CHAPTER SIX

DISASTER RELIEF EVALUATION

This chapter provides an examination and evaluation of the disaster relief that was provided in the Dominican Republic after Hurricanes David and Frederick. To clarify for the reader the succession of events, the chapter begins with a brief chronology of the first four post-disaster weeks. The chronology is followed by an examination of the roles, activities, and the degree of role fulfillment of the most important agencies involved in the Dominican relief effort. Using the results of this examination, we proceed to an evaluation of the goodness of fit of the overall relief program, at both two weeks and six months following the hurricanes. The chapter concludes with a presentation of the perceptions, evaluations, and suggestions offered by both agency heads and relief recipients.

This chapter is not meant to be a sociological treatise on multi-organization interactions, but rather a systems or policy-analysis evaluation of the disaster relief provided in the Dominican Republic, with emphasis on health. Nonetheless, I must mention my indebtedness to the sociological researchers of disasters who have developed, clarified, and operationalized many of the basic concepts that I and every other disaster researcher use.

Chronology

Much of the information in the following chronology comes from the "Situations reports" cabled from the U.S. embassy in Santo Domingo to the U.S. State Department in Washington. The source is noted where

other sources are used for data that might be disputable.

29 to 31 August: Meteorological services warn the island of the coming hurricane. Government and private radio stations warn the populace to prepare for the hurricane. Civil Defense, military and national police begin moving inhabitants of marginal riverside dwellings to established shelters in the Santo Domingo area. This evacuation starts voluntarily, then has to be forced. The Dominican Red Cross sends ambulances, medical teams, search and rescue groups, and communications teams to San Cristóbal, Ázua, Baní, and Barahona, where the storm's impact is expected to be most acute.

31 August: Hurricane David strikes and crosses the island. It hits the south-central coast region directly, then crosses over the island diagonally in a north-westerly direction, exiting the north coast close to the border with Haiti. President Guzmán calls the U.S. Ambassador Yost, to a meeting in the middle of the storm and formally requests disaster aid. All electrical power is knocked out, as well as the telephone system. The satellite communications tower in San Cristobal is destroyed, limiting both national and international communications.

1 September: The services of the U.S. Military Disaster Area Survey Team (DAST) are requested by the ambassador, who also donates his discretionary $25,000 relief fund and formally requests U.S. Government assistance. The Red Cross teams begin the search and rescue process, providing first aid and ambulance transport to clinics and hospitals, where possible. President Guzmán, select military officials, and U.S. embassy personnel take an aerial tour for an overview of the damage.

The Organization of American States makes a statement of intent to provide aid.[1] President Guzman declares a national emergency.[2] The government estimates that there are 150,000 people in Civil Defense shelters, many without sufficient food, water, or medicines.[3] CARE announces an aid package consisting mostly of food.[4]

2 to 3 September. The Disaster Area Survey Team arrives in Santo Domingo and starts its emergency assessment. The first official death toll is set at 652. President Guzmán makes a formal plea for assistance to the United Nations Disaster Relief Office. The World Health Organization announces its intention to work with the health ministry to prevent water-borne disease. CARITAS DOMINICANIS and Servicio Social de Iglesias begin home repair assistance.[5] The Pan American Health Organization (PAHO) sends two medical teams with supplies, along with a sanitary engineer.

4 to 7 September. The Ministry of Public Health organizes brigades of medical students to provide health relief in refugee shelters, and to travel to rural areas when possible. There is still no potable water in Santo Domingo. Since roads are impassable, U.S. and Dominican helicopters deliver food by air. DAST continues its survey of damages. UNDRO is asked to coordinate international assistance, while Dominican coordination rests with a triumvirate of the president, Civil

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1 "Listín Diario," 2 September 1979, p. 1.

