HEALTH IN THE EASTERN CARIBBEAN

By

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INTRODUCTION:

Recently, there has developed an increased interest in the health system a country utilizes to deliver health care to its population. It is a well accepted position that systems are important determinants in the success of improving the health status of any population. In the last two decades, England, Canada, Sweden, Russia, Cuba, and the U.S.A. have undergone considerable change in the organization of their health systems. In the Caribbean, many newly independent, quasi-independent and dependent countries are considering following suite. In 1975, the Caribbean Ministers of Health met in Antigua to discuss a plan of action to correct the severe health problems affecting the Caribbean. Maternal death rate ranged from 4-7/10,000 live births; infant mortality 15-70/1000 live births; infectious disease was the number one cause of death among children; and, 50 percent of the children of the region were not immunized. Representatives from fifteen (15) Caribbean countries were present. They decided on four common goals, one of which was to strengthen the present infrastructure of health delivery. Dr. Ken Standard, Professor of Social and Preventive Medicine at the University of the West Indies, noted that the final criterion of effectiveness of a health care system is the extent to which the system improves health and reduces suffering and disability.¹ In many epidemiological interventions the endpoint or evaluation of success is based on mortality.² Some authors have wisely

¹Source - Four Decades of Advances in Health in the Commonwealth Caribbean, pg. 14
²Source - Gary Cutter, et al; Mortality Surveillance in Collaborative Trials, AJPH Vol. 70 #4, pg. 394, April, 1980
used infant and child mortality as an indication of effectiveness. Unlike the gross national product, which can rise significantly as a result of a major improvement in the economic status of a country's elite, Halfdon Mabler and his colleagues have stated that infant mortality rate can only decline substantially as a result of improving the lot of the total population. The purpose of this paper is twofold: 1) to compare and contrast the differences in the health and socio-economic political systems in the Eastern Caribbean countries; and 2) to determine what factors and/or resources impact on the health status by improving health conditions, that is, a decrease in the mortality rates.

The countries of Dominica, Antigua, St. Kitts (DASK) and the U.S.V.I. were chosen for study. These countries represent the spectrum in terms of socio-economic, geographic, political, human and technical resource, and health system differences. The paper is structured as follows:

1) comparison of organizational structure of health systems;
2) comparison of the financing and regulating of health delivery;
3) comparison of the socio-economic, political and health structure for each country;
4) comparison of the birth and death rates as indicators of improved health status;
5) a profile of expenditure and resources versus the indicators of health status;
6) comparison of human and technical resources in health;
7) an analysis of the findings; and
8) conclusion

**ORGANIZATIONAL STRUCTURE OF HEALTH SYSTEM:**

Without leadership no worthwhile goal could be achieved. In this
respect, the organizational leadership and structure of a health system is important. By health system I mean the facilities, personnel, equipment and financial resources which collectively make possible the delivery of health care.

The Eastern Caribbean countries of Dominica, Antigua and St. Kitts (DASK) (see maps), have the same basic organizational structure. It is derived from a British-type system. An elected member of the Legislature party gets the majority of seats. Therefore, he is the top executive for health as well as a law maker. His chief administrative officer is the Permanent Secretary. He is responsible for the day to day operations of the ministry. The Minister employs a chief technical advisor to the Permanent Secretary who is a physician, the Chief Medical Officer. This individual is, theoretically, the supervisor of all health personnel. He is assisted by health professionals who supervise their respective areas - medicine, nursing, pharmacy, dentistry, and so on. These professionals have subordinates who answer to them from their base - be it hospital, the health clinics or health inspectors. The Chief Medical Officer (CMO) is the top medical personnel in the ministry. His authority in clinical matters is final. However, administratively, the Permanent Secretary (PS) makes the decisions. From my observations, none of the top officials have had formal administrative training, that is, received degrees in health administration. All have experience and some short-term courses in health administration.

The United States Virgin Islands' organizational structure differs significantly from the other countries under study. The executive branch is separate from the legislative. The Head of Health is called a Commissioner. This person is not an elected official, but is appointed by the Chief Executive of the country, the Governor. From the inception of the government in the United States Virgin Islands (U.S.V.I.) a physi-
cian has been the Commissioner of Health; this is not specified by law. The Commissioner is assisted by Assistant and Deputy Commissioners.

Traditionally, the designation of Assistant was to individuals who were physicians. The line of authority is from Commissioner to Assistants to Deputies. The Deputies are, normally, non-physicians. Each of these Assistants and Deputies is responsible for a section. Usually, clinical divisions, such as hospitals, medical services, ambulatory care, mental health and environmental health are assigned to Assistants. The Deputies are responsible for Management areas, such as personnel, payroll, financial affairs and property and procurement. Few of the physicians employed in these administrative positions have had formal administrative training. All of the non-physicians have had some formal administrative training.

