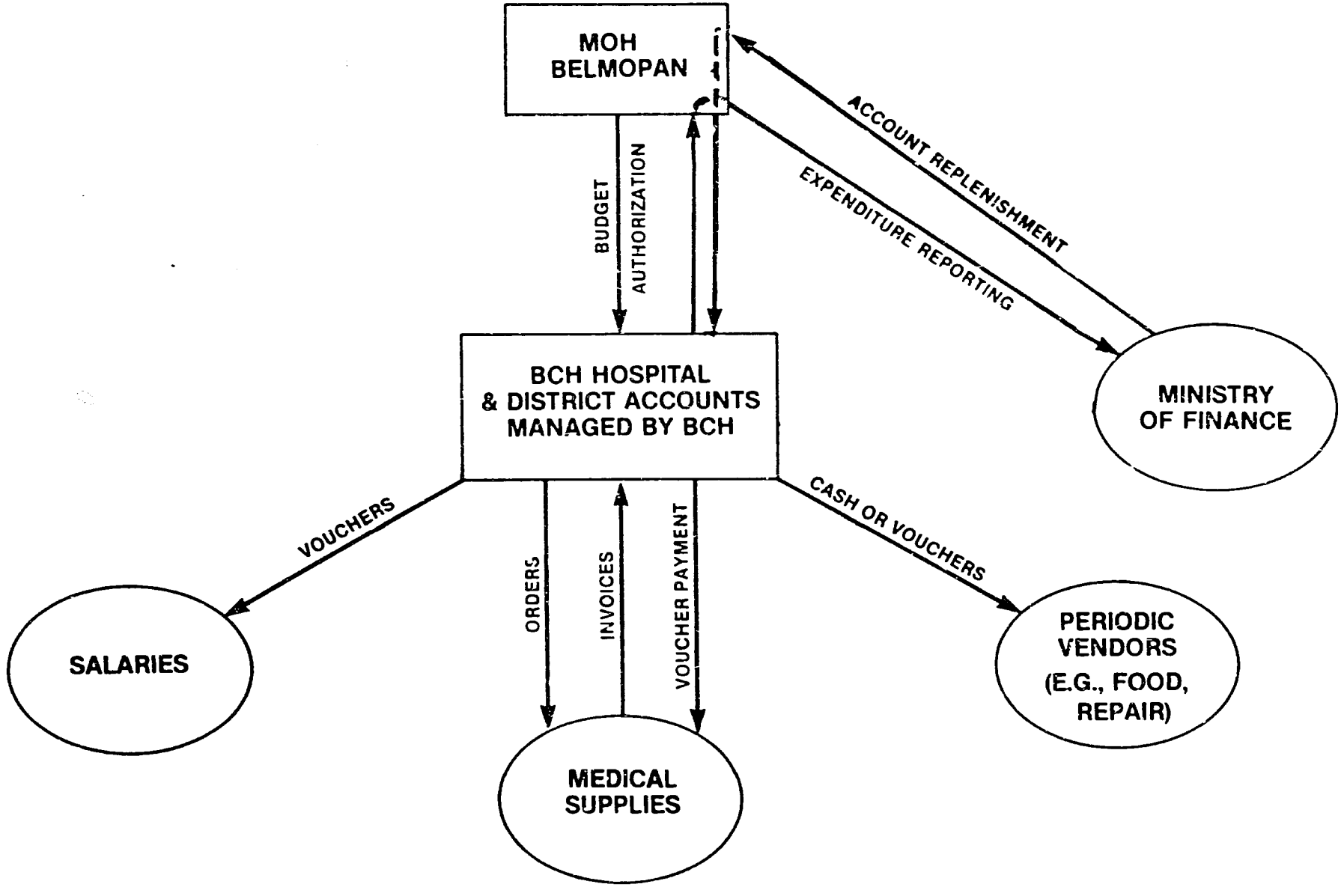


CHART VII.3

DISTRICT & VERTICAL PROGRAM COST/FINANCE CENTERS

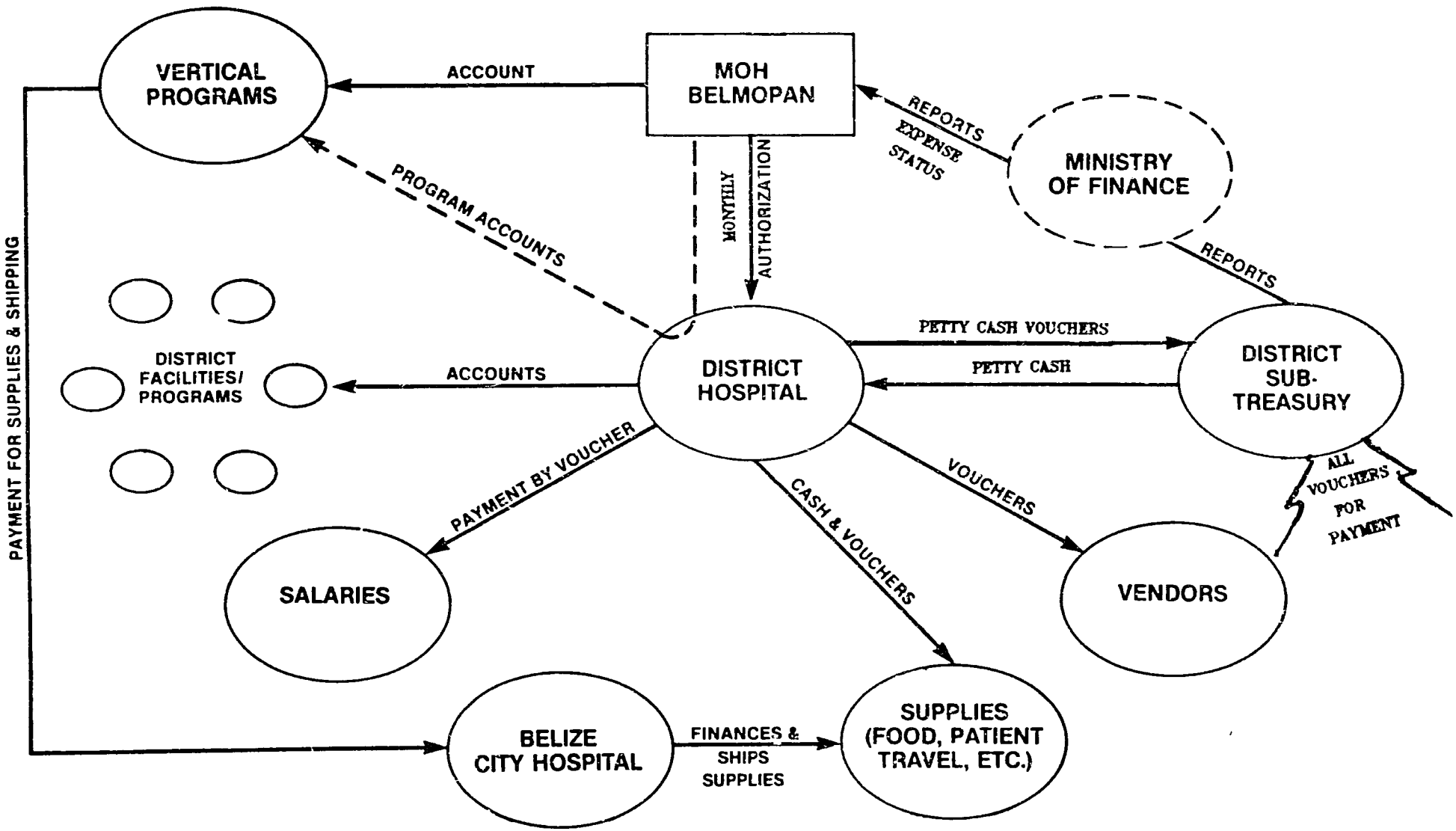


CHART VII.4

VIII. FINANCING HEALTH CARE COSTS

If options for controlling or better managing health care costs in Belize are to be examined pragmatically, it is crucial to understand the extent of the current financial participation of the various actors with interests in the health system. For this purpose, compare the "Flow Of Health Finance" diagram (Chart VII.1) with Chart VIII.1, which includes (where known) the specific amounts of financial resources involved in the various relationships. On the basis of this chart several observations can be made.

A. Recurrent Costs

Public finance for operation of the Belize health system is a very traditional process. A full 56% of the total financial resources flowing in the health care system come from government coffers. Of that, the overwhelming majority of funds are provided by the Ministry of Finance, originating from general revenues. Only two sources of funding for public health services are currently available: the annual contribution to the MOF from the SSB, and the extremely incomplete tariff collections from the BCH. The two taken together comprise just under 2% of the annual recurrent budget of the MOH, and, indeed, are not even transfers to that Ministry but instead to the general funds of the Ministry of Finance.

No creative financing schemes are in place to further recapture costs of public health services, to rigorously control costs at the point of service provision, to remove some categories of costs or some cost centers from direct public finance, or to introduce, for example, specific commodity or service taxation earmarked to defray health costs for those unable to pay for services.

On the private side of the finance equation, estimates from the 1981 Belize household expenditure survey are that 44% of total outlays for health services in Belize take place in the purely private sector. In terms of proportions, 63% of these outlays are for private physician, dental, and affiliated service fees; 14% are for prescription medications; and 23% are for over-the-counter health products (Central Planning Unit 1981).

As in the public sector, the financing mechanisms are traditional -- straight fee-for-service arrangements between providers and patients. Even the SSB, in rethinking its options in contracting for services in the private sector, has focused only on traditional fee-for-service arrangements.

Nowhere in the private sector, with the exception of some early thinking at the Banana Control Board about arranging alternate health services for employees of banana plantations, are alternate organizational and finance models being examined or used. There is little if any private health insurance marketed in Belize, and no systems exist to facilitate cost containment by managing the relationships between physicians, hospitals, patients, and payment. Because of reliance on traditional financing approaches, it is difficult to rationalize the health finance market in such a way as to expand opportunities for health services development.

As a result, health services are likely to continue to be constrained by costs in both the public and private sectors, since those costs can be financed only by general revenues or traditional fixed fee-for-service approaches. Furthermore, the situation is going to get worse. Cost escalation seems likely, particularly if (1) demographic trends continue in the direction of increased life expectancy and of changes in morbidity and mortality that will increase the number of Belizeans with expensive medical conditions; (2) the planned new hospital opens and expands system capacity; and (3) services available are not comprehensive, so that there is a major loss of revenue to foreign facilities. Moreover, so long as a majority of consumers are not a direct part of the payment process, so long as choice is removed from their health care decision-making because of government domination of service provision options (via its control of facilities), and so long as this traditional way of proceeding with health care development is pursued, opportunities for attracting larger amounts of private resources into health sector investments will remain marginal.

The irony in this situation is that Belize has both the economic capability and the policy framework within which alternate ways of financing services, controlling costs, and at the same time attracting new sources of investment and revenue can be implemented. Doing so would diversify both the sources of health care finance (de facto reducing the demands on public budgets for inpatient services, thus freeing up those budgets to address their primary concern -- preventive public health services) and expand the types and levels of services available to care for the needs of the Belizean people.

