

Health Effects of the War in Two Rural Communities in Nicaragua

NICARAGUA HEALTH STUDY COLLABORATIVE AT HARVARD, CIES,* AND UNAN[†]

Abstract: We report on a pilot study to assess the effects of low intensity war in Nicaragua on the health of the civilian population. The study compared data from two regions in Nicaragua, one in an area of intense conflict, the other further removed from the war's violence. Information was obtained from a questionnaire administered to female heads of randomly selected households; structured interviews with community leaders and health workers; group discussions with community residents; and a review of regional and municipal death records. Height and mid-upper arm circumference of children were measured, and immunization records reviewed.

The war has had a serious negative effect on the lives of the civilian population in both the war zone and the non-war zone, with the effects

most severe in the war zone. In both communities, over half of the respondents reported the death of a friend or relative. In the war zone community, over one-fourth of respondents reported attacks on family members in non-combat situations around their homes. Death by firearms was the leading cause of death in persons over age 6 in the war zone. Vaccination coverage, nutritional indices, and familial disruption were worse in the war zone community. The findings suggest that continued funding of the Nicaraguan *contra* forces by the United States may be harming the ostensible beneficiaries of that policy, and that use of such low intensity conflict as a foreign policy tool should be questioned. (*Am J Public Health* 1989; 79:424-429.)

Introduction

There has been a dramatic and well-documented improvement in the health status of the Nicaraguan population since the revolution of July 1979.¹⁻¹¹ The war waged by counterrevolutionary forces (*contras*) attempting to overthrow the government of Nicaragua has threatened to halt or reverse these advances. The *contra* war in Nicaragua is an example of what is termed "low intensity conflict" (LIC) by United States military and diplomatic officials.¹²⁻¹⁴ LIC refers to conflicts short of conventional war, which intentionally subject the civilian population to a combination of psychological, economic, and military pressure to promote the adoption of the desired social system by the civilian population.

Several reports, using national data and standard epidemiologic methods, have documented negative effects of the current war in Nicaragua on the health status of the civilian population.^{10,15-17} To date, however, little field research has examined the effects of the war through the collection of data at the community level. We report here the results of a pilot study comparing health indicators collected in a uniform fashion in two regions in Nicaragua, one in an area of intense conflict, the other further removed from the violence of the war.

Methods

Data were collected on selected health indicators in two regions of Nicaragua: one suffering frequent *contra* attacks

and another experiencing fewer *contra* attacks to serve as a comparison. For this pilot study, a single town was chosen in each region as representative of the region under study.

Information was obtained from four sources:

- A questionnaire administered to the female heads (*amas de casa*) of a random sample of households with at least one child under 6 years of age;
- Standardized interviews conducted with community leaders: health professionals, the mayor, school teachers, and the head of the women's organization;
- Facilitated group discussions;
- Review of municipal and regional death records.

Regional information was obtained in structured interviews with Ministry of Health officials and from annual health records.

The household questionnaire measured a variety of health indicators, including economic conditions, food availability, nutrition, child health, stability of family life, disruption or deaths due to the war, access to health services, educational status, and psychological health. Vaccination data were recorded on all children under 72 months of age whose vaccination cards were available. Standing height of all children of the household between the ages 24 and 71 months present during the interview was measured using a metal tape measure and right angle. Mid-upper arm circumference of the left arm of children between 12 and 71 months was measured using an insertion-type measuring tape.¹⁸

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Towns to be studied were selected from Nicaragua's Region V, an area in the central part of the country under increasing attack from the *contras* since 1984,¹⁹ and from Region IV, an area on the Pacific Coast near the Costa Rican border. According to the Ministry of Health, Region IV has experienced only isolated *contra* attacks since the Revolution in 1979.

In Region V, we studied the town of Acoyapa. A community of about 8,500 population, and surrounded by nine small villages or *comarcas*, Acoyapa is located in the dry, hilly region of Chontales Province east of Lake Nicaragua, about 30 kilometers by paved and fairly secure road from the provincial capital, Juigalpa. While Acoyapa itself has not been subjected to a direct *contra* attack, the mayor reported there have been at least 10 attacks on the surrounding *comarcas*, and fighting has occurred within a few kilometers of the town.