2 Ibid, p. 1.

3 Ibid, p. 5.

4 Ibid, p. 14.

5 Ibid, 3 September 1979, p. 3.

Defense, and the armed forces. On 5 September Hurricane Frederick passes across the Dominican Republic, following almost the same trajectory as Hurricane David. The storm temporarily stalls over the country, dropping copious amounts of rain and causing widespread flooding. The Dominican Red Cross appeals for help from the international League of Red Cross Societies (LICROSS). The Ministry of Public Health announces that the Dominican Republic has sufficient physicians to meet medical needs, but appeals for material support in the health sector.[6] Catholic Relief Services authorizes US$ 50,000 for relief in the Dominican Republic and the island of Dominica. The American Red Cross allocates US$ 50,000 for Caribbean relief. The Gulf and Western Corporation announces its donation of baby food, powdered milk, and some medicines. A U.S. Marine Corps helicopter on a relief mission crashes in the rain, killing three and injuring eight. Rain from Frederick continues for several days, greatly worsening the overall situation.

8 to 12 September. Continuing U.S. helicopter flights are delivering food and other supplies to areas which have been without food for up to ten days. The Peace Corps begins its "peace bread" program for distribution throughout the country. Rebuilding materials and medical supplies are sent to the Dominican Republic by the Seventh Day Adventist World Service, Brothers Brother Foundation, Medical Assistance Program, Inc., Michigan Partners of Partners of the Americas, and the City of Miami. Food, reconstruction materials, and emergency funds are sent by the governments of Canada, the Federal Republic of Germany, the

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[6] U.S. Department of State: "Situation Report: Dominican Republic - Hurricane David," No. 5, 5 September 1979.

Netherlands, Argentina, Norway, Colombia, Venezuela, and Cuba. The Cuban medical supplies are accepted, but the Cuban relief personnel are not allowed to enter the country.[7,8] The number of U.S. helicopters providing relief flights is now up to 16, with 181 men from the U.S. relief forces now in the country. DAST medics warn of a possible polio outbreak in the Nizao-Baní area.

13 to 21 September. The Food and Agriculture Organization donates $250,000 worth of seed and tools. France donates three tons of medicines and Switzerland, through LICROSS, donates tents and water purification tablets. The Catholic Episcopate of Puerto Rico sends 60,000 pounds of food. OXFAM (U.K.) sends $10,000 for the transport of local work brigades, while Medicins Sans Frontiere sends a medical team. On 21 September, UNDRO reports that, although emergency relief work continues, the country is starting to move toward long-term reconstruction. U.S. and other foreign medical supplies continue to replace depleted stocks in clinics and hospitals. The Mennonite Disaster Services selects as its major reconstruction project the "end of the road" community of Juan Barón, where 99% of the housing was destroyed. The American Red Cross makes another shipment of foods and $100,000 worth of medicines. The World Relief Commission and Compassion International donate additional foods and medicines. The Pan American Development foundation (of the O.A.S.) donates four field hospitals and fifteen generators. Additional money, food, and medical supplies are

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7 "El Nacional," 9 September 1979, p. 1.

8 Op. cit, U.S. Department of State, No. 10, 12 September 1979.

donated by the Red Cross organizations of Honduras, Japan, and Federal Republic of Germany.

22 to 30 September: As the emergency relief decreases, DAST starts to withdraw helicopters and personnel. Authorities place much emphasis on the restoration of electrical power, roads and the water supply. It is estimated that 136,000 people remain in public shelters (28 September). Food and medicine distribution programs continue at a lower level; relief programs are beginning to be supplanted by rehabilitation and reconstruction programs.

Relief Provided by the Dominican Government: Civil Defense and the Ministry of Public Health and Social Assistance (SESPAS)

Duties and Relationship to other Relief Providers

The Civil Defense is the normal coordinator of all relief. SESPAS fills emergency health roles at the request of Civil Defense. In the case of this disaster, responsibility for relief coordination was divided by presidential declaration between Civil Defense, the military, and the president. SESPAS was given responsibility for the health sector response and control over the national medical services. The health ministry would, therefore, officially be in a position to guide the Red Cross response to the disaster. However, the same presidential declaration officially outlined the duties of the Red Cross, giving the Red Cross some autonomy. SESPAS worked with the Pan American Health Organization and the Health Unit of the Agency for International Development in establishing its own response to the disaster, and its plan for the coordination of voluntary health agencies. The majority of the disaster response coordination was, as planned, carried out by Civil

Defense, the military, the U.S. DAST, and the president.