B. Capital Costs

Chart VIII.1 illustrates a serious problem for the evolution of health care development and financing in Belize. In the public sector, there is virtually total reliance on outside donors for major capital investments and equipment. Although exact numbers are difficult to determine, in fiscal 1986-87 approximately $4.4 million of donor money was

committed to the health sector, out of total estimated costs for financed projects of $15 million (Government of Belize 1986). The $4.4 million represents commitments, not disbursements; the latter figure appears not to be available anywhere in the government.

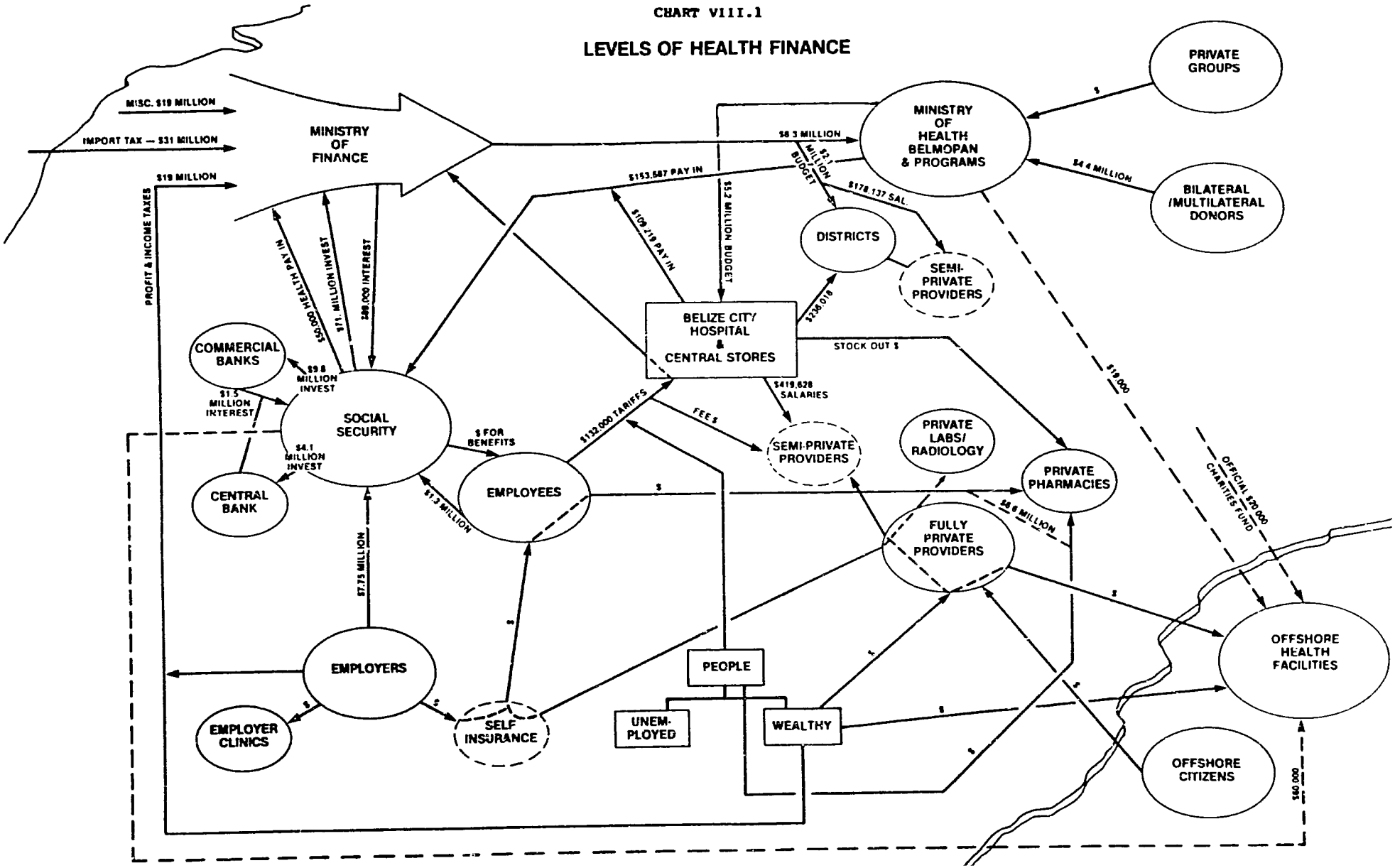
The major capital financing role of donors has placed two burdens on the public sector. On the one hand, it threatens to hold health sector development hostage to the vagaries of international donor policies and interests. On the other, unless the cost implications of major investments are carefully examined by public sector recipients, the recurrent financing implications of well-intended donor capital commitments will swamp traditional public financing capabilities and methods, and might present cost management problems for the public sector even under alternative financing and management arrangements.

On the private side, there is little capital investment in the health sector. This is a function of two financing facts. First, since the public sector dominates both health care facilities and physician access to those facilities, and since alternate payment and reimbursement systems have not been put into place to enable health care consumers to choose their sources of care, the private sector perceives that the health care market in Belize is shallow and cannot absorb additional services or points of service delivery. Second, capital equivalent to that available from donors to the public sector has not been made available to private practitioners. Credit terms in the banking community are difficult, and long term credit is hard to find. At the same time, assistance in creative capital investments in the health sector has not been made available by the major international donors.

The implications of these public and private capital finance trends will become increasingly serious in the next 10 years, as life expectancies rise and unit costs for treating chronic and degenerative diseases begin to take a toll on the health system. Without careful re-thinking of capital investment programs and sources, health sector leaders will have no alternative but a faster stream of recurrent finance moving out of the country to meet the costs of patient treatment.

CHART VIII.1

LEVELS OF HEALTH FINANCE



IX. COST MANAGEMENT

Integral to the revision of financing strategies and cost accounting methods are the methods by which the management structure can best implement the adopted policies. The concepts discussed in earlier chapters will require the use of several different organizational principles if any of the options put forward in Chapter X are to be implemented successfully. This chapter discusses management principles and techniques applicable to a cost management system, with specific examples from the Belize health program. Chart IX.1 summarizes the cost management issues facing the Belize City Hospital.

A. Responsibility for Costs

The four basic steps in initiating a cost management system are (1) to make available detailed and reliable cost information in order to track cost performance; (2) to analyze these data and establish practical short-term goals; (3) to implement change; and (4) to evaluate the results and begin a new iteration.

Responsibility for cost management will vary with the complexity of the various programs. Health care programs with very streamlined objectives can assign such responsibility to a single program director. Because of the complexity of the BCH organization and the many different types of services it provides, however, service supervisors need to bear the most immediate cost management responsibility in this setting. Although the Minister of Health is ultimately responsible for the amount spent on a hospital health care program, it is the resident department manager who -- on a daily, weekly, or monthly basis -- can monitor expenditures and most effectively change the way money is spent.

Under the current structure, the central administration of the MOH, with input from hospital managers, sets the budget for approval by Parliament. Thereafter, the Ministry monitors total line item expenditures. The only mechanism for controlling expenditures throughout the year is the eventual exhaustion of budgeted resources. Such a system forces department heads to live within a budget, but does not facilitate direct cost management in order to maximize service output for resources available. For hospital managers to become more actively involved in managing and containing costs in their departments, the first step is to reassign responsibility for departmental costs through the hospital administrators to the department heads.

B. Departmental Budgets

Along with accepting responsibility for departmental costs, managers must be provided with information on the costs of the services under their control. The current budgeting process in the MOH and within BCH focuses only on overall line items. In order for departmental managers to effectively control costs, however, they need to take active roles in identifying the amounts that will be spent within their programs for supplies, personnel, and capital equipment to deliver specified services. The process for reorganizing line item budgets into departmental budgets is discussed in detail in Appendix A.

One effect of this change in the organization of budgets and cost information is that the hospital accounting department becomes responsible for tracking and providing department heads with detailed information on expenditures by and for each department. The accounting department thus becomes a distributor of cost data, rather than a passive repository for such data.

C. Accountability

An important reason for assigning responsibility and providing detailed cost information at the department head level is to enable the individuals spending the money to be held accountable for the amounts spent. Accountability implies that departmental spending will be monitored on a regular monthly and quarterly basis, so that spending that varies from the expected pattern, whether over- or under-budget, can be explained and justified, and action to address these deviations can be taken speedily. This information then contributes to setting new departmental goals and assigning increasingly realistic costs to these goals.

D. Productivity Goals

Currently, no BCH department operates under productivity goals tied to either department or service cost. Furthermore, each department within the hospital has different units by which to measure the productivity of its service. Armed with cost data, the process of costing each service component could be undertaken. For example, the maintenance department could begin to differentiate, in both time and parts, the amount and proportion of costs spent in repairing routine office equipment from the costs of repairing medical equipment. The department would then be able to track which machines in which departments are wearing out fastest, and be better able to advise department heads on when their machines will have exhausted their useful lives. Based on charted past experience with the repair costs of various models of equipment, maintenance could also advise

department heads and Central Medical Stores on which models can be most effectively maintained.

By standardizing such cost and productivity goals across districts, the various district hospitals could be compared with each other. Norms or group averages could thus be established to assist the various departments and medical officers in evaluating their goals, measuring their effectiveness, and tightening their unit costs.

There is no institution in Belize with which to compare BCH. Therefore, measures of efficiency will have to be based on the hospital's own prior month's or prior year's experience. The process of measuring productivity would be strengthened if sister hospitals in the Caribbean or elsewhere in Latin America were identified for comparative purposes.

E. Incentives

The greatest current obstacle to beginning program budgeting and goal-setting is the lack of an incentive/reward system to make the effort worthwhile. Several suggestions are made in Chapter X for introducing tangible incentives for program budgeting and cost containment.

Financial rewards and/or public recognition are both strong motivators. Programs able to charge for their services to the private sector, such as radiology or laboratory, might find the opportunity to retain some of the revenue for their programs an incentive towards increasing the margin between costs and charges by reducing service provision costs. Bonuses or special vacation allowances are more direct and immediate rewards for meeting productivity goals. Staff need immediate feedback on their accomplishments if they are to find new and more effective means to manage costs and increase productivity. Special mention in the MOH newsletter, at public functions, or in the national press, calling attention to individuals who have improved the effectiveness and efficiency of their programs, would reward productivity with public recognition.

The emphasis should be placed on supervisors' rewarding specific actions that have improved productivity and cost allocation. Part of creating an atmosphere in which staff know that achievement will be rewarded is to provide the opportunity for all staff members to make suggestions, via suggestion boxes, quarterly round-table discussions between the administrator and staff below the department head, or similar techniques.

F. Utilization and Cost Information

As currently managed, the public hospitals in Belize have no mechanism for tying costs for services to individual patients. Any cost analysis, therefore, is immediately hampered by having to rely on averages. In order to make sound management decisions and monitor programs effectively, much greater emphasis must be placed on obtaining accurate data regarding services. This applies to data on utilization, such as numbers of laboratory tests or patient days, as well as detailed cost information about the purchase and use of supplies.

An effective tool for sensitizing staff to the costs of delivering patient care would be to include, on each patient's chart, an itemized list of the services available at the hospital, including the actual cost of each service (see Chart IX.2 for a sample). As each service is performed, these items could be checked off. All staff interacting with the patient would thus have immediate information on the costs of specific treatments. With staff so informed, it would be easier to implement more effective cost management strategies.