El Ostional was selected as the comparison town from Region IV. A town of 441 residents, and also surrounded by neighboring *comarcas*, El Ostional is a fishing and farming community located on the southern Pacific coast of Nicaragua, 12 kilometers from the Costa Rican border and 30 kilometers by dirt road from San Juan del Sur, the nearest town with over 2,000 population.

Despite the difference in their sizes, Acoyapa and El Ostional are similar in several important aspects. The economies of both towns are based on food production, and both towns have health facilities with a permanent staff.

El Ostional and two towns in Region V of comparable size, economy, and proximity to a major road or city were pre-selected jointly by the Ministry of Health and the North American study participants. Arriving in the war zone in Region V, however, the team was informed by the regional Ministry of Health that one of the pre-selected towns had been attacked just 10 days earlier and that the road leading to the other town had been mined by the *contras*. Considerations of safety led to the final choice of Acoyapa on the day the study began.

The field work and data collection were conducted in January and February 1987 by 11 North Americans, five in the war zone and six in the non-war zone. Random samples of households were surveyed in both towns. The female head of household was defined as the woman within the household identifying herself to be the *ama de casa*. In Acoyapa, a group discussion was conducted with families of displaced persons. In El Ostional, all the women in the town were invited to participate in a group interview.

Results

Sample Survey

Fifty interviews were completed in 76 sampled households in Acoyapa. Thirty-nine interviews were completed in 59 sampled households in El Ostional. The selected households represented approximately 9 per cent of households in Acoyapa and 90 percent of households in El Ostional. Interviews were not conducted in sampled households if the female head of household was not home on three successive visits, or if no children under age 6 lived in the home. No interviews were refused in either community.

The two towns were similar economically, with nearly identical proportions of households having electricity (78 and 82 per cent in Acoyapa and El Ostional respectively), radio or television (50 and 51 per cent), and a latrine (84 and 82 per cent). Only half of the households in Acoyapa had piped

water compared to 84 per cent in El Ostional. At the time of the investigation, however, the actual flow of water was disrupted in both communities due to malfunctioning pumping systems and parts being difficult to obtain because of the economic embargo. Houses in both communities were small and crowded, with a mean of about 4.5 occupants per room in both. A mean of roughly 2.5 children under 6 years of age per household was reported in both towns, although the mean number of occupants in Acoyapa was 10.7 compared to 7.8 in El Ostional.

Respondents were asked if their standard of living was better, worse, or the same as the year before. In Acoyapa (war zone), half (51 per cent) of the households reported their living standard currently *worse* than the year before compared to 41 per cent in El Ostional, while only 8 per cent in Acoyapa reported an *improved* living standard compared to 26 per cent in El Ostional (test for trend $\chi^2 = 3.13$, $df = 1$, $p = .077$).

Indices of change in food production, change in food availability, and nutrition were consistently worse in Acoyapa (war zone) than in El Ostional (non-war zone). Eighteen per cent (9 of 50) of the households in the war zone town had had one or more members leave agricultural production within the past year, compared to none (0 of 39) in El Ostional (95% CI = 1.7, ∞).

As an indicator of availability of food, respondents were asked whether they were eating more, the same, or less of three basic starch foods and seven basic protein foods than the year before. A greater proportion of people in Acoyapa reported eating less rice, corn, chicken, milk, cheese, and fish, and fewer eggs and beans compared to the year before than in El Ostional (Table 1). Starch consumption had decreased in both communities, while protein consumption had decreased greatly only in Acoyapa (Figure 1). Consumption of both starch and protein foods had declined significantly more in the past year in Acoyapa than in El Ostional (Wilcoxon rank sum test: for starch foods $z = 3.04$, $p = .002$; for protein foods $z = 4.86$, $p < .0001$).

Prevalence of chronic undernutrition in children ages 24 to 71 months as estimated by the proportion of children with height for age below the 5th percentile compared to the National Center for Health Statistics reference popula-