A matrix of organizational structure exists for all four countries. Usually personnel have two lines of authority with which to be concerned: (1) their section supervisor; and (2) their professional supervisor. For example, a matron of the hospital in the first three countries, or her equivalent in the USVI system, the Director of Nursing for the hospital, answers to the Medical Superintendent of the hospital (a physician) in the first three countries or the Medical Director (a physician) in the USVI. At the same time, this matron or nursing director relates professionally to the Principal Nursing Officer in (DASK) or the Territorial Chief Nurse in the USVI. These officers are not involved in the day-to-day operations of the hospital. Their role is to develop policy on nursing matters and monitor all nursing activities. In all of the countries we analyzed, personnel had difficulty with these relationships.

Antigua and the U.S.V.I. have opted to have a group of advisors to the ministry (department) of health. In the case of Antigua, a Central Board of Health advises the ministry on policy matters as well as on
the recruitment, selection and appointment of the medical staff. In the U.S.V.I., the council advises on policy and makes recommendations on priority areas. However, it is not involved in any of the day to day functioning of the department.

FINANCING AND REGULATING THE HEALTH DELIVERY SYSTEM:

In the Commonwealth Caribbean countries of DASK the present system of health care delivery is financed mainly by the government. Consequently, a majority of the people believe the services are maintained free. Both rich and poor seek free care.

The legal standards for the registration and operation of hospitals and long term care facilities are elementary. There are no provisions for accreditation. Licensing boards for medical specialists are non-existent. Doctors, pharmacists, nurses and other health professionals' licenses vary from country to country. The distribution of these health professionals leaves much to be desired.

When payments for health care services are received in these countries, they fall under the following methods:

1) salaried basis; 2) fee for service; 3) capitation; and 4) out of pocket.

In all of the above methods, the total output is not geared to ensure maximum consumption of the service relative to other goods and services on which the consumer can spend. In addition, it is difficult to determine any degree of efficiency. The private sector, via the medical societies, does not exercise disciplinary controls over physicians. There are no mechanisms to assess quality of care yet the populace is demanding more medical services and more advanced technology.³

³Health Care Financing in the Commonwealth Caribbean; Report of the Special Subcommitteee of the International Federation of Voluntary Health Service Funds on Health Care in the Commonwealth Caribbean (No Date)
The U.S.V.I. system does not differ in its structure of financing care. The government provides 80% of all services. All hospitals are government controlled, but, unlike the other Eastern Caribbean countries, they have been subject to accreditation by the Joint Commission on Accreditation of Hospitals, a National U. S. Organization. In 1979, the hospitals lost their accreditation due, mainly, to poor and antiquated physical structure. All medical specialists are subject to the national, that is, U. S., licensing requirements of their specific specialty. All doctors, pharmacists and nurses are licensed through their respective local boards. However, other health professionals, such as psychologists, do not have a body to license them for practice outside government facilities.

Payment for services mirrors the methods outlined for the other Caribbean countries. Similar events occur in the case of the consumption of services and the lack of disciplinary controls of health professionals. However, assurance of the quality of care is assessed through the Professional Standard Review Organization (PSRO). The PSRO is mandated by the laws of the U. S. and is therefore applicable to the U.S.V.I. The Virgin Islands Medical Institute (VIMI) is the PSRO for the Virgin Islands. VIMI is comprised of 63% of the licensed doctors of medicine in the U.S.V.I. who:

1) make sure the necessity of hospital admission, appropriateness of hospital stay and effectiveness of discharge planning are assessed through criteria, standards and norms;

2) identify deficiencies in the quality, organization, administration and delivery of care and make recommendations to correct these deficiencies through education and administrative change; and
3) conduct profile analysis - where profiles of provider and recipient are established, analyzed and evaluated to identify if the care is necessary, meets professional standards or is in the most appropriate setting.

This body is attempting to regulate and monitor the services as well as gather accurate data on the health care services in the U.S.V.I.

**A DESCRIPTION OF SOCIO-ECONOMIC,的政治 ASPECTS OF THE HEALTH SYSTEMS:**

**DOMINICA**

The Commonwealth of Dominica has an area of 290 Sq. miles. It is located between Guadeloupe and Martinique (see map). The topography is easily describable as mountainous. It is the largest of the Windward Islands. It was named for the Sunday on which it was discovered by Columbus. It is an agri-economy with 40% of the total land utilized for agriculture. Peculiar foods are fine flesh of the crapaud or mountain chicken (frogs), fresh water crayfish and "tee-tee-ree", fried cakes made from tiny fish. The government owns 60% of the land.

The Gross Domestic Product (GDP) in 1970 was $33.9 million East Caribbean dollars. In 1975 it was $55.2 million. In 1978 Dominica became independent. In 1980 the people of Dominica elected, overwhelmingly, the first female Prime Minister in the Caribbean, Ms. Eugenia Charles, a conservative and leader of the Dominica Freedom Party.