Activities

The Civil Defense, in conjunction with the military and the national police, forced the evacuation of marginal communities in low-lying areas along the banks of the Rio Ozama and other major rivers. It opened public shelters in schools, other public buildings and churches, and transported riverside residents to these shelters before the arrival of Hurricane David. It is universally agreed that this action saved thousands of lives. The Civil Defense estimate of the number of people it had in its own shelters the night of August 31 is around 150,000.[9]

After Hurricane David passed, the Civil Defense remained in charge of the public shelters and began the process of acquiring and providing food to the sheltered refugees. The Civil Defense issued calls for specific assistance to voluntary agencies (volags), and worked closely with CARE, CARITAS, Catholic Relief Services, and Servicios Sociales de Iglesias Dominicanas. At the same time, the Civil Defense was working with DAST and the Dominican military to assess the extent of damages and population need, and to begin food and water distribution to affected communities.

The Ministry of Public Health opened its individual clinics and hospitals throughout the country immediately after Hurricane David passed. SESPAS did an assessment of the damage to its facilities and the need for resupply. Based on this assessment, SESPAS issued an international call for the donation of medical supplies.

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[9] "Listín Diario," 2 September 1979, p. 1.

To provide emergency medical services. SESPAS organized brigades of medical students. These brigades worked in the refugee shelters and traveled to medically underserved areas and isolated communities. Unfortunately, the distribution of these services was uneven and inadequate, and the medical students often found themselves with insufficient supplies to treat their patients by accepted protocols. SESPAS also formed a team of pharmacists and medical students who worked at the airport examining and classifying incoming drugs and other medical supplies, to enhance their rapid and accurate distribution.

SESPAS met with DAST, USAID, and PAHO officials to examine the dispersion of health needs and discuss the possibility of epidemics. PAHO and WHO personnel assisted the department with the design of programs to prevent the spread of water-borne disease. This included water purification and distribution, and a nationwide program of radio announcements to convince the populace to boil water before consumption. U.S. experts helped in overall health relief coordination, epidemic investigation, and vector control.

A few days after Hurricane David, the health ministry declared that the number of Dominican physicians and health workers was sufficient to cover the country's needs, and that foreign medical personnel would not be required. The same declaration requested, however, that the international community continue to donate medical supplies.

By the last week of September most SESPAS clinic activities were close to normal. The department continued to work with other parts of the government to improve the supply of potable water. Extraordinary

trips of medical students into rural areas ended. Some typhoid vaccinating had been done in the Baní area. The epidemiologic surveillance returned to its normal weekly/monthly reporting system.

In May, 1980, SESPAS produced a report claiming to show that the post-disaster medical/public health services had been sufficient to control any disaster health sequelae.[10] A number of Dominicans suggested to me that this artificially optimistic report from the health ministry was the result of pressure from the Minister of Tourism. The tourism office, according to this version of events, did not want news of post-hurricane health problems to scare potential tourists from vacationing on the island. I could find neither confirmation nor refutation of this allegation. The fact remains, however, that the report was misleading.

Evaluation of Role Fulfillment

Considering the small size of its office and staff, the Civil Defense did a commendable job of evacuating vulnerable civilians, and providing shelters and food, food and transportation to isolated areas, and coordination of disparate voluntary agencies. Virtually all agencies and groups which worked with the Civil Defense later praised the agency's role in hazard mitigation, relief, and rehabilitation, even if there were some bureaucratic problems. The agency undoubtedly saved thousands of lives and lessened the level of suffering for many more thousands of Dominicans.

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[10] José R. Oviedo Javier: "Atención de Salud in Relación al paso del Huracán David," Santo Domingo: Secretaría de Estado de Salud Pública y Asistencia Social, May 1980, pp. 8, 11.