Hospitals generate a great quantity of detailed data, and it is easy to postpone creating a management information system until computers become available to handle the data. However, it is important to be familiar with the information that needs to be collected and the different kinds of analyses that need to be performed before the choice of computers is made. Thus each department should begin now to put in place an information system on the itemized costs and utilization of its services. Even before computerization, a 6-month review of data collected would provide a much more accurate cost picture.

For the administration and medical staff of BCH, one of the most important benefits of a management information system would be the ability to evaluate and select patient programs that should be offered at the hospital. A certain amount of triaging already takes place; physicians refer abroad those patients they are not equipped to treat. On the one hand, management information would enable the administration to review whether other patients should be sent out, and whether the decision to refer patients is being made early enough. On the other, this information would equip the administrative and medical staffs to evaluate whether certain programs could be intensified.

G. Marketing

Although government facilities are not currently in the business of competing for patients, it is nonetheless important for BCH to have a strong image in the public mind.

Belizeans are well aware that they have paid tax dollars for health care, and they need to perceive that they are receiving value for their money. Belizean hospitals could begin to inform the public of the benefits and quality of the services they provide. BCH, for example, could offer health tips on maternity, or inform the public of well-managed programs such as the malnutrition and diabetes programs. As part of this effort, patient questionnaires could be routinely provided, so that the administration could obtain direct feedback, both positive and negative, on services delivered. This procedure could become a useful tool with which the hospital administrator could monitor the perceived quality of services.

H. Management

Hospitals are twenty-four-hour, seven-day-a-week operations. However, department heads and administration work a five-day week, a recent and probably permanent reflection of public service employee benefits. Tracking patients admitted and discharged on weekends, and the inability of accounting to collect tariffs on weekends because the cashier is closed, are immediate problems. Since patient activities are conducted outside of normal business hours, it would increase efficiency to schedule evening and weekend management coverage.

CHART IX.1

COMPARISON OF MANAGEMENT PROBLEMS/OPTIONS: BCH

Problem Area	Current Situation	Options	Change Needed
Responsibility for Costs	Central Administration sets budget; departments spend budgeted amounts	Department Heads estimate budget needs, & are responsible for cost containment	Reassign responsibility to department heads
Department Budgets	No departmental knowledge of functional components of budget	Operation by program budgets for each department	Equip. managers with cost per service information; have accounting provide expense information to departments
Accountability	No direct cost control accountability assigned to program areas	Operation by program budgets for each department	As above
Productivity	No measures of goals for productivity or efficiency	Establish goals and evaluate achievement by tracking and comparing costs for each service component across departments or institutions	As above
Incentives	No incentives for cost control or containment	Varied techniques	Implement a range of techniques in BCH and districts
Information	Limited information which is highly centralized; no patient/cost data tracking sheet	Full management information system	Decision on key data data elements needed; design/implement tracking sheets
Marketing	None	Regular patient and public feedback regarding quality	Public education programs; opinion and patient surveys
Off-Hours Management	None	Around the clock	Implement full management schedule

Chart IX.2

PATIENT SUMMARY FORM

Name _____ Admission Date_____/_____/_____

Record Number_____ Discharge Date _____/_____/_____

Responsible Physician_____ Date of Birth_____/_____/_____

Birth wt. (if under 28 days)____

First Ward _____

Second Ward _____ Date moved in _____/_____/_____

Third Ward _____ Date moved in _____/_____/_____

(etc.)

First Diagnosis _____

Second Diagnosis _____

Third Diagnisis _____

(etc.)

Laboratory Exams

	Number	Price
CBC		$.10
Differential		$1.10
X-match		$2.00
(etc.)		(etc.)

Radiology Exams

	Number	Price
Ankle		$20.00
Abdomen		$25.00
Chest		(etc.)
(etc.)		

Surgery

Principal Procedure _____ Date ____/____/____ Duration _____

2nd Operating Episode _____ Date ____/____/____ Duration _____

3rd Operating Episode _____ Date ____/____/____ Duration _____

(etc.)

X. COST CONTROL AND REVENUE

This chapter presents options available within the Belize health system to control costs and generate increased revenues. The reader will note two common themes. First, the options discussed conform to the parameters set out in the first chapter of this report, in that they require neither a greater portion of income from the country's general revenues nor any greater reliance on outside donor aid. They emphasize the ability of the health sector, and individual institutions within it, to gain control of costs and expand revenue bases as a matter of essential self-sufficiency. Second, it is clear that in the short run BCH has considerable choice among the options it can implement apply to control costs and initiate cost-containment programs. It does not have to rely on difficult national policy changes to exert control over its financial life.

The hospital's options are considerably narrower, however, on the revenue side. It can generate some levels of revenue within the parameters of its own authority, but when it comes to making money, it is considerably more dependent on the policy leadership of the MOH and the national government. In controlling costs and generating some levels of revenue, BCH currently has opportunities to reallocate its expenditures to areas in greatest need of resources, but -- without cooperation at the ministerial level -- it cannot hope to escape from continued and considerable dependence on general national revenues.

A. Short Term Options: Cost Control and Containment

1. Responsibility: Belize City Hospital.

a. Match departmental responsibility with cost accountability. For example, let the kitchen determine what foods should be ordered when, with Central Medical Stores implementing this order with independent contractors. Dietary would then be responsible not only for nutrition but also for seeing that dietary needs and available funds are combined in the best possible ways.

b. Establish cost goals per department, and require justification for cost/budget requests and cost overruns.

c. Continue to improve the pharmaceuticals procurement system to avoid emergency, low-volume, stock-out buys from pharmacies. Alternatively, examine the costs and benefits of shifting to

fixed-cost procurement in the private pharmacy sector for all BCH drugs. Apply FIFO (first-in-first-out) accounting.

d. Standardize major equipment inventory by purchase cost (value), not just by items. Update inventories of capital equipment to determine inventory value and replacement costs. Create a (prioritized) list of replacement items needed, and use this as a basis for donor/philanthropic requests (see also Short Term Revenue Options, below).

e. Attach costs to all itemized shipments of supplies, to create awareness of the cost of goods used (COGU).

f. Track all inputs in a disaggregated fashion, by ward, by district, by health center -- especially drugs, medical supplies, and equipment.

g. Unpack, inventory, and use or discard donated supplies and equipment currently sitting in boxes.

h. Provide incentives for accurate and timely data collection, especially COGU, by explaining how to utilize the data for local service monitoring, planning, and resource allocation decisions.

i. Contract out ancillary services: tender for vendor competitive bids on a fixed cost basis (especially laundry, dietary, maintenance and repair), and lease space to combine cost containment and maximum revenue.

j. Change patient order sheets to show costs per test, to discourage physician over-prescription of radiology or lab tests.

k. Cut back on types of service for which excessive "stand-by capacity" is provided, by reorganizing beds to target higher-utilization wards. Alter staffing patterns acccordingly.

l. Staff administrative offices with part-time help over weekends and holidays.

m. Reward cost-containment ideas. Give an award for the most lucrative idea of the month, with the winner's name on a plaque, posted in a public location. Insert a monthly news story and pictures in local papers. Give the winner a day of vacation.

n. Institute a reward process, as above, for cost containment ideas implemented. (This would require that an administrator facilitate implementation.)

2. Responsibility: Ministry of Health. The following options lie outside the immediate area of authority of any individual institution, and would require the leadership and cooperation of senior officials in the MOH.

a. Change use parameters for physicians and their relationships to hospitals; reduce the number of physicians on salary (see also Long Term Revenue Options, below).

b. Closely assess the recurrent costs of all donor "gifts," and establish a regular list of needed equipment based on inventory reform.

c. Establish cost accountability in the districts.

d. Publish a bi-monthly report on costs per service for districts, and distribute it to all districts.

3. Responsibility: Districts. This cost control option could be carried out independently by district medical officers.

a. Establish district equivalents of cost-containment awards, as described above for Belize City Hospital.

B. Short Term Options: Revenue

1. Responsibility: Belize City Hospital

a. Lease hospital ground space space for snack, magazine, and gift vendors, and also take a percentage of sales. Land is valuable: maximize the return on the public investment.

b. Strengthen the hospital auxiliary to raise revenue in organized campaigns, working with local churches and employers. Target fixed goals, e.g., an itemized capital equipment replacement fund (see below).

2. Responsibility: Ministry of Health.

a. Negotiate with the Ministry of Finance to

keep a percentage or all -- above the current base -- of the money earned in revenue centers.

b. Establish an enforceable tariff system. Given unit costs, it is unlikely that such a system will generate cost-recovery level revenue, but a system of flat enforced fees could contribute to revenues. Fees for certain services might be paid on an installment basis, e.g., a pre-natal visit fee of $5 per visit could be credited toward the delivery fee. The introduction of fee schedules could be staged: institute fees for radiology now, followed in six months by laboratory, etc.

c. Since tariffs will not cover operating costs, place such revenues in a special fund for replacement of capital equipment.

d. Establish district-relevant tariff schedules based on detailed analysis of district costs.

C. Long Term Options: Cost Control and Containment

The options below require policy changes and therefore greater time to enact, but, like the short term options, they do not require more general general revenues or donor support. Establishing a degree of independence and self-sufficiency in the health sector is the aim. BCH has almost no ability to implement long term options alone; it must rely on, encourage, and cooperate with national policy decisions, which will be the key to longer-term, more lucrative cost-containment (and revenue) approaches.

1. Responsibility: Belize City Hospital. Most of the internal control of BCH costs can be implemented forthwith. Over the longer term, one option is necessary:

a. Revise the patient management system to link the flow-of-costs data to expenditure responsibility.

2. Responsibility: Ministry of Health.

a. Examine the options for and costs of relocating BCH geriatric patients into, for example, hospital facilities with a lower proportion of nurses in relation to support staff. Other options for substantially reducing the costs of geriatric care include the establishment of day-care centers for the elderly (with emergency links to the hospital) and the development of geriatric facilities where facility costs are at least partially met by sales of handicrafts or other

services performed by residents.

b. Re-emphasize mobile units, using hospitals as mobile-unit centers. Reduce excess bed capacity accordingly.

c. To ensure equity, charge nominally for services at urban outpatient clinics run by hospitals.

D. Long Term Options: Revenue

Although requiring major changes in current policy, a number of creative options are available for opening up new streams of revenue into the public medical sector.

1. Responsibility: Ministry of Health.

a. Offer the private sector access to laboratory and radiology services of government facilities for a fee, especially in districts near major employers with Social Security or self-insurance coverage.

b. Establish revenue options for district services in local areas -- e.g., mobile unit contractual services, described above.

c. Allow private physicians admission privileges to government hospitals, and charge their patients private hospital rates.

d. To maximize revenue on occupancy, lease a wing of BCH to private doctors for their patients. The physicians would provide the services, staffing and charging as they see fit; the hospital would charge rent plus equipment and overhead costs.

E. Recommendations

The options presented above represent specific alternatives from which Belize can choose in formulating its future cost control and finance system. To make these selection decisions more informed, however, we recommend the following efforts, aimed at completing the process of cost and finance data development so as to provide a comprehensive and valid database to support decisions on health system development.