In 1970 the census population was 59,900. By 1975 the population was estimated at 79,900. Because of its mountainous geography, the population is clustered on the sea coast. Roseau, the capital, is in the Southwest. Roseau is the chief port and center of government, commerce and trade with 25% of the population occupying its boundaries. Portsmouth on the Northwest, next in density, has 3,000 people. Forty-two percent
of the population are under 15 years of age. The health delivery system is basically comprised of hospital, clinics and environmental health surveillance. Forty-four health clinics staffed by nurse midwives are supervised by 11 public health nurses. Four medical officers visit the clinics periodically. These clinics provide general outpatient care, maternal and child health and health education. Thirty-six percent of the clinics are government owned facilities. Rented houses, generally lacking the proper structural components to support a health function, comprise the remaining sixty-four percent. There are three regional hospitals in the towns of Portsmouth, Marigot and Grand Bay providing for deliveries, emergency care and general ambulatory care. Two of the hospitals have no resident medical officer. These hospitals are managed by nurses. The 240-bed State Hospital is in Roseau. In August 1979, hurricanes David and Frederick extensively damaged the State Hospital. Presently, the hospital is under reconstruction with the aim of redesigning and organizing it to bring it in compliance with the hospital standards of developed nations.

There are 12 Public Health Inspectors who are responsible for sanitation, communicable disease and vector control. Much of the equipment needed to perform their function is lacking.4

ANTIGUA:

Antigua's land area is 108 sq. miles. It is bordered by 365 white sandy beaches and is mostly flat. It has a large tourist industry. It is served by an international airport. The GDP in 1970 was EC$40.7 million.

In 1975 it was EC$128.9 million. Antigua is an associated State of Britain. Antigua will be independent in June, 1981. In 1980, Mr. Vere C. Bird, Sr., dubbed the father of the Antigua nation, was re-elected to lead his country under the banner of the Antigua Labor Party. Bird has been the effective head of Antigua for well over 25 years.

In 1970 population was 55,600 and 70,500 in 1975. One-third of the population lives in the capital, St. John's. Two-thirds of the population lives within a five mile radius of St. John's. Thirty-eight percent of the total population is under 15 years of age.

The health delivery system is comprised of curative (hospitals and clinics) and preventive service (communicable disease control and environmental control). Vector control of mosquito capable of transmitting both dengue and yellow fever have been a high priority. Antigua has five health institutions. Three of which are hospitals comprised of a total of 35 beds and two homes with a total of 180 beds. Only the Holberton Hospital in St. John's can be considered acute care. It has the only medical laboratory in Antigua. The present size of the hospital will suffice to serve the Antiguan population for at least the next ten years. The average length of stay exceeds 14 days and occupancy rate is 77%. The post of medical superintendent of the hospital was abolished in 1973 but reactivated in 1979. This individual is presently a surgeon; he also acts as a Medical Advisor to the Minister of Health.

The ambulatory care services are provided through five health centers and 16 clinics. Under the Medical and Holberton Institution Ordinance of 1899, District Medical Officers (DMO's) are appointed to provide free treatment to those eligible at facilities convenient to their home. The centers do not differ from clinics except that centers have two Public Health Nurses working together. The DMO's are required to visit these facilities once a week. The DMO's generally spend two hours a
session seeing 50 to 60 patients. No prescriptions can be filled except at the Health Center in St. John's. There are 12 Public Health Nurses who supervise 28 nurse midwives and 22 community aides. Therefore, there are 70 nursing staff to cover 21 health centers or clinics. It is important to note that outside of the St. John's Health Center, no family planning, post-natal clinics or penicillin injections are given. Antenatal clinics are held regularly at the Health Centers. Although the original reason to employ 28 nurse midwives was due to undertake deliveries in the community, 90% of all births are at Holberton Hospital or the private Adelin Clinic.

The estimated ratio of clinic to population was one clinic for 2,700 persons. This is as great a coverage as the best served areas of the world. However, these clinics have no diagnostic facilities or even the simplest range of drugs. Basically, screening is the only service provided. Many of the clinics are in dilapidated buildings.