The Ministry of Public Health has not been as universally praised for its disaster role fulfillment. Its declaration of sufficient physicians and other medical personnel might have been correct if the medical personnel had been used to their fullest capacity. This would have meant sending many (and experienced), personnel with sufficient and appropriate medical supplies into the countryside for an extended period of time. The medical students and residents who did travel to rural villages stayed only a short time and had insufficient supplies. Given the maldistribution of Dominican medical personnel and the government's inability or unwillingness to temporarily change that distribution, it might have been better to allow extra-national medical teams to enter the country and work in underserved areas for three to six weeks.

The epidemiologic surveillance failed to notice the rather sizeable epidemics which hit the study provinces. It is likely that other provinces suffered similar problems. Instead, SESPAS produced the previously mentioned document claiming that the post-disaster health services had been sufficient.

Although individuals within SESPAS did their best to mitigate the country's post-hurricane health problems, the overall effort was characterized by a lack of management's ability to understand the size and complexity of the problem and to treat it accordingly.

United States Government Response: Agency for International Development and the Disaster Area Survey Team

Relationship to Civil Defense

The Agency for International Development has a long-term relationship with the government of the Dominican Republic. It also has

had a direct relationship with the Dominican Civil Defense, having helped the Dominican government develop disaster preparedness and response capability.

AID works at the request of the Dominican government in conjunction with the U.S. embassy and the U.S. Department of State. The Disaster Area Survey Team is administratively tied to AID's Office of Foreign Disaster Assistance, but enters a disaster-stricken country at the request of the national government via the U.S. ambassador. The duties of the DAST are to survey and analyze the extent of disaster-caused damage and health vulnerability, and suggest relief and reconstruction measures to be taken. DAST may also expand to the actual provision of emergency relief when warranted, as was the case in the Dominican Republic. The Dominican office of AID has also had a long and close relationship with the Dominican Ministry of Public Health, and worked closely with SESPAS during the disaster period.

Activities

The U.S. ambassador made an immediate donation of $25,000 for the purchase of foodstuffs and supplies. At the ambassador's request, AID sent a Disaster Area Survey Team to the Dominican Republic. Because the need was so great, the DAST eventually expanded to 295 men, 18 helicopters, and 10 tank trucks. The helicopters spent the first few days surveying the damage. The rest of the following month was spent delivering foodstuffs, medical supplies, and emergency personnel to areas which were inaccessible by ground transport. DAST helicopters also provided medical evacuation flights and transport for other relief and government agencies when necessary. An aerial photographic survey

was made of the disaster area.

The health unit of AID provided continuous consulting, assistance in coordinating the international health relief effort, and several outbreak investigations. AID also arranged for the U.S. Navy Disease Vector Ecology and Control Center to survey the danger of increased vector diseases and provide control measures. An electrical engineering team and bridge repair specialists were also sent in. The U.S. government also sent in the following supplies for use in the relief effort:

-120,000 meals or C-rations
-13 30KW generators and 2 100KW generators
-100 family tents and 250 cots
-$10,000 authorized to fly CARE foodstocks from Haiti to the Dominican Republic
-P.L. 480 foodstuffs were provided to be distributed by CARE, CARITAS, Catholic Relief Services, and Church World Service.
-4,500 locally manufactured water jugs were obtained for distribution.
-the following medical supplies:
4,000 Ampicillin vials
100,000 Ampicillin tablets
2,000 Benzathine Penicillin vials
50,000 Erythromycin tablets
2,000 Garamycin vials
1,000,000 Aspirin tablets
110,000 Disposable syringes
20 Syringe cartriges
100,000 Hypodermic needles
2,280 Catgut suture packages
30,000 Suture needles
48,000 Intravenous infusion sets
1,870 Aminophylline vials
5,000 Lidocaine w/epinepherine
2,650 Surgical dressings
3,000 Cotton rolls
1,000 Adhesive tape rolls
100 Suture silk rolls
25,000 Scalp vein sets
500 Atropine sulfate vials
2,500 Chloramphenicol ophthalmic ointment tubes
2,500 Chloramphenicol ophthalmic solution bottles
2,500 Solucortef ampules

20,000 Aldomet tablets
25,000 Penicillin G potassium ampules
5 Field first aid stations with supplies

Evaluation of Role Fulfillment

The United States' assistance proved to be of key importance in providing good disaster relief after Hurricanes David and Frederick in the Dominican Republic. The DAST functions, particularly damage assessment and helicopter transport, proved to be especially valuable when land transport was limited or impossible.