For the Belize public health sector, three immediate steps should be considered:

1. A patient cost records system similar to that

described in this report should be initiated immediately at BCH. At the end of six months, data from this ongoing system should be aggregated and analyzed to supplement and clarify key cost data in this report. Particular attention should be given to surgery cost estimates and patient costs by diagnosis, since both will affect the recurrent cost estimates of the new hospital with its expanded surgical and intensive care capabilities.

2. The central Ministry of Health should conduct one or more workshops or seminars in Belize to review the cost methods and findings of this report and to consider options for cost control and alternative financing. All parties involved in the Belize health system should participate including the Ministry of Health, BCH and at least some district hospitals, the Ministry of Finance, the Social Security Board, private providers, private business, and major international donors.

3. In the relatively near term, several major changes will be made in the organization of the Belize health system. To prepare for these and their cost/finance implications, the MOH should carry out cost analyses at the soon-to-be-regionalized Belmopan and Orange Walk hospitals, so that costs are clear and administrators are trained in cost analysis prior to the start-up of expanded services. Similarly, the Ministry should use this report, along with cost data generated by the patient cost record system suggested under point #1 above, to assess the recurrent costs of the new Belize City facility, including services (such as ICU) not currently provided at BCH.

The Social Security Board may become a major influence in the health sector if it begins to provide broader health services reimbursement to enrollees. It faces important choices in this matter: whether to provide, purchase, or simply further utilize MOH facilities; how to structure its payments within these various choices; and how to ensure cost containment. To prepare for this likely future, the SSB should commission a careful examination of the technical and cost parameters both of its health services acquisition options (e.g., purchase versus equity participation) and of its financing options (e.g., using reserves versus increasing pay-in rates).

Finally, the private sector can also build on the results of this study. Private providers and private businesses must carefully assess the range of opportunities available for expanding their roles in meeting health services needs in Belize, so that costs can be controlled, services improved, and public finances concentrated on those unable to afford private services.

1. Major employers need to examine various methods of providing and/or paying for health care benefits until such

time as SSB benefit structures are expanded. Models for prepayment systems, self-insurance, or moderately-priced health insurance packages need to be studied. Assistance should be sought for pilot projects to test the applicability of these models to Belizean employer needs.

2. Private medical providers should also develop greater awareness of mechanisms for providing expanded services at lower costs to greater numbers of people (e.g., prepayment schemes, various group practice alternatives, etc.). Providers should aggresively examine methods for marketing services under these new organizational modes to major groups of purchasers. Such an expansion of private roles is in the Government's interest, since it would allow public resources to be focused on those in need. The Government should thus encourage, by policy and by partnership, examination of and experimentation with such private sector expansion alternatives.

FOOTNOTES

1. All cost and financial data in this report are expressed in Belize dollars. The exchange rate used is $2.00 BZ to $1.00 U.S.

2. Revenue and finance data in this section are taken from World Bank 1984a.

3. As in many developing countries, specific health status data in Belize are often of questionable quality and sometimes vary widely by source. Data not specifically collected by the study team are derived from PAHO 1985, PAHO 1986, PAHO n.d., and World Bank 1984a.

4. Open vote positions are those not yet established as permanent civil service posts.

5. All patient type data were developed by the study team.

6. All size, service, case mix, and utilization data were derived from district hospital records by the study team.

7. The program does meet other claims, such as sickness benefits (payments for work days missed due to illness), maternity benefits and grants, and retirement benefits. The number of sickness benefit claims (2,324) is much higher than injury benefits. However, since these claims are for days of work missed due to illness, their direct relation to payment for health services is unknown. Thus the analysis of Social Security's payment is based on the 713 injury claims.

8. All data pertaining to this hospital were taken from private interviews and from Santiago Castillo Hospital 1985-1986.

9. Discussion of this point, and of donor roles in the health system, is presented in detail in Section H, below, and in the capital costs section of this report.

Appendix A

METHODOLOGY FOR DETERMINING THE COST PER PATIENT AT BELIZE CITY HOSPITAL

A. Overview

Five steps were taken to assign the costs of Belize City Hospital to patient types:

1. The 1985/1986 line item budget was prepared from hospital and Ministry of Health records (Table A.1).

2. Thirty-two hospital departments or cost centers (Table A.2) were identified, and operating costs calculated for each.

3. The costs of each department were then corrected for items that were not directly attributable to BCH services. Amounts related to the district hospitals, Rockview Psychiatric Hospital, and the School of Nursing were removed from Belize City and reassigned directly to those programs. Capital costs related to specific BCH departments were annuitized and assigned to each department. All capital costs were annuitized at 8%, buildings over 20 years, and equipment costs for 5 or 10 years, depending on useful life.

4. The costs of the 9 indirect overhead departments were then separated out. These costs were stepped down to the direct service departments -- specifically, to laboratory, radiology, dispensary, patient wards, the operating theatre, and the outpatient clinics (Table A.12).

5. Finally, total costs for each patient ward were averaged across the types of patients managed in each ward. An operating room fee was assigned to surgical patients. The average treatment cost for each disease category was computed in three classes: pediatric, male and female medical, and male and female surgical (see Table IV.4).

The following sections of this Appendix describe the tasks associated with each of these stages.

B. Preparation of the 1985/1986 Line Item Budget

Financial records for the 1985/1986 fiscal year were gathered from both BCH and the Ministry of Health in Belmopan. Since expenses for BCH are paid through the Accountant General's office in Belize City, the more detailed records itemizing the

purpose of each expense were those in the books of the hospital accountant. From these records a complete line item operating expense report (Table A.1) was prepared. Total expenses for the year amounted to $6,148,857.

C. Departmental Costs

For the sake of efficiency, steps 2 and 3 (the preparation of operating and capital costs by department and the allocation of costs to the district hospitals) will be discussed in this section by department.

As noted, 32 BCH departments were isolated for the calculation of operating costs (Table A.2). (This list differs slightly from the cost centers in Table A.12, since that table includes the social security and depreciation line items ultimately used to calculate total costs, as well as calculation line items for the old-age infirmary and the Rockview mental facility, whose costs needed to be isolated so that ultimately they could be subtracted from the total cost picture.)

Table A.3 provides an initial breakdown of the $6,148,857 expenditure prior to the standardization of accounts. For each department, expenses related to programs other than BCH were deducted (which explains the difference in total cost in Tables A.2 and A.3) and the annuitized costs of capital equipment added in. Tables A.4 through A.11 provide the details for each department.

1. Administration. General expenses related to the overall management of BCH were assigned to Administration. This category (see Table A.4) included, from the hospital itself, the hospital administrator and related clerical staff, accounting, the library, and security and groundsmen.

From national programs, a percentage of the salaries of the Principal Nursing Officer (PNO) and the Director of Medical Services (DMS) were added to BCH Administration. Similarly, part of the total costs of the Medical Statistics office were assigned to Administration. The amount of the PNO and DMS salaries and the proportion of the Statistics office allocated to the hospital itself took into account their extensive commitment to vector control, public health, and maternal and child health programs outside BCH. A portion of the Ministry of Health office in Belmopan was also allocated to the hospital, based on the proportion of the total Ministry budget for BCH and Central Medical Stores.

At the same time that national expenditures related to BCH were added to the costs of Administration, certain salaries not related to BCH, but recorded in its accounts, were deducted. Examples of such deductions include salaries for primary health care and for communicable diseases control programs.

All departments in the hospital obtain stationery through the administrative office, so this item, along with the costs of telephone, electricity, and water, were assigned to the Administration. Since BCH accounts for approximately 65% of all hospital costs in Belize, 65% of utilities costs (water and electricity) were allocated to BCH.

2. Central Medical Stores. CMS purchases drugs, medical supplies, and minor capital equipment for hospitals and health centers throughout Belize. Direct costs for these items were assigned based on a one-month sample of requisitions of each patient ward and shipments to district hospitals. Expenses assigned to CMS (see Table A.5) are salaries and equipment expenses related to storing supplies and distributing them in vehicles. Expenses related to the vehicle used exclusively by CMS were split with the Vehicles program, which includes the expense of maintaining this vehicle. These expenses were split at this stage, since the Vehicles program is listed after CMS in the stepdown of indirect expenses across departments. Thus these expenses were allocated back to CMS prior to the stepdown.

Since approximately two-thirds of the expenses of the nation's hospitals are BCH expenses, 67% of the expense of managing CMS was assigned to BCH and 33% to national support for the district hospitals and health centers.

3. Maintenance. The expenses of maintenance (carpenters, plumber, electrician, and mechanics) were separated from vehicle upkeep. The salary for the maintenance supervisor was split between the Maintenance and Vehicles programs.

Maintenance staff visit district hospitals and health centers to assist with repairs beyond the skill of local staff. Based on estimates of the frequency of regional visits by BCH staff, 5% of maintenance payroll and 20% of maintenance supplies were deducted to correct for district hospital support.

Major repair to the Medical Building is a capital expense. The amount expensed in fiscal year 1985/1986 was a direct line item, so this capital amount did not require further annuitization. Repairs to the Infirmary and Rockview Psychiatric Hospital were deducted from the BCH (see Table A.6).

4. Domestic. Since ward maids were included in the computation of the direct costs per ward, this cost center covers the remaining personnel and supplies (Table A.7). The expenses of this cost center were assigned entirely to BCH.

5. Laundry. This cost center (see Table A.7) includes the salaries and supplies related to washing of hospital linen. Supplies were calculated based on an estimate of monthly expenditure.

6. Seamstress. This cost center (Table A.8) includes salaries and supplies related to sewing uniforms for nurse aides

and medical auxiliaries and lab coats for laboratory technicians. Based on the national health budget, it appeared that two-thirds of these employees are based at BCH, so the costs of this department were apportioned accordingly between BCH and the district hospitals.

The capital costs associated with the domestic, laundry, and seamstress departments were less than $1000 each when annuitized, and were treated as negligible.

7. Dietary. This cost center (Table A.8) includes the direct expenses of salaries, raw food expenses, and capital costs for food services. The dietary department supplies meals for the patient wards and a small nursing dining area, as well as meals for aides, auxiliaries, and other staff.

The raw food expense included food purchases for the School of Nursing, Rockview Psychiatric Hospital, and Infirmary. Based on records from the department, an estimated 45% of meals are served to staff. Therefore, 55% of the raw food costs were attributed to the patient wards. Of the remaining raw food cost, 50% was allocated to the three external facilities.

8. Medical Records. The expenses of this department (Table A.8) consisted solely of salaries. It was not possible to separate the paper supply costs from the total stationery expenses assigned to administration.

9. Vehicles. The vehicles program included nine drivers, half the salary of the maintenance supervisor, one Korean ambulance, two pick-up vans, staff transport to Rockview, and two-thirds of the vehicle used by Central Medical Stores. An estimated six drivers are used to transport supplies and personnel to hospitals and programs other than BCH. Therefore, the salaries for six drivers and 66% of the fuel and vehicle maintenance costs were allocated to the district hospitals.

10. Dispensary. The costs of drugs were assigned as direct supply costs to the patient wards and clinics, along with other medical supplies. This cost center (Table A.10) thus reflects only the personnel costs for the distribution of drugs to the patient wards and clinics.