At present, environmental sanitation services are not within the jurisdiction of the Ministry of Health. Environmental Health is in the portfolio of the Ministry of Barbuda Affairs, Labour, Housing and Sanitation. The Health Inspector staff of nineteen, including a Chief and Deputy, answers to the Central Board of Health which is chaired by the CMO. However, his funding comes from the Ministry of Barbuda Affairs and not Health. Twelve health inspectors have had no formal training and five of the senior inspectors have had one year at the training school in Jamaica. Their duties are wide and varied. They control nuisance animals, inspect privies, drains, public baths, bakeries, hotels, restaurants, markets, barber shops, factories, workshops and common lodging houses; dispose of the dead and take care of cemeteries and grave yards; control the spread of vectors and infectious disease as well as assume responsibility for school hygiene, venereal disease,
milk, ice-cream and aerated water. They function under the Public Health Ordinance of 1957. It is readily evident that they are short staffed and in need of additional formal training. The report of a special subcommittee of the international federation of voluntary health service funds on health care in the Commonwealth Caribbean recommended that appropriate staff of CAREC advise the inspectors on immediate measures to deal with the vector problem and the growing epidemic of gastro-enteritis in 1980.

**ST. KITTS/NEVIS:**

St. Kitts is a plantation society. It is 68 sq. miles. Nevis is 36 sq. miles, it is the sister island of St. Kitts. All further reference and statistics to St. Kitts will include Nevis. Its main industry is agriculture and its main crop is sugar. Sugar, which comprises over 75% of the exports of the country, contributes over 50% of the gross domestic product.

St. Kitts is dubbed the "Mother Colony" of the West Indies. This label is being used to its advantage as it develops its small scale tourism. A new jet airport and terminal were recently completed. These promise to assist in enabling more people to discover the island.

Added to sugar, which is now organized through a state run organization called the National Agricultural Corporation (NACO), St. Kitts is also engaged in light manufacturing such as clothing production and electronics assembling. These new initiatives could have an impact on the population and the attendant health system of the island.

The GDP in 1970 was E$40.7 million. St. Kitts/Nevis is a state linked to Britain. After nearly 30 years in power and subsequent to the death of the founder/leader of the St. Kitts/Nevis Labour Party,
the late Premier Robert Bradshaw, the Labour Party lost to a coalition of the People's Action Movement and the Nevis Reformation Party in the general election on February 18, 1980. The new premier is Dr. Kennedy Simmonds, an anesthesiologist. Although the former government was in the planning stage for independence, the new government does not consider independence a high priority item.

In 1970, the population of St. Kitts/Nevis was 45,600. In 1975 it was 48,300. Basseterre, the capital of St. Kitts is the chief port and center of government. The largest of the three hospitals, the Joseph N. France with 164 beds, is located in Basseterre. Sandy Point, the second largest town, is located in the Northwest of the island. Pogson Hospital, a 28-bed cottage hospital, is located in Sandy Point. The 54 bed Alexandra Hospital is located in Charlestown, the capital of Nevis. Only the Joseph N. France Hospital is equipped for delivering all major special services.\(^5\) From my observations, the Joseph N. France Hospital in St. Kitts is the best equipped hospital when compared with Antigua's and Dominica's hospitals.

There are an average of five DMO's, three in St. Kitts and two in Nevis. St. Kitts is divided into four Medical Districts and Nevis two. The DMO's numbers vary from year to year based on the availability of physicians.

St. Kitts has 11 health centers serviced by the three DMO's, nine health sisters, 18 district nurses and a supervisor. Nevis has six health centers serviced by two DMO's, five health sisters, six district nurses and one nurse aide.\(^6\) One of the St. Kitts DMO's has the additional responsibilities of medical superintendent of Pogson Hospital and


\(^6\) We must note here that the health centers in St. Kitts go back to the 1960's when their pioneer development was ushered in by Dr. Phillip Boyd, present Chief of the CARICOM Health Desk.
Pediatrician at the Joseph N. France Hospital. In addition, he has a private practice as do all physicians in the State. In general, the health centers throughout St. Kitts are in poor physical condition.

Of the 17 Public Health Inspectors, only nine are trained. Nevis has four sanitary districts with one inspector per district. St. Kitts has eight districts with 12 inspectors and a chief inspector.

THE UNITED STATES VIRGIN ISLANDS:

The United States Virgin Islands is comprised of three principal islands of St. Croix, 84 sq. miles and 50 miles south of St. Thomas. St. Thomas, 28 sq. miles, St. John, 20 sq. miles and 60 small cays and inlets. The U.S.V.I. is the Eastern most part of the United States. It is located in some of the deepest ocean water over 1,000 miles south of the mainland U.S.A. The United States purchased the Virgin Islands for a protectorate from Denmark in 1917 for $25 million. Administratively, the Navy controlled the territory until the U. S. Interior Department assumed responsibility in 1931.

The U.S.V.I. consists principally of steep mountainous areas with the only large body of flat land on St. Croix. Its industries are mainly tourism on St. Thomas and St. John and heavy industry such as oil refining and aluminum production on St. Croix.