Although AID and the DAST may have had superior relief capabilities, they were careful not to overwhelm the Dominican government in the actual provision of relief. DAST physicians and the director of the AID health unit, Dr. Oscar Rivera Rivera, played very important roles in organizing the health relief effort and providing expert advice, but remained in the background of public attention.

The helicopter deliveries of medicines and foodstuffs were essential to the health and welfare of numerous isolated communities. The vector control, which was done in conjunction with the Pan American Health Organization, may also have had key importance in preventing large malaria and dengue outbreaks after the hurricanes.

In all, without the U.S. materials, transport, and expertise, the gravity of the post-disaster health problems would undoubtedly have been much worse. The U.S. had a low profile in the direct provision of health care services, but provided the supplies, expertise, and transport that made such services possible. The U.S. would have provided more direct care if it had been requested.

CARE, CARITAS, Catholic Relief Services, and Church World Services Duties and Relationship to Civil Defense

All four organizations are officially independent of governments and rely heavily on private donations for operating expenses. All four, however, work at the pleasure of the national government in normal times, and at the behest of Civil Defense in times of disaster. These organizations were asked by the Civil Defense to provide food support to citizens in shelters and to those who lived in communities which had suffered a loss of foodstocks during the storms. They were also requested, where possible, to provide supplies such as clothing, tools, bedding, and transport for relief activities. All of these groups worked closely with AID in the distribution of P.L. 480 foods.

Activities

Civil Defense coordinated sites where the organizations operated. Assignments were usually tied to normal bases of operation. All four organizations provided bulk foods to refugee centers and devastated communities. The foods came from many donation sources, were distributed according to perceived need, and by way of all forms of transport. The total amount of food distributed is unknown, but AID estimates that these four organizations distributed over 7,300,000 pounds of food in the first 28 post-disaster days.[11] All four organizations also distributed varying amounts of reconstruction and agricultural tools, clothes, and housing materials.

CARE and CARITAS provided considerable logistical support to

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[11] Op. cit, U.S. Department of State, No. 14, 28 September 1979.

Civil Defense in terms of food transport, distribution, and administration. Both organizations assisted with nutritional assessments of disaster-affected populations.

CARITAS acquired and distributed medicines from Spain, Puerto Rico, and the U.S. These medicines were distributed to established clinics (some or which are run by CARITAS) and medical relief groups that were providing health services in rural areas.

CARE nas a full-time medical training program utilizing North American physicians to train Dominican practitioners. These Dominican practitioners provided post-hurricane health care, but CARE's direct medical role was only minor.

Catholic Relief Services assessed damage to on-going agricultural training and experiment programs, and took steps to re-start agricultural production as soon as possible.

Evaluation of Role Fulfillment

Within the limits of the supplies and transportation available, all four organizations did a commendable job of fulfilling the role of food delivery. Some stored food was lost in the hurricanes and should have been better protected. The degree of cooperation between these voluntary agencies and between the volags and Civil Defense/AID was very high. However, several members of this group complained that the bureaucratic work at Civil Defense was too slow. In reality, these organizations formed the backbone of the Civil Defense-coordinated food delivery program, and provided the expertise that made it work well under very difficult conditions.

The role or this group of volags in the provision of health

care was too small to evaluate. Nonetheless, CARITAS' collection and distribution of medicines, and limited provision of medical care was much needed. It is clear, however, that these organizations played a key role in protecting health by providing emergency food supplies to an already nutritionally precarious population.