11. Laboratory. There are two sections to the laboratory department: the central laboratory, located near the School of Nursing, and the "Emergency" laboratory, located on the hospital complex. The costs of both laboratories were combined. For this reason the maintenance and depreciation costs of the laboratory are relatively high, given the spacious accommodations of the central laboratory.

It was estimated that the equivalent of three laboratory technicians at the central laboratory perform tests referred from district hospitals and health centers. Therefore, the salary expense for three technicians, plus a related proportion of the

supply costs, were allocated to national support for the district hospitals (Table A.10).

12. Radiology. Total x-ray expenses for personnel, supplies, and capital were retained at BCH. The five district hospitals with x-ray units perform most of their own routine x-ray examinations. The BCH department does perform some more complex procedures for district hospitals, but these records were not compiled separately. Without a more specific measure of the severity of cases treated at district hospitals, and therefore the volume and type of complex x-ray exams, it was not possible to estimate the costs to be allocated to the district hospitals.

13. Inpatient Wards and Outpatient Clinics. Each inpatient ward and clinic was treated as a separate cost center. The salary expenses for physician specialists and medical officers were assigned to the inpatient units and clinics based on their specialties and areas of activity. Similarly, the salaries for staff nurses, practical nurses, nurse aides, operating theatre technicians, nurse midwives, attendants, and ward maids were assigned to patient units based on the personnel schedules used by the hospital nursing matron and the supervisor of the domestic service (Table A.11).

Regarding medical supplies, staff from Central Medical Stores compiled requisition lists of drugs and supplies by inpatient and outpatient unit for one representative month. These costs were annuitized to estimate the direct cost of supplies by patient unit.

Every patient unit has beds, bedside lockers, and benches. These comprised the capital costs for each patient unit. (Table A.13 details these costs for inpatient services and groups outpatient costs together).

D. Stepdown of Hospital Overhead

The maintenance supervisor provided estimates of the square footage for each department of the hospital (see Appendix C) and for the total hospital grounds. Based on estimates from a local architectural firm, the building expense was priced at $35 per square foot for timber buildings and $65 per square foot for timber and block. After discussions with a Belize City real estate firm, the land was priced at $8 per square yard. These were annuitized at 8% over a 20-year period.

The annual value of buildings and land, plus a lump sum amount for the social security payment for open vote positions (positions not yet established as permanent civil service posts), plus the expenses from the 9 indirect departments, were then allocated to those departments involved in direct patient treatment. Departments from which expenses were allocated were sequenced (or stepped down) so that those with the most widespread impact (e.g., Administration) preceded those with a

more focused or narrower impact (e.g., Medical Records).

The order in which the stepdown calculation is made is important in ultimate cost determinations, for the department that is allocated first does not, of course, receive its portion of expenses from the second department. An example may clarify this point. Assume there are three departments, Administration, Medical Records, and the Post-operative Ward. While (technically) Administration does benefit from Medical Records, the Administrative input into Medical Records (and other indirect departments) is broader. So a portion of the broader function (Administration) is allocated to Medical Records (but not Medical Records to Administration). A portion of the sum is then stepped down to the Post-operative Ward. (It is possible to double-apportion the overhead costs to take this interdependency into account; however, this level of precision was deemed unnecessary.)

Decisions on sequencing the indirect departments for stepdown to the service wards are important methodologically, and must be made in light of the organizational structure being studied.

Table A.12 provides the actual stepdown of overhead costs to the cost centers for direct patient treatment. The criteria used to step down the indirect departments, based on accessibility to the data and the extent to which they might measure the inter-relationships between departments, are as follows:

Building and land: Square feet per department.

Open vote social security payment: Payroll expense by department.

Administration: Total operating costs by department.

Central Medical Stores management: Total operating costs by department.

Maintenance: Square feet to maintain by department.

Domestic service: Personnel assignment by department.

Laundry: Estimated patient days by patient ward.

Seamstress: Nurse staffing by ward and clinic.

Dietary: Meals served by ward.

Medical records: Adjusted patient days. (This computation adds the outpatient equivalent of patient days to the inpatient days. The U.S. formula uses inpatient and outpatient revenue, for which inpatient and outpatient operating costs were substituted. The formula is as follows: [(outpatient costs per visit)/

(inpatient costs per visit) x outpatient visits = outpatient equivalent days]. The result is added to inpatient days to obtain adjusted patient days.

Vehicles: estimated departmental use.

The way the stepdown works is as follows. There are two columns. The top number in the first represents the total quantity of the factor to be distributed; the rest of the numbers represent that proportion of the factor allocated to each department by the previously-explained criteria. The top number in the second column is the cost of that department, derived from Tables A.4 - A.10. The rest of the numbers are the costs allocated to each department according to the proportion in the first column. As the stepdown procedure moves to the right, each amount from the previous step is added to the next indirect department's total, and this new total is stepped down again. Summing each amount stepped down provides the indirect allocation to each patient service department. Notice how this amount coincides with the first column in Table A.13, in which all the outpatient services have been grouped together in order to focus on the inpatient departments for the next step.

E. Average Cost Per Ward

The remaining analysis of the costs of the BCH focused on the inpatient wards, in order to obtain total costs and operating costs by patient diagnosis. Table A.13 provides a summary of BCH costs by department immediately after the allocation of overhead. This table was used to extract the inpatient ward costs and to determine the average cost by patient type.

The costs per ward were determined both by total cost, including capital and equipment costs, and by operating costs, excluding capital. Needless to say, the capital expense for the indirect departments was not included in the operating cost figures. The cost for each ward was divided by the number of patients in each ward in order to arrive at the average cost per ward.

Since a precise measure of the use of the operating room by patient diagnosis or severity of procedure was not readily available, operating theatre costs were allocated to the patients in the four surgical wards. Again, operating theatre costs were allocated to each ward on the basis of its proportion of the costs of the four wards.

In theory, once the costs of drugs had been treated as a direct expense of each department, the costs of the management of the dispensary should have been allocated to the wards as overhead in the stepdown procedure. Because BCH lacked any means to tie patients to actual dispensary use, however, the dispensary was costed out to each ward based on the proportion of total and

operating costs per ward.

F. Determination of Patient Type Per Ward

Three source documents plus physician expertise were used to assign patients to specific diagnoses within each ward. The medical statistics department provided two of the reports: one summarizing the total number of patients in each ward during 1985, and the other providing a count by diagnosis of the number of patients treated in 1985. Diagnoses in this report were classified based on the World Health Organization's International Classification of Diseases (ICD), 9th edition. The diagnoses had been summarized into about 60 categories, and more detail was necessary in order to assign these diagnoses to specific wards. Therefore, this information was cross-referenced with data from the Medical Records department on detailed ICD-9 codes, sex, and age.

Each of the three reports contains a different count of the total number of patients hospitalized in 1985. There was no solid information on how to account for these differences. The second report from Medical Statistics, on the number of patients by diagnosis category, was selected as the total count (7008 patients). The more detailed data from Medical Records was used to estimate the distribution to the wards. Considerable advice and guidance in this process was provided by the chief of the medical staff.

In BCH, patients are assigned to specific wards by their physicians. It therefore appeared that physician experience would provide the most accurate assignment of diseases to patient wards. The report from Medical Statistics providing a summary of the total number of patients in each ward was used to check the reasonableness of the assignments made. This report had the highest total number of discharges for BCH, but no diagnostic data, so could be used only as a reference tool. It could also have provided patient days and ALOS by ward, but because of the differences between this report and those that contained information on diagnoses, it was decided not to introduce patient day information.

It should be acknowledged that the assignment of patients to diagnoses is inexact. Only when the physician expert was willing to sign off on the detailed assignment of patients by diagnosis to the wards were these numbers aggregated into the 17 disease categories used in the analysis of costs by patient.

G. Average Cost per Patient Type

The average cost per patient type was calculated on both total costs (including capital) and operating costs. The same procedure was used for each of the 17 patient types, and in the following description "operating costs" could be read for "total

costs," to see how the operating cost per diagnosis was obtained.

At this point in the analysis, the two basic sources of data -- the cost per patient ward and the number of patients by diagnosis by ward -- were brought together. Using the total cost per ward and the total number of patients by ward, an average cost per patient was calculated for each ward. This was multiplied by the number of patients in each diagnosis in each ward. In other words, in any given ward, each patient had the same average cost, but for each diagnosis the cost of the patients varies according to the ward in which they were housed.

The costs were summed for each diagnosis. This total cost for each diagnosis was then divided by the total number of patients in each diagnosis, to obtain an average cost per diagnosis. These figures appear as the schedule of costs per disease category in Chapter IV.

TABLE A.1

TOTAL OPERATING COSTS FOR BELIZE CITY HOSPITAL
DURING FISCAL YEAR 1985

ITEM	AMOUNT	TOTAL
Vehicles (*):		
Maintenance and Parts	$135,206	
Fuel	$153,749	
Miscellaneous	$20,844	$309,799
Dietary (**):		
Burial	$4,689	
Food	$532,313	
Misc	$26,300	$563,302
Stationery		$13,069
Materials:		
Cleaning Aids	$86,708	
Medical Gases	$91,507	
Minor Repairs	$17,152	
Materials for Equipment	$30,804	
Uniform Allowance	$28,230	
Miscellaneous	$85,158	$339,559
Public Utilities		$178,085
Subsistence:		
Nurses	$14,219	
Doctors	$66,500	
Administrative Staff	$3,896	
Medical Auxiliaries	$9,434	$94,049
Supplies:		
Misc. Mats. & Supplies	$112,163	
Medical and Surgical	$95,013	
Pharamaceuticals	$883,882	
X-ray	$71,762	
Pathology	$83,192	$1,246,012
Repairs to Medical Building		$21,622
Personnel:		
Employees	$3,290,175	
General Social Security	$93,185	$3,383,360
TOTAL OPERATING COST		$6,148,857

(*) Country-wide
(**) Includes Infirmary, School of Nursing, and Rockview

TABLE A.2

HOSPITAL DEPARTMENTS

1) ADMINISTRATION
2) CENTRAL MEDICAL STORE
3) MAINTENANCE
4) DOMESTIC DEPARTMENT
5) LAUNDRY
6) SEAMSTRESS
7) DIETARY
8) MEDICAL RECORDS
9) VEHICLES
10) DISPENSARY
11) LABORATORY
12) RADIOLOGY
13) OUTPATIENT PHYSIOTHERAPY
14) OPERATING THEATRE
15) MATERNITY WARD
16) FEMALE MEDICAL WARD
17) FEMALE SURGICAL WARD
18) MALE MEDICAL WARD
19) MALE SURGICAL WARD
20) POST-OPERATIVE WARD
21) CHILDREN'S SURGICAL WARD
22) CHILDRENS' SPECIALTY WARD
23) CHILDREN'S MEDICAL WARD
24) NURSERY
25) CASUALTY
26) DENTAL CLINIC
27) OPTHALMOLOGY CLINIC
28) MEDICAL CLINIC
29) SURGICAL CLINIC
30) CHEST CLINIC
31) PSYCHIATRIC CLINIC
32) PEDIATRIC CLINIC