TABLE 1—Comparison of Change in Consumption of Basic Foods over Previous Year

Food	Number (per cent) of Households Eating Less of Food Item		Odds Ratio	95% CI
	Acoyapa	El Ostional		
Starches				
Corn	33/49 (67)	14/38 (37)	3.54	(1.45, 8.60)
Rice	38/49 (78)	22/38 (58)	2.51	(1.0, 6.37)
Plantains	21/48 (44)	11/38 (29)	1.39	(.58, 3.37)
Proteins				
Milk	27/49 (55)	7/38 (18)	5.44	(2.01, 14.7)
Eggs	21/49 (43)	5/38 (13)	4.95	(1.65, 14.8)
Beans	30/49 (61)	13/37 (35)	2.91	(1.20, 7.07)
Chicken	18/49 (37)	6/38 (16)	3.10	(1.09, 8.83)
Cheese	19/49 (39)	7/38 (18)	2.80	(1.03, 7.64)
Fish	11/47 (23)	2/36 (6)	5.19	(1.07, 25.2)
Red Meat	28/49 (57)	16/38 (42)	1.83	(.78, 4.32)

The analysis was done by comparing the proportion of households reporting eating less of a particular food to the proportion giving any of the other possible responses. Other possible responses were that the respondent eats more or the same of the food as the year before, or the respondent does not eat the food at all.

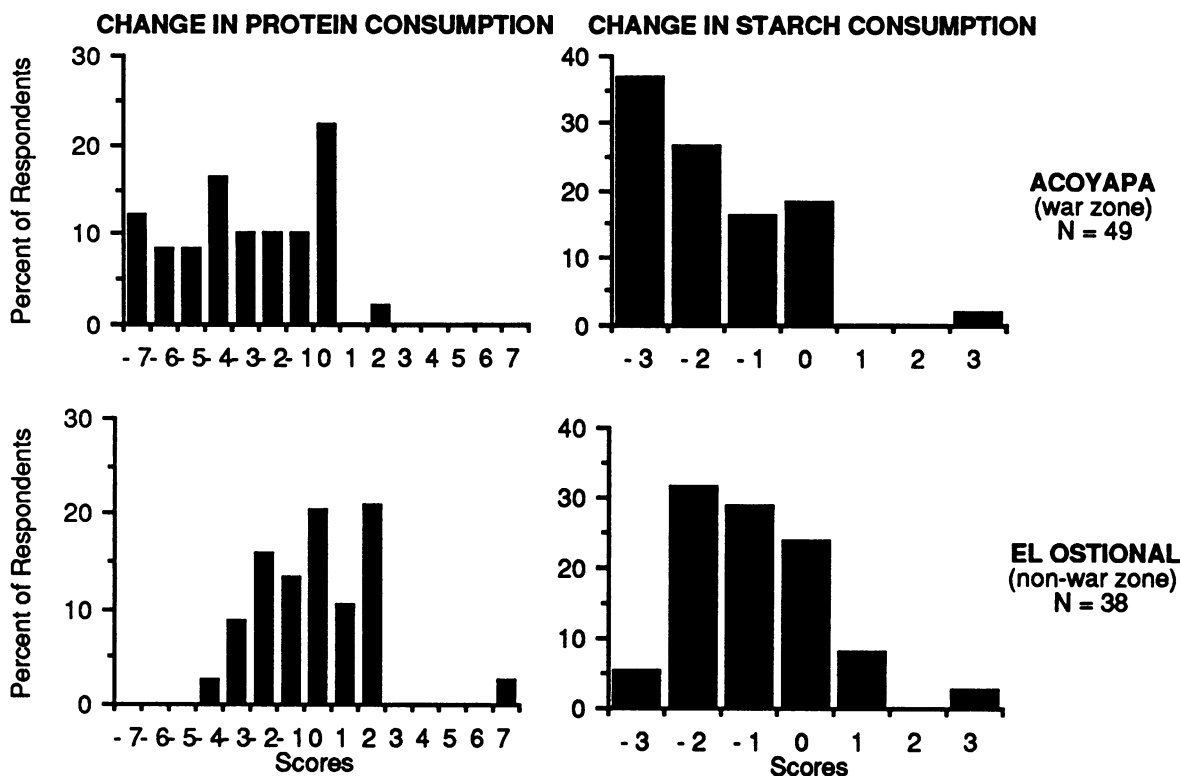


FIGURE 1—Distribution of households reporting increase, decrease, or no change in consumption level of protein and starch foods. To assess overall change in consumption of starch and protein foods, composite scores for change in both were constructed for each household. Integer values were assigned to responses for individual foods, and separately summed for the three starch foods and the seven protein foods. The response 'more' was scored with 1, 'less' with -1, and 'same' or 'not at all' with 0. Thus, starch scores range from -3 to 3 and protein scores from -7 to 7. Negative scores indicate a net