The per capital income in 1970 was $2,377, one of the highest among Caribbean Islands. In 1977 it was $4,743. Since 1954 with the passage of the revised Organic Act, the U.S.V.I. has had increasing self-rule. However, it still is governed by the laws of U.S.A. and is therefore politically dependent (a colony of the U.S.A.). Its Chief Executive Officer is the Governor who is elected by the people. The present governor, Juan Luis, is the youngest governor to be elected at the age of 38. He is of Spanish decent.
In the past decade, the population has doubled with a decreasing proportion being native born Virgin Islanders. In 1960 of the 32,500 population 83% were native born while in 1978 of the 118,900, 43% were native born. The capital of the Virgin Islands is Charlotte Amalie on the island of St. Thomas. Charlotte Amalie is the chief port, center of government and commerce of the U.S.V.I. Twenty-eight percent of the population is less than 17 years of age.\(^7\)

The Department of Health is made up of 11 divisions responsible for outpatient, emergency, curative and preventative care. The two hospitals in the Virgin Islands (one in St. Thomas and one in St. Croix) with an annex (in the third main town of Frederiksted) have a total of 253 beds. In 1978 the average length of stay was 7 days and the occupancy rates was over 104%. The hospitals which are now 25 years old do not meet the current needs of the population. Upon completion of the hospitals in 1953, they were already inadequate to deal with the relatively small population on the island. These construction estimates were based on the 1940 census. Several additions and renovations to the facilities were insufficient in bringing the hospitals up to standard. In 1978 the Joint Commission on Accreditations of Hospitals found each hospital with at least 36 structural and life safety deficiencies. The cost of correcting the deficiencies to bring the hospitals up to a marginal acceptance was $US18 million. Under the leadership of the Commissioner of Health, funds were obtained from the federal government and two new 250-bed hospitals, one for St. Thomas and one for St. Croix, will be completed at the end of 1981 at the cost of $US24 million each.

The U.S.V.I. ambulatory health facilities date back to 1910 abandoned World War II military barracks and converted hotels and houses.

\(^7\) U.S.V.I. Health Plan, 1979
Many of the facilities are beyond repair. Unlike the other countries under discussion in this paper, the U.S.V.I. ambulatory services are divided mainly by programs rather than districts. The Community Health program provides preventative, diagnostic, screening and treatment services in many buildings throughout the territory. Similarly, the Maternal and Child Health programs, family planning, mental health and specialty clinics utilize the same buildings. Within the past five years the ambulatory services have been restructured in districts with identifiable health centers. In St. Thomas the second largest settlement has its health center in a renovated hotel. This center at the Eastern End of the island is situated on a hill and is rather inaccessible by foot. The other health center is located in Frederiksted, the second largest town in St. Croix. Presently, this center is under construction. Services are provided in rooms made available in the hospital annex. The present health plan calls for the establishment of eight health districts, three on St. Thomas, three on St. Croix and two on St. John. Monies have been partially identified to accomplish this objective. All land sites have been purchased. Architectural plans have been put out on bid for one of the St. John centers with the second already in existence. In 1981 all ambulatory services on the three islands have been placed under the direction of an Assistant Commissioner.

Environmental Health is the responsibility of two departments of the government, Health and Conservation and Cultural Affairs. The Department of Conservation and Cultural Affairs is responsible for air and water pollution and waste disposal. The Department of Health is concerned with vector control, inspection of eating and drinking establishments and food protection.

There are nine public health inspectors. All of the inspectors have received short term courses in their respective areas. None have had any formal training.
PRESENTATION OF TABLES AND GRAPHS:

The four countries were compared for the years 1971-75 for the following:

1) birth rate (Table I, Graph I)
2) death rate (Table II, Graph II)
3) population (Table III)
4) Beds per thousand population (Bp) vs. Infant Mortality Rate (Table IV, Graph III)
5) Government Expenditure on Health and East Caribbean Dollars and U. S. Dollars vs. Infant Mortality Rate (Table V, Graph IV)
6) Government Expenditure on Health as Percent of Total Government Expenditure vs. Infant Mortality Rate (Table VI, Graph V)
7) Composite of the four countries in reference to government expenditure on health, health expenditure vs. total expenditures and infant mortality rate (Graph VI)
8) Population per nurse vs. Infant Mortality Rate (Table VII, Graph VII)
9) Population per medical doctor vs. Infant Mortality Rate (Table VIII, Graph VIII).
### TABLE I
#### BIRTH RATE

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<th>Year</th>
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Birth Rate = \( \frac{\text{Number of Births}}{\text{Population}} \)

### TABLE II
#### DEATH RATE

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<tr>
<th>Year</th>
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Death Rate = \( \frac{\text{Number of deaths}}{\text{Population}} \)

**SOURCE:**
- DOMINICA - ECCM Annual Digest of Statistics, 1975
- ANTIGUA - ECCM Annual Digest of Statistics, 1975
- USVI - Annual Reports of the Dept. of Health, fiscal years 1971-75
### TABLE III