TABLE A.3

DEPARTMENTAL EXPENSE WORKSHEET
FISCAL YEAR 1985

Departments		Beds	Payroll	Supplies	Building expense	Capital equipment	Total
Wards:							
Maternity	MA	34	$262,018				$262,018
Female medical	FM	25	$169,033				$169,033
Female surgical	FS	25	$177,848				$177,848
Male medical	MM	17	$118,598				$118,598
Male surgical	MS	11	$110,227				$110,227
Post-operative	PO	24	$169,869				$169,869
Children's surgical	CS	16	$133,115				$133,115
C3	C3	12	$88,661				$88,661
Children's medical	CM	15	$98,455				$98,455
Nursery	NU	7	$129,640				$129,640
Operating theatre			$238,542	$91,507			$330,049
Dental			$31,748				$31,748
Casualty			$185,195				$185,195
Opthalmology			$20,805				$20,805
Medical clinic			$4,235				$4,235
Surgical clinic			$13,969				$13,969
Chest clinic			$66,722				$66,722
Psychiatric clinic			$39,699				$39,699
Pediatric clinic			$9,512				$9,512
Infirmary			$5,042				$5,042
Physiotherapy			$12,324				$12,324
Radiology			$61,090	$71,762	$1,200		$134,050
Laboratory			$102,316	$83,192			$185,508
Dispensary			$98,430				$98,430
Central Medical Store			$41,286	$1,091,058		$4,435	$1,136,779
Dietary			$54,660	$563,302			$617,962
Medical Records			$29,244				$29,244
Domestic			$24,930	$86,708			$111,638
Laundry			$37,595	$5,721			$43,316
Seamstress			$11,424	$38,055			$49,479
Maintenance			$47,070	$133,114			$180,184
Vehicles			$34,268	$288,955		$21,622	$344,845
Administration			$639,921	$211,998			$851,919
General Social Security			$93,185				$93,185
Total			$3,360,684	$2,665,372	$1,200	$26,057	$6,053,313

TABLE A.4

COST COMPOSITION OF
ADMINISTRATION EXPENSES

Includes:
Hospital Administration
Allocated Ministry of Health
Accounting Office
Nursing Administration
Library Services
Medical Statistics Office
Groundskeepers

	Expenses	Total
Payroll:		
BCH Personnel		
(Budget item # 1902/01)	$321,496	
Less: Medical Officers	($130,592)	
90% Prin. Nursing Off.	($16,481)	
90% Dir. of Hlth. Svce.	($20,174)	
Admin. & Accting. salaries	$154,249	
Groundskeepers	$17,640	
Related subsistence	$3,896	
Subtotal, Hospital payroll		$175,785
Allocations from:		
National level of Ministry	$79,230	
Medical Statistics	$12,707	
Subtotal, National Administration		$91,937
Total, payroll		$267,722
Non-payroll:		
Stationery	$13,069	
Additional paper materials	$29,844	
Utilities	$115,755	
Telephone	$153,478	
Total, non-payroll		$312,146
Capital:		
Capital equipment	$12,987	$12,987
Total Administration		$592,855

TABLE A.5

COST COMPOSITION OF
CENTRAL MEDICAL STORES (*)

Payroll expense	$41,286
Use of vehicle (see vehicles)	$4,429
Capital equipment	$2,316
Total	$48,031
Allocation to:	
Nation ($48,031 x .33)	$15,850
BCH ($48,031 x .67)	$32,181

(*) Direct costs of supplies were assigned to the individual departments.

TABLE A.6

COST COMPOSITION OF
MAINTENANCE (*)

	BCH		National allocation
Personnel	$42,396		
Supervisor	$4,674		
Payroll expense		$47,070	$2,354
Building - minor	$17,152		
Materials	$30,804		
Replace parts	$85,158		
Welding	$4,000		
Non-payroll		$137,114	$23,992
Capital	$21,622		
Less Rockview & Infirmary	($6,958)		
		$14,664	$6,958
Total		$198,848	$33,304

(*) All data are from BCH records.

(**) Personnel include:

Carpenters	5
Plumber	1
Electricians	2
Mechanics	3

(***) Partial salary; see Table A.9 for the remainder.

TABLE A.7

COST COMPOSITION OF
DOMESTIC AND LAUNDRY SERVICES

Domestic (*)		
Personnel		
Maids (5 x $3,594)	$17,970	
Supervisor	$6,960	
Total, personnel		$24,930
Supplies		$86,708
Total costs		$111,638
Laundry		
Personnel		$37,595
Supplies		$5,721
Total costs		$43,316

(*) Payroll expense for 24 maids assigned directly to personnel costs for wards and clinics

TABLE A.8

COST COMPOSITION OF SEAMSTRESS, DIETARY AND MEDICAL RECORDS SERVICES

Seamstress			
Personnel		$11,424	
Linen supplies		$38,055	
Total			$49,479
BCH (67%)		$33,151	
Dietary			
Personnel		$54,660	
Raw food	$563,302		
Less Infirmary Rockview, & Nursing School	($126,703)		
		$436,599	
Capital		$22,592	
Total			$513,851
Medical Records			
Personnel		$29,244	
Total			$29,244

TABLE A.9

COST COMPOSITION OF
VEHICLES PROGRAM

	National usage		BCH allocation	
Drivers	$34,268		$14,931	
Supervisor	$4,674		$2,037	
Subtotal, payroll		$38,942		$16,968
Maintenance	$135,306		$81,184	
Fuel	$153,749		$92,249	
Rental	$20,000		$20,000	
Sub-total, non-payroll		$309,055		$193,433
Ambulance & trucks	$13,420		$13,420	
Less 33% for Central Med. Stores	($4,429)		($4,429)	
Subtotal, capital		$8,992		$8,992
Total		$356,989		$219,392

TABLE A.10

COST COMPOSITION OF
DISPENSARY, LABORATORY AND RADIOLOGY SERVICES

Dispensary		
Personnel	$98,430	
Total		$98,430
Laboratory		
Personnel	$102,316	
Supplies	$83,192	
Capital	$67,475	
Total		$252,983
Allocated to nation	$34,708	
BCH Total	$218,275	
Radiology		
Payroll	$61,098	
Supplies	$71,762	
Contracted services	$1,200	
Capital equipment	$68,055	
Total		$202,115

TABLE A.11

PERSONNEL COST BY PATIENT SERVICE DEPARTMENT
(Based on personnel distribution to each department)

PERSONNEL	MEDICAL SPECIALISTS	MEDICAL OFFICERS	DEPT. SISTERS	WARD SISTERS	STAFF REGIST. NURSES	PRACTICAL NURSES	NURSES AIDES & NURSE AUXILIARIES	THEATRE TECHS	MIDWIVES	ATTENDANTS	WARD MAIDS	SUB-TOTAL	NURSING BENEFITS	TOTAL WARD COST
WARDS:														
MATERNITY	$31,748	$25,366	$9,572	$8,622	$41,760	$0	$3,798		$112,086	$3,584	$10,782	$247,718	$14,300	$262,018
FEMALE MEDICAL	$31,748	$25,366		$8,622	$41,760	$28,548	$11,394			$3,584	$7,188	$158,210	$10,623	$169,033
FEMALE SURGICAL	$31,748	$25,366	$9,572	$0	$41,760	$33,136	$11,394			$3,584	$7,186	$166,148	$11,700	$177,848
MALE MEDICAL	$31,748	$25,366		$4,311	$20,880	$17,568	$5,697			$3,584	$3,594	$112,748	$5,850	$118,598
MALE SURGICAL	$31,748	$15,993		$4,311	$20,880	$17,568	$5,697			$3,584	$3,594	$104,377	$5,850	$110,227
POST-OPERATIVE	$31,748	$16,995		$8,622	$55,680	$25,207	$5,697			$3,584	$7,188	$158,721	$11,148	$169,869
CHILDREN'S SURGICAL	$31,748	$16,995	$4,936	$0	$27,840	$26,352	$3,416			$3,584	$10,782	$125,705	$7,410	$133,115
C3	$21,271	$0		$8,622	$13,920	$23,363	$7,596			$3,584	$3,594	$81,953	$6,708	$88,661
CHILDREN'S MEDICAL	$21,271	$0	$4,936	$0	$27,840	$26,352	$3,418			$3,584	$3,594	$91,045	$7,410	$98,455
NURSERY	$21,271	$0		$0	$55,680	$28,109	$3,798			$3,584	$7,188	$119,630	$10,010	$129,640
OPERATING THEATRE	$40,256	$65,256	$0	$24,672	$50,784	$17,568	$11,394	$10,344		$3,584	$3,594	$227,492	$11,050	$238,542
DENTAL	$31,748	$0		$0								$31,748	$0	$31,748
CASUALTY	$0	$101,464		$8,622	$27,840	$23,365	$8,546				$7,188	$177,025	$8,171	$185,195
OPTHALMOLOGY	$9,959			$8,622			$1,899					$20,480	$325	$20,805
MEDICAL CLINIC				$0			$2,849				$599	$3,747	$488	$4,235
SURGICAL CLINIC				$8,622			$3,798				$899	$13,319	$650	$13,969
CHEST CLINIC	$30,178			$8,622	$13,920	$5,841	$3,798				$899	$63,258	$3,465	$66,722
PSYCHIATRIC CLINIC	$30,178			$8,622			$0				$599	$39,699	$0	$39,699
PEDIATRIC CLINIC				$8,622			$760					$9,382	$130	$9,512
INFIRMARY						$5,841	$0							
TOTAL	$428,409	$319,170	$29,916	$119,514	$440,544	$284,821	$94,950	$10,344	$112,086	$39,424	$79,068	$1,952,404	$115,466	$2,067,889

TABLE A.12 (PART 1)