The reconstruction assistance provided by these organizations immediately after the hurricanes consisted mostly of the provision of tools and supplies. Certainly these supplies were badly needed and well appreciated. CARE later became involved in several somewhat more problematic reconstruction projects, such as the CARE-INVI community reconstruction program in Sabana Grande de Palenque. However, this exceeds the originally assigned roles of the organizations, and is beyond the scope of the present research.

Dominican Red Cross

Duties and Relationship to Civil Defense

In normal circumstances the Red Cross serves independently of the government, although it actually often coordinates its programs with government agencies. In the case of a disaster, the Red Cross would normally come under the direction of the Civil Defense or SESPAS. In this case, however, a presidential decree outlined the specific responsibilities of the Red Cross, increasing its autonomy from other agencies. The Red Cross was given the responsiblity of acquiring and distributing medicines and blood products. The organization also assumed its own normal functions of performing rescue and first aid, providing interim medical care where needed, and providing shelter, food,

and clothing.

Activities

Before Hurricane David hit the Dominican Republic, the Red Cross had dispatched ambulances, medical, rescue, and communications teams to the areas judged most likely to be seriously damaged -- San Cristóbal, Ázua, Baní, Barahona, San Juan, and San José de Ocoa. Some of these teams provided the backbone of rescue and relief services in their assigned areas. Transport to most of these areas from Santo Domingo was blocked after Hurricane David, thus making the presence of the Red Cross teams doubly important.

Nationwide, the Red Cross provided medicines and blood products it collected from both national and international sources. It also surveyed the entire hurricane-affected portion of the country, starting services where needed and making recommendations to other organizations. Many organizations relied upon Red Cross communications specialists for contact with disparate parts of the country. In some areas, the Red Cross provided refugee shelters, food and clothing, tools, reconstruction materials, and housing articles to those who had lost them.

Evaluation of Role Fulfillment

By all reports, the Red Cross did a laudable job of securing and distributing medicines and blood products where requested. Within the limits of the resources available, and considering the immensity of the disaster, the Dominican Red Cross also did a significant job of fulfilling its own charter. It was the only organization to have

started its emergency health response program before the disaster actually hit the country.

Small Private Organizations and Churches

The number of small private organizations and churches that provided succor after the Dominican hurricanes is too high to research them all thoroughly. Three divergent examples are given here to impart to the reader an impression of the roles and activities of such small organizations in the disaster environment. The groups presented here are the Dominican Episcopalian Church (Santo Domingo), the (U.S.) Mennonite Disaster Services, and the (U.S.) Medical Group Missions Program.

The Role of Small Groups and Their Relationship to Civil Defense

The small organizations examined here basically worked independently of the Civil Defense. They may have notified Civil Defense as to their activities or collaborated with the Civil Defense in the distribution of foodstuffs on a small level. Medical Group Missions maintains its primary government contact in the Ministry of Public Health. These groups set their own roles.

Activities

The Dominican Episcopalian Church, as do many small organizations, chose one small devastated community to assist. This church chose the community of Santana in the province or Baní, not far from the study communities. It collected and provided the community with food and clothes during the emergency period, and on several occasions provided transport for individuals to medical facilities in Santo Domingo. Of more lasting effect, the Episcopalian Church

partially funded and formed a cooperative, through which Santana families could, at low cost, build a concrete block "hurricane proof" home. Unfortunately, fewer than twenty homes were built.

The Mennonite Disaster Services, based in Akron, Pennsylvania, took on a somewhat larger project. The Mennonites chose to assist "end of the road" community Juan Baron, which lost 99% of its housing. The Mennonite group met with the community reconstruction committee, which had already been formed, and discussed the community's post-disaster needs. Together, the Mennonites and the community devised plans for reconstructing the community with concrete hurricane-proof homes for each family. Work brigades were organized, the Mennonites brought in a hand-driven concrete block forming machine, a carpentry shop was built, and the Mennonites arranged for about $400,000 in seed funding to get the project started. The money was put into a revolving fund, through which the community members pay for their own houses over time. Part of the pay-back money is allocated for community improvement projects.