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</table>

Infant Mortality Rate (IMR) = \frac{\text{Number of infant deaths}}{\text{Number of live births}}

**SOURCE:**
- DOMINICA - ECCM Annual Digest of Statistics, 1975
- ANTIGUA - ECCM Annual Digest of Statistics, 1975
- USVI - Annual Reports of the Department of Health, fiscal years 1971-75

(19)
<table>
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<th></th>
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<td>780</td>
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<td>3287</td>
<td>1217</td>
<td>19.1</td>
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<td>678</td>
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<td>4474</td>
<td>1657</td>
<td>36.7</td>
<td>2659</td>
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**SOURCE:**
- DOMINICA - ECCM Annual Digest of Statistics, 1975
- ANTIGUA - ECCM Annual Digest of Statistics, 1975
- USVI - Annual Reports of the Department of Health, fiscal years 1971-75
### TABLE VI

**HEALTH EXPENDITURE AS % OF TOTAL EXPENDITURE VS. INFANT MORTALITY RATE**

<table>
<thead>
<tr>
<th>Year</th>
<th>DOMINICA %</th>
<th>IMR</th>
<th>ANTIGUA %</th>
<th>IMR</th>
<th>ST. KITTS %</th>
<th>IMR</th>
<th>USVI %</th>
<th>IMR</th>
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<tr>
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<td>1.7</td>
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<td>1972</td>
<td>17.3</td>
<td>36.8</td>
<td>1.4</td>
<td>19.1</td>
<td>13.5</td>
<td>69.6</td>
<td>17.4</td>
<td>23.3</td>
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<td>38.7</td>
<td>13.4</td>
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<td>7.5</td>
<td>51.4</td>
<td>16.4</td>
<td>22.5</td>
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<tr>
<td>1974</td>
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<td>28.1</td>
<td>14.4</td>
<td>31.4</td>
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<td>56.9</td>
<td>16.0</td>
<td>18.6</td>
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<td>7.2</td>
<td>42.8</td>
<td>15.9</td>
<td>23.8</td>
</tr>
</tbody>
</table>

Infant Mortality Rate (IMR) = Number of infant deaths / Number of live births

**SOURCE:**
- DOMINICA - ECCM Annual Digest of Statistics, 1975
- ANTIGUA - ECCM Annual Digest of Statistics, 1975
- USVI - Annual Reports of the Department of Health, fiscal years 1971-75
### TABLE VII

**POPULATION PER NURSE VS. INFANT MORTALITY RATE**

<table>
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<th>Year</th>
<th>DOMINICA</th>
<th>ANTIGUA</th>
<th>ST. KITTS</th>
<th>USVI</th>
</tr>
</thead>
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<td>IMR</td>
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<td>1972</td>
<td>583</td>
<td>36.8</td>
<td>641</td>
<td>19.1</td>
</tr>
<tr>
<td>1973</td>
<td>739</td>
<td>38.7</td>
<td>644</td>
<td>11.9</td>
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<tr>
<td>1974</td>
<td>680</td>
<td>28.1</td>
<td>447</td>
<td>31.4</td>
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<tr>
<td>1975</td>
<td>619</td>
<td>26.9</td>
<td>339</td>
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</table>

Population per nurse = Population
Average number of nurses = number of nurses

### TABLE VIII

**POPULATION PER MEDICAL DOCTOR VS. INFANT MORTALITY RATE**

<table>
<thead>
<tr>
<th>Year</th>
<th>DOMINICA</th>
<th>ANTIGUA</th>
<th>ST. KITTS</th>
<th>USVI</th>
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<td>IMR</td>
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<td>IMR</td>
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<td>51.6</td>
<td>3343</td>
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<td>1972</td>
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<td>3400</td>
<td>19.1</td>
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<td>1973</td>
<td>5336</td>
<td>38.7</td>
<td>3283</td>
<td>11.9</td>
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<td>1974</td>
<td>5079</td>
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<td>3487</td>
<td>31.4</td>
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<td>1975</td>
<td>7992</td>
<td>26.9</td>
<td>3205</td>
<td>36.7</td>
</tr>
</tbody>
</table>

Population per medical doctor = Average number of doctors = Population
Number of doctors

**SOURCE:**
DOMINICA - ECCM Annual Digest of Statistics, 1975
ANTIGUA - ECCM Annual Digest of Statistics, 1975
USVI - Verbal Report from Secretary of Board of Nursing February, 1981
Verbal Report from Secretary, Bureau of Malpractice February 1981
*ESTIMATES*
GRAPH I

HE = Health Expenditures of Government
BR = Birth Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
Graph II

HE = Health Expenditures of Government
DR = Death Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
GRAPH III

Bp = Beds per 1,000 population
IMR = Infant Mortality Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
GRAPH IV

HE = Health Expenditures of Government
IMR = Infant Mortality Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
GRAPH V

HE = Health Expenditures of Government
TE = Total Expenditures of Government
IMR = Infant Mortality Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
GRAPH VII

PPN = Population per nurse.
IMR = Infant Mortality Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
GRAPH VIII

PMD = Population per medical doctor
IMR = Infant Mortality Rate

NOTE: The trend in the data was obtained by using the figure for year 1971 equal to 100 and dividing all other data by the figure for 1971.
The birth rates for all four countries have decreased since 1971. In Dominica, Antigua and St. Kitts/Nevis, the rate decreased by 40.21%, 25.59%, .03%, respectively. For the U.S.V.I. the decline was 23.90%.