STEPDOWN PROCEDURE USED TO ALLOCATE INDIRECT COSTS
BELIZE CITY HOSPITAL

Indirect cost centre	Net Expense	Building and land		Social Security		Administration		Central Med. Stores	
		Factor	Amount	Factor	Amount	Factor	Amount	Factor	Amount
Cost criteria		Square feet	$	Payroll expense	$	Operating costs	$	Operating costs	$
Indirect departments									
Depreciation - building & land	$772,957	1.000	772,957						
Social Security	$93,185			1.000	93,185				
Administration	$592,855	0.113	87,242	0.098	9,092	1.000	689,189		
Central Medical Stores	$32,181	0.067	51,645	0.016	1,472	0.013	8,998	1.000	94,296
Maintenance	$198,848	0.004	2,837	0.018	1,678	0.052	35,994	0.053	4,963
Domestic	$111,638	0.001	887	0.010	889	0.032	21,746	0.032	3,008
Laundry	$43,316	0.038	29,273	0.014	1,340	0.012	8,421	0.012	1,167
Seamstress	$33,151	0.006	4,743	0.004	407	0.009	6,436	0.009	892
Dietary	$513,851	0.025	19,210	0.021	1,949	0.133	91,662	0.136	12,857
Medical Records	$29,244	0.023	17,998	0.011	1,043	0.008	5,685	0.008	768
Vehicles	$219,392	0.019	14,629	0.015	1,388	0.069	47,242	0.069	6,504
Direct departments									
Dispensary		0.026	20,126	0.038	3,509	0.028	19,135	0.028	2,652
Laboratory		0.174	134,749	0.039	3,648	0.050	34,494	0.050	4,739
Radiology		0.022	16,993	0.023	2,178	0.038	26,245	0.038	3,612
Physiotherapy		0.003	2,689	0.005	439	0.003	2,396	0.004	332
Operating Theatre		0.026	20,185	0.081	7,511	0.086	59,240	0.087	8,226
Maternity		0.090	69,377	0.089	8,257	0.067	46,492	0.069	6,490
Female medical		0.064	49,650	0.053	4,940	0.041	28,495	0.041	3,900
Female surgical		0.067	51,645	0.055	5,168	0.043	29,379	0.043	4,072
Male medical		0.018	13,831	0.039	3,642	0.030	20,458	0.030	2,836
Male surgical		0.018	13,831	0.036	3,343	0.027	18,831	0.028	2,610
Post-operative		0.052	40,370	0.050	4,675	0.039	26,691	0.039	3,700
Children's surgical		0.017	13,004	0.042	3,934	0.032	22,351	0.033	3,098
C3		0.008	6,413	0.028	2,653	0.023	15,666	0.023	2,171
Children's medical		0.024	18,914	0.029	2,698	0.023	15,614	0.023	2,164
Nursery		0.008	6,206	0.035	3,285	0.028	19,116	0.028	2,650
Casualty		0.019	15,013	0.062	5,823	0.048	32,753	0.048	4,568
Dental		0.006	4,655	0.012	1,132	0.009	6,172	0.009	855
Opthalmology		0.010	7,807	0.008	742	0.006	4,044	0.006	561
Medical clinic		0.010	7,807	0.002	151	0.001	974	0.001	135
Surgical clinic		0.010	7,807	0.005	498	0.004	2,866	0.004	397
Chest clinic		0.010	7,807	0.022	2,048	0.016	11,318	0.017	1,569
Psychiatric clinic		0.010	7,807	0.015	1,415	0.011	7,868	0.012	1,091
Pediatric clinic		0.010	7,807	0.004	339	0.003	1,849	0.003	256
Infirmary				0.020	1,897	0.015	10,343	0.015	1,434

Note: Social Security does not receive building and land costs as it occupies no space.
Costs allocated only to those departments where resources are consumed.
This table has been revised from the authors' original to correct for minor inconsistencies, affecting total cost by about 1 percent.

TABLE A.12 (PART 2)

STEPDOWN PROCEDURE USED TO ALLOCATE INDIRECT COSTS
BELIZE CITY HOSPITAL

Indirect cost centre	Maintenance		Domestic		Laundry		Seamstress	
	Factor	Amount	Factor	Amount	Factor	Amount	Factor	Amount
Cost criteria	Square feet	$	Personnel staffing	$	Patient days	$	Nursing Staffing	$
Indirect departments								
Depreciation - building & land								
Social Security								
Administration								
Central Medical Stores								
Maintenance	1.000	244,320						
Domestic	0.001	349	1.000	138,517				
Laundry	0.047	11,518	0.017	2,388	1.000	97,423		
Seamstress	0.008	1,866	0.017	2,388			1.000	49,884
Dietary	0.031	7,558	0.023	3,152				
Medical Records	0.029	7,082	0.011	1,576				
Vehicles	0.024	5,756						
Direct departments								
Dispensary	0.032	7,919	0.034	4,776				
Laboratory	0.217	53,019	0.059	8,120			0.235	11,738
Radiology	0.027	6,586	0.034	4,776				
Physiotherapy	0.004	1,058	0.011	1,576				
Operating Theatre	0.033	7,942	0.034	4,776	0.021	2,046	0.088	4,402
Maternity	0.112	27,297	0.103	14,329	0.142	13,834	0.029	1,467
Female medical	0.080	19,535	0.069	9,553	0.125	12,178	0.088	4,402
Female surgical	0.083	20,320	0.069	9,553	0.136	13,250	0.088	4,402
Male medical	0.022	5,442	0.034	4,776	0.103	10,035	0.044	2,201
Male surgical	0.022	5,442	0.034	4,776	0.066	6,430	0.044	2,201
Post-operative	0.065	15,884	0.034	4,776	0.125	12,178	0.044	2,201
Children's surgical	0.021	5,116	0.103	14,329	0.092	8,963	0.026	1,320
C3	0.010	2,523	0.034	4,776	0.035	3,410	0.059	2,934
Children's medical	0.030	7,442	0.034	4,776	0.092	8,963	0.026	1,320
Nursery	0.010	2,442	0.034	4,776	0.042	4,092	0.029	1,467
Casualty	0.024	5,907	0.069	9,553	0.021	2,046	0.066	3,301
Dental	0.007	1,831	0.034	4,776				
Opthalmology	0.010	2,397	0.017	2,407			0.044	2,201
Medical clinic	0.010	2,397	0.017	2,407			0.022	1,100
Surgical clinic	0.010	2,397	0.017	2,407			0.029	1,467
Chest clinic	0.010	2,397	0.017	2,407			0.029	1,467
Psychiatric clinic	0.010	2,397	0.016	2,200				
Pediatric clinic	0.010	2,397	0.017	2,407			0.006	293
Infirmary								

TABLE A.12 (PART 3)

STEPDOWN PROCEDURE USED TO ALLOCATE INDIRECT COSTS
BELIZE CITY HOSPITAL

Indirect cost centre	Dietary		Medical Records		Vehicles		
	Factor	Amount	Factor	Amount	Factor	Amount	
Cost criteria	Meals served	$	Adj. pat. days	$	Est. dept. use	$	Totals
Indirect departments							
Depreciation - building & land							
Social Security							
Administration							
Central Medical Stores							
Maintenance							
Domestic							
Laundry							
Seamstress							
Dietary	1.000	650,239					
Medical Records			1.000	63,416			
Vehicles					1.000	294,911	
Direct departments							
Dispensary					0.05	14,746	72,863
Laboratory					0.05	14,746	265,251
Radiology					0.05	14,746	75,237
Physiotherapy							8,491
Operating Theatre							114,328
Maternity	0.133	86,294	0.137	8,716			282,553
Female medical	0.202	131,096	0.121	7,645			271,393
Female surgical	0.155	101,044	0.131	8,313			247,144
Male medical	0.106	69,205	0.100	6,317			138,742
Male surgical	0.068	44,246	0.054	3,399			105,109
Post-operative	0.165	107,247	0.121	7,660			225,383
Children's surgical	0.073	47,283	0.089	5,626			125,024
C3	0.073	47,283	0.034	2,134			89,964
Children's medical	0.025	16,542	0.089	5,626			84,060
Nursery			0.042	2,633			46,667
Casualty			0.062	3,962	0.8	235,929	319,054
Dental			0.011	710			20,132
Opthalmology			0.001	81			30,240
Medical clinic			0.002	121			15,093
Surgical clinic			0.002	157			17,997
Chest clinic			0.001	37			29,051
Psychiatric clinic			0.003	171			22,948
Pediatric clinic			0.002	109			15,458
Infirmary					0.05	14,746	28,419

TABLE A.13

COST DISTRIBUTION
TU INPATIENT SERVICES
AFTER STEPDOWN PROCEDURE

	Indirect costs	Payroll	Supplies	Capital	Total
Dispensary	$72,863	$98,430			$171,293
Laboratory	$265,251	$102,316	$83,192	$67,475	$518,234
Radiology	$75,237	$61,098	$71,762	$68,055	$276,152
Operating theatre	$114,328	$238,542	$363,514	$108,132	$824,516
Maternity	$282,553	$262,018	$85,862	$10,025	$640,458
Female medical	$271,393	$169,033	$68,736	$3,715	$512,877
Female surgical	$247,144	$177,848	$70,457	$4,055	$499,504
Male medical	$138,742	$118,598	$21,688	$2,538	$281,566
Male surgical	$105,109	$110,227	$20,157	$1,988	$237,481
Post-operative	$225,383	$169,869	$104,851	$3,911	$504,014
Children's surgical	$125,024	$133,115	$49,736	$2,940	$310,815
C3	$89,964	$88,660	$9,288	$2,178	$190,090
Children's medical	$84,060	$98,455	$36,786	$2,770	$222,071
Nursery	$46,667	$129,640	$12,223	$510	$189,040
Totals	$2,143,718	$1,957,849	$998,252	$278,292	$5,378,111
Outpatient	$468,465	$371,885	$123,917	$23,160	$987,427
TOTAL	$2,612,183	$2,329,734	$1,122,169	$301,452	$6,365,538

Appendix B

TERMS AND DEFINITIONS

Operating Costs are the costs of personnel, and of any supplies consumed by a department within one year that cost less than $500.

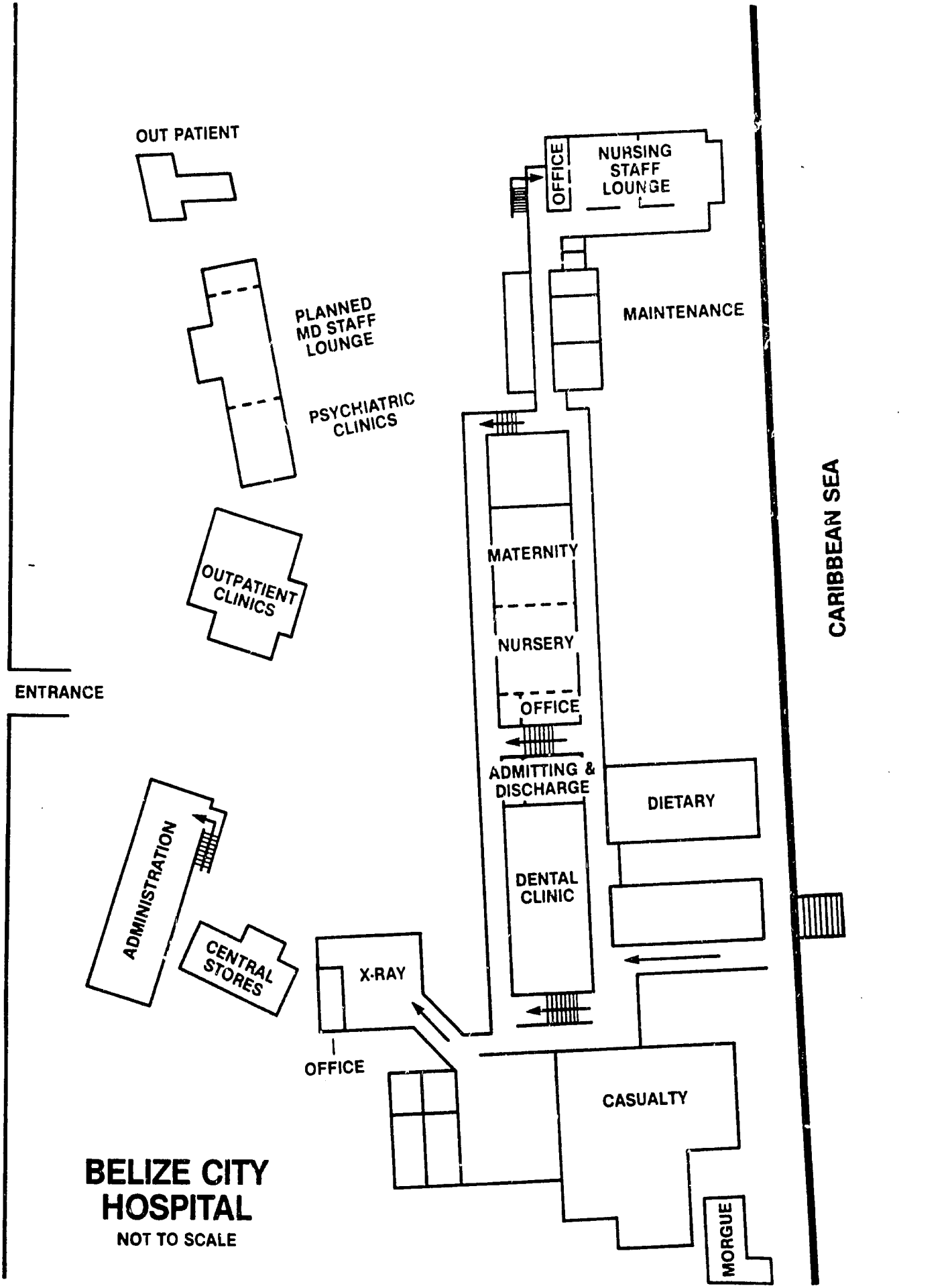
Capital equipment is equipment valued at greater than $500 with a useful life longer than one year.