A work brigade came from the U.S. to help teach community members how to use the carpentry and cement working tools. This brigade worked side-by-side with the community members until the community could handle the various required skills on its own.

The outcome of the Mennonite project is that Juan Baron has converted itself from a thatched-hut community entirely dependent on low-technology agriculture to a community in which each family owns its own well-built home, and in which thriving carpentry and cement block making businesses sell their products to surrounding areas. The town has added a new community center, improved the local clinic, and was in

the process of planning to build a school at the time that this researcher left in November, 1981. Only one Mennonite, a pastor, remained, and he remained only at community invitation.

The Medical Group Missions Program is run by a conglomeration of U.S. churches. The program brings North American physicians to the Dominican Republic on a regular basis to provide medical care in underserved rural areas. The in-country leadership of the program was at Boca de Nigua, a few kilometers from Palenque and Juan Baron, at the time of the hurricanes. The medical care provided there by John Shannon and a medical student has already been described. The program organized food distribution for 4,500 people following the hurricanes, obtaining most of the food from the Civil Defense and some from AID. This food aid was continued through Christmas, 1979. The Medical Group Missions Program also brought a team of construction workers from the U.S. to help in nearby communities for a short time.

In addition to the extraordinary programs the Medical Group instituted in the post-disaster period, it decided it would be important to continue its previously planned program of medical visits. A team of physicians spent the month of November, 1979, providing care in rural areas of the Dominican Republic. They reported finding more malnutrition than had been seen during previous visits.

Evaluation of Role Fulfillment

Evaluation is difficult in the case of these small organizations. The Episcopalian Church group was quite small. It is clear that the community of Santana benefitted from the church's

involvement, although that benefit was limited by the small amount of resources available and the overwhelming degree of need. The church was also somewhat hampered in its efforts by lack of the community's whole-hearted collaboration. It was impossible to find out why such collaboration was not forthcoming, but it is possibly related to the fact that the church and its members were seen to be outsiders who went home to their own secure buildings in Santo Domingo at nightfall. The effect of the Episcopalian work on the community's health is indirect, at best, and unmeasureable.

The work of the Mennonites in Juan Barón has been an unqualified success. With their help, a community which was almost entirely destroyed rebuilt itself into something stronger and more comfortable than previously existed. The carpentry and block-making businesses, which are owned by the workers, continue to bring money into the community. Community improvement programs are well underway. Although the Mennonites' work was not directly health-related, community members overwhelmingly agreed that the new housing is healthier than the previous. In addition, each family now has its own hurricane shelter, thereby diminishing the probability of mass hurricane-caused disease transmission in the future.[12]

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[12] Recently published work by Bates et al examines the social effects of different kinds of housing relief programs in Guatemala, following the 1976 earthquake. They found that permanent housing has the effect of stimulating community development and self-sufficiency, and may even help diminish social inequalities. Temporary housing relief programs have the opposite effect, and apparently may do more damage than no program at all. See: Bates, Frederick L., ed.: Recovery, Change and Development: A Longitudinal Study of the 1976 Guatemalan Earthquake. Athens, Georgia: University of Georgia, 1982.

The Medical Group Missions Program provided virtually all medical care and relief coordination for a relatively small but devastated population. Their commitment to this population carried on for months following the hurricanes, providing services and organization that simply may not have existed without their presence. Furthermore, the group continued to provide its normal medical care program, which is often a notable omission following disasters. This group's impact on the health of its target population, although not now measureable, was surely positive and important.

Goodness of Fit: Overall Health Relief Program to Demonstrated Needs

The analysis of the "goodness of fit" between the "needs," as demonstrated in the epidemiologic chapter, and the health relief programs that were actually provided, is examined here in two parts: the immediate needs of the first two post-disaster weeks (trauma care, immediate disease control, and nutrition), and the disease control and curative medical needs of the following six months.

First Two Weeks: Trauma

In the three communities we studied, 18.8% of the families reported someone injured in the two-week survey. The two-year survey found that an average of about 10% of the respondents had been injured during the hurricanes. The majority of the injuries were puncture wounds or blunt trauma to the feet, legs or face, and the intromission of foreign material into the eyes.