Death rates fell for Dominica, St. Kitts and the U.S.V.I. and increased slightly in Antigua. For the countries of decrease, the percentages were 35.48%, .04%, 17.91%. Antigua's increase was .08%.

Population increased in all countries. The increase was 11.46% for Dominica; 5.47% for Antigua; 2.33% for St. Kitts and 15.78% for U.S.V.I.

Bed per thousand population declined in Dominica by 7.89%, 5.26% in Antigua, and 13.51% in the U.S.V.I. The ratio was constant for St. Kitts.

Infant Mortality Rates declined in Dominica by 47.87%; 34.15% in St. Kitts and 11.19% in the U.S.V.I. In Antigua the rate increased by an unbelievable 89.18%.

Government expenditures on health increased in all countries except the U.S.V.I. The increases were, in US dollars, 47.69% for Dominica, 41.99% for Antigua, 32.21% for St. Kitts. In the U.S.V.I., government expenditures on health decreased by 1.77%.

Health expenditures as a percentage of total expenditures increased in all countries except St. Kitts. The increases were 32.65% for Dominica; a fantastic 576.42% in Antigua; and 3.25% in the U.S.V.I. In St. Kitts the decline was a remarkable 51.35%.

In terms of medical manpower, the population per nurse increased in only one country, Dominica. There the ratio increased by 9.56%. Decreases were registered in Antigua by 47.77%; 5.75% for St. Kitts and 4.97% in the U.S.V.I. The population per medical doctors increased in Dominica and decreased in all other countries. For Dominica, the increase was 44.99%. Decreases were 4.13% in Antigua; 20.88% in St. Kitts, and 17.89% in the U.S.V.I.
ANALYSIS OF FINDINGS:

Where small numbers of vital events are concerned, regardless of the quality of reporting, vital statistics data may have limitations for analytical use. Because small frequencies are affected by random variation, caution should be exercised in their use and interpretation, whether they are statistics for small demographic groups or for small geographic areas. This author, cognizant of the above, feels however, that the data have shown some important facts:

1) Graph I clearly demonstrates that with proportionately increasing health expenditures the birth rate decreased. As the expenditures levelled off or decreased birth rate levelled off or increased;

2) Similar findings were found for health expenditures versus death rate as with the birth rate as shown in Graph II;

3) The relationship between beds per 1,000 population and infant mortality rate is not clear as presented in Graph III. For the most part in all countries the beds trend remained slightly constant while the infant mortality rate increased, decreased or vacillated;

4) Graph IV clearly shows that as health expenditures increased proportionately, infant mortality rate decreased. As health expenditure started to decrease infant mortality rate increased and if health expenditures were constant, infant mortality rate remained constant;

5) Similar findings were found for health expenditures as a percent of total expenditures as shown in Graph V;

6) Graph VI shows that Dominica which proportionately spent more and a larger proportion of its total budget on health
had the best rate of decrease in infant mortality. Antigua's situation is peculiar for between 1973 and 1974 there was a sudden rise in infant mortality. Perhaps there was a special health problem such as an epidemic affecting infants; 7) However, Graph VII may be shed some light on this peculiarity. The average number of nurses for the population was constant until 1973, then it suddenly dropped between 1973 and 1974 with a less proportional drop between 1974 and 1975. This means there were more nurses to take care of fewer individuals. For Dominica and St. Kitts with a drop in the average number of nurses the IMR continued to decrease. In the USVI, there were fewer nurses in 1973 to 1975 than in 1972, yet the decrease in IMR was in 1974; and 8) As the average number of doctors for the population increased significantly, the IMR decreased.

CONCLUSION:

In a world growing more interdependent, day by day, we increasingly share each others distresses and dangers as well as the fruits of mankind's success. In a region that encompasses microstates which reflect the coming together of all the worlds peoples in a small space, it is important that we review our progress and that our colleagues in the region are aware of the findings that support the advancement of well-being of our peoples.