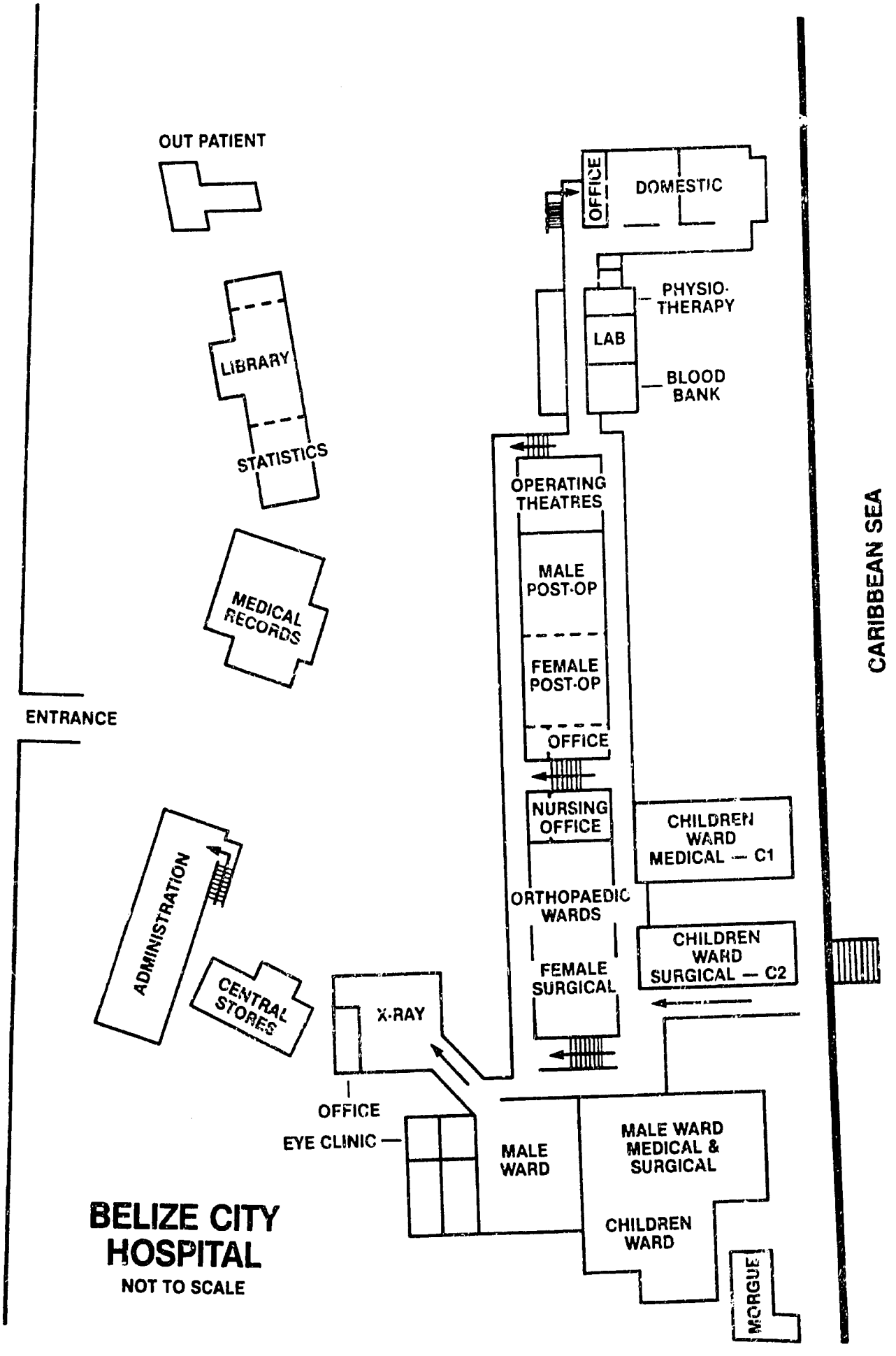
Total costs are operating costs plus annuitized costs of land, buildings, and capital equipment.

Costs for hospital departments that support the basic operation of a facility, such as maintenance or administration, are classified as the indirect costs of running the facility. Those costs incurred in the provision of direct patient treatment, such as laboratory or nursing costs, are clasified as the direct costs of caring for patients.

Hospitals that maintain services to treat patients referred in from less well equipped facilities must pay for the continuous availability of their more specialized resources. These costs are called stand-by capacity costs. Stand-by capacity should be distinguished from under-utilization of a hospital's beds, which implies that the hospital is staffed to manage more patients in routine care than are required by the population it serves. The distinction between under-utilization and stand-by capacity can best be seen by examining the volume of patients by type of diagnosis and patterns of referral to the hospital.

The Full Time Equivalent (FTE) method of counting the number of hospital employees adjusts for intervals between resignations and new appointments to vacancies, and measure the amount of time actually worked at a hospital in terms of full-time staffing. This measure of personnel is particularly significant in nursing departments, which have large personnel allocations.


OUT PATIENT
OFFICE
NURSING STAFF LOUNGE
PLANNED MD STAFF LOUNGE
MAINTENANCE
PSYCHIATRIC CLINICS
OUTPATIENT CLINICS
MATERNITY
NURSERY
OFFICE
ADMITTING & DISCHARGE
DIETARY
CARIBBEAN SEA
ENTRANCE
ADMINISTRATION
CENTRAL STORES
DENTAL CLINIC
X-RAY
OFFICE
CASUALTY
MORGUE
BELIZE CITY HOSPITAL
NOT TO SCALE
GROUND FLOOR


OUT PATIENT
OFFICE
DOMESTIC
PHYSIO-THERAPY
LAB
BLOOD BANK
LIBRARY
STATISTICS
OPERATING THEATRES
MALE POST-OP
FEMALE POST-OP
OFFICE
MEDICAL RECORDS
CARIBBEAN SEA
ENTRANCE
NURSING OFFICE
CHILDREN WARD MEDICAL — C1
ADMINISTRATION
ORTHOPAEDIC WARDS
CHILDREN WARD SURGICAL — C2
CENTRAL STORES
X-RAY
FEMALE SURGICAL
OFFICE
EYE CLINIC
MALE WARD
MALE WARD MEDICAL & SURGICAL
CHILDREN WARD
MORGUE
BELIZE CITY HOSPITAL
NOT TO SCALE

FIRST FLOOR

Appendix D

DISTRICT HOSPITALS AND HEALTH CENTERS

Data on district-level service utilization were gathered from Belize's central health information service. These included data on hospital disease categories and volumes and on the volume of services provided by community health programs for entire districts. Data relating to services provided by individual health centers were collected at district health centers and local clinics. When only a partial year's accumulation was available, projections were made based upon the available months.

On the cost side, data sources were more complex and time was a constraint. A sample of three hospitals (Orange Walk, Dangriga and San Ignacio) was chosen, based upon recommendations from the Permanent Secretary about which institutions would be most representative, as well as upon easy accessibility and geographic dispersion criteria.

Orange Walk is a new brick hospital in the north of the country; Dangriga is an older wooden hospital in the south, while San Ignacio is the second oldest wooden hospital (only BCH is older) and represents the west. Orange Walk provides a reference for Belmopan, which is of similar construction, while Corozal and Punta Gorda are represented by the other two hospitals.

For district hospitals, personnel and dietary costs came from local vote control books and were confirmed at the national level. However, the amounts of medical supplies, drugs, and general operating supplies had to be roughly projected based upon sample monthly orders from Central Medical Stores by the dispenser at each hospital. The value of each item was determined using purchase prices from Central Medical Stores records as well as local market prices for household items. Vehicle costs are based upon Blue Book values for district vehicles annuitized over 7 years. Equipment costs are based upon the actual inventory of items in each establishment. Prices were assigned using a valuation sheet composed of different sources of information, ranging from the 1986 UNIPAC price catalogue (UNIPAC 1986) to suppliers' bids to reasonable estimates. These costs were annuitized at 8% for either a 5- or 10-year useful life. Finally, building costs were determined by square footage and building type, using an estimate from the Public Works division of $35 per square foot for timber buildings, $65 for timber and block, and $85 for cement and block. Land costs were computed for the value of the square yardage -- approximately $2 per square yard in the districts. The total was annuitized at 8% for 20 years. National support costs,

consisting of those items paid for or provided by either the national administrative office or BCH, were allocated to each district based on the direct cost of each hospital. Average equipment and building costs were employed for those hospitals not sampled, while supplies costs were derived from the Central Medical Stores sample.

For the sake of convenience, the health center sample was taken from the same districts sampled for hospitals. In Orange Walk, the health center is physically incorporated as a wing of the hospital; in Dangriga and San Ignacio, it is on the hospital premises, but is housed in a separate building. There is great variety in construction types among health centers throughout the country, and in some communities clinic space is rented. Clinics visited during the investigation are not necessarily representative of the country as a whole.

Its brick and mortar construction makes the facility at Hopkins representative of recently-constructed clinics. Due to time limitations, no wooden clinic was visited, but it is reasonable to assume that the wooden urban health centers in Dangriga and San Ignacio are representative of that construction type. The Mopan clinic defies categorization since its elaborate physical infrastructure was financed by the Nazareans and later taken over by the government.

For the personnel costs of both urban and rural health centers, it was necessary, due to time constraints, to use average salaries and emoluments. Medical supplies costs were derived from one-month samples of orders from district dispensers. Vehicle costs of mobile clinics were aggregated, and included as a cost only for the district health center. Buildings and inventory were treated in the same fashion as hospitals, while national support costs were divided in a 70/30 split between hospitals and health centers. Between health centers, these costs were proportionately distributed.

A major problem in the statistics section of the Belizean health sector is the quality of data from health clinics. The study team and MOH statisticians had little confidence in these data, and for this reason no effort was made to link costs to patient service levels.

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