The second community survey showed that an average of 80% of those injured sought medical care for their injuries (in Yaguate only

54%). It should be remembered that all three of these communities have a permanent clinic, although each clinic is not permanently staffed. Of those who sought medical care for their injuries, 88.5% received care, 78% of which took place within 24 hours after the injury occurred. (Eighty percent of those who reported not finding medical care said that they were cared for by their families.) Of those who had their injuries medically treated, 85% said that the care they received had been sufficient to heal their wounds. It is unknown what happened to the other 15%, although some of them are known to have gone to San Cristobal or Santo Domingo for further treatment.

Ninety percent coverage with an 85% cure rate is a good outcome for traumatic injuries in a resource-poor country following the devastation of many types of resources. The above figures, however are from communities which had permanent medical facilities that happened to be staffed by a physician and/or medical students at the time of the hurricanes. What actions were taken, however, for areas which had no clinic, and how did such areas fare?

Recognizing that many areas would be without sufficient medical care after the hurricanes, the Dominican Red Cross sent a group of ambulances with rescue and first aid crews to the areas where Hurricane David was expected to impact most severely. These Red Cross teams not only served as the only rescue and first aid services available in some areas, but they also provided some stability and organization around which other rescue and first aid could take place. Although the Red Cross continued to work its way more and more into the damaged interior of the country with four wheel drive vehicles, its reach was severely

limited by widespread destruction of roads and bridges.

Primarily because of the destruction of the roads, helicopters were utilized to carry medical personnel to isolated areas and to transport some severely injured patients back to urban medical facilities. This service was primarily provided by the United States military in conjunction with Dominican (and a few U.S.) medical personnel. It was clearly indispensible in bringing trauma and nutrition care to many isolated areas which would have otherwise received no medical care or other outside help.

Immediately after Hurricane David passed, the Medical School of the Universidad Autonoma de Santo Domingo and several other medical education institutions, in conjunction with the Ministry of Public Health, formed brigades of medical students to attend to the immediate health needs of the affected populations. These medical student brigades traveled widely throughout the central region of the country, spending a day or two in each community before moving on to the next site. In many areas, this day or two visit proved to be the only emergency medical care available. Unfortunately, as already mentioned, these teams were frequently required to work without sufficient medical supplies, and were in each rural community only a short time, thereby limiting their effectiveness. John Shannon, of the Medical Group Missions, witnessed a medical student team operate in Boca de Nigua ten days after Hurricane David. Their immediate effectiveness was limited by their lack of supplies. Additionally, by the time many local people found out about its visit to the area, the team had finished its one-day clinic and had left. Shannon could not comment on the

appropriateness of the care that was provided, but noted that by the time the brigade had arrived, most first aid problems had already been alleviated, and the seriously injured had either already died or had been hand carried to the hospital in San Cristóbal, some twenty kilometers away.

It is somewhat difficult to judge whether the medical supplies which were donated from abroad were appropriate for the trauma care and disease control needs that existed. Most organizations which donated pharmaceuticals and other supplies have listed their donations simply as "medical supplies." The U.S. Office of Foreign Disaster Assistance, however, listed its contributions by category, as is shown above on pages 120 and 121.

Since OFDA is experienced in disaster relief and post-disaster health problems, one could expect the organization to donate a better than representative shipment of medical supplies. This list discloses, however, some questionable choices and serious omissions. The many broad-spectrum and more specific antibiotics indicate an expectation of bacterial infections, perhaps wound infections, bacterial enteritis, or pneumonia. The inclusion of aspirin would hve been useful for the many undefined fevers that did, in fact, occur. The suture sets, silk, surgical dressings, cotton rolls, adhesive tape, and local anesthetics were useful for the types of lacerations and puncture wounds victims sustained, but it would have been useful if plaster casting material and x-ray films had also been included. That ophthalmic ointments and solutions were sent shows some familiarity with the possible health effects of hurricanes, but it is difficult to understand why 25,000