It is very clear that Dominica has had the most significant impact on its health status over the five year period. It is clear also that this impact is not related to the nominal dollar amount but the increasing expenditure on health. All countries demonstrate this phenomenon. The USVI spent nineteen times as much money on health as Dominica and ended
with very little significant decrease in rate and very little difference in actual IMR. However, it is important to note that the USVI mortality rates for the five year period were the lowest. This indicates an overall good health status. Also, of interest, is that the USVI expenditure in 1975 reverted to its expenditures in 1971 resulting in increasing IMR back to 1971 levels. It is not clear what is happening in Antigua. We know for certain the reporting of vital statistics has always been a priority in Antigua. Birth and death registration has been a statutory requirement since the nineteenth century. This registration is cross checked by the statistician in the Chief Medical Officer's department and is considered accurate. Therefore, this cannot account for the sharp change in 1973-74. Neither the population, number of beds nor average number of persons per doctor changed. However, the expenditures and average number of nurses were significantly decreased, the latter, at a more striking rate. It may be safe to say that in Antigua's case, the manpower resource, paradoxically, has been a determining factor to the detriment of the health system. In the Dominican case, the fiscal resource has been a determining factor to the benefit while in the USVI and Kittitian experience the decrease proportionally in fiscal resources has adversely affected health status. This finding supports Davidson R. Gwatkin, a demographer with the Overseas Development Council (ODC). In the San Juan Star (February 8, 1981, p.16) he noted, to the surprise of his colleagues, that the progress in reducing mortality in the world's poorer countries over the last generation, which had been remarkable, is now faltering in the 1970's and 1980's. He theorized that one factor underlying this faltering mortality picture is that the progress in social and economic development has slowed in many places. His findings

8L. Bertrand and BEC Hopwood, Pre-planning Review of the Health Status and the Effectiveness of the Health Services in Antigua, July 1980.
were based on analysis of mortality data for Asia and one Caribbean country, Jamaica. Our findings support this theory for these four East Caribbean countries as well.

How does the structure and organization of the health delivery system affect the health status? From my perspective in researching this paper, no clear association can be readily seen between structure and health status. This observation may be important. The countries of DASK organizational structure and systems of delivery were very similar yet significant differences were found in their ability to lower the mortality rates. The U.S.V.I.'s structure was significantly different and yet no real gains were noted either in the actual mortality rates or in the trend of decreasing the rates. Significant amount of time and energy is spent by nations in organizing their health system. What may be more important may be how expenditures are allocated over a period with a commitment to steadily increase fiscal capability as theorized earlier by David Gwatkin.

Gwatkin and his colleagues went on to evaluate the impact of specific interventions on infant and child mortality in 10 projects as reported in "Can Health and Nutrition Interventions make a difference," Monograph 13 of the Overseas Development Council, February 1980. The projects were in Many Farms - USA, two in Guatemala, Imesi - Nigeria, Northern Peru, Etimesgut - Turkey, Narangwal - India, Jamkhed - India, Hanover - Jamaica and Karar - Iran. In 8 of the 10 projects immunization was the common factor that was present as the intervention used in the medical system. Nutrition was the other common factor, usually as direct food supplements to the population and/or intensive nutrition counselling. It may be critical to analyze how the expenditures of these countries were allocated. Such considerations argue strongly for continued evaluation and incorporation of these findings into the research effort. The authors caution the readers: The substantive suggestions are straightforward, consisting of a summary of points made earlier. The contribution of nutrition to physical growth and mortality reduction in the projects reviewed, for example, argues strongly for incorporating nutritional considerations into program designs. Also, the transfer of health services from the hospital into the community emerges as a promising shift. More specifically, maternal nutrition and immunization, nutrition monitoring, and expanded roles for health personnel seem to have worked well in many different settings. Yet, as noted, the composition of successful service packages has varied widely, suggesting that no single approach is best suited to all situations throughout the developing world. This indicates a need for considerable flexibility.

(Continued on page 36)
This paper did not address the socio-cultural obstacles and/or variables that affect health services delivery. Perhaps these factors contribute to our findings. Yet it is clear from these data that increasing expenditures impact on health status positively; that increasing manpower resources' did not have a positive impact on health status and that the organization and structure of the health care system did not play an important role in the four countries discussed. We need, however, to be cautious in our findings. Clearly a longer period of time will be more important in terms of giving us definitive answers.

As the former Secretary of Health, Education and Welfare, Joe Califano, said before the World Health Assembly in 1977, "These world health problems are so immense that they may be beyond the capacity of individual nations to solve. But we have seen how much can be accomplished when the nations of the world combine their resources, their knowledge, and, above all, their will." We as Caribbean people must combine our resources, knowledge and will to find the true determinants that affect the quality and status of health in our region.

A willingness to consider sympathetically a wide range of organizational and technological approaches developed on the basis of a full appreciation of local conditions. It is not enough for a proposed approach to be consistent with current international community thinking about what represents effectiveness; it is even more important that project implementors also demonstrate persuasively the congruence of their approaches with local realities, both technical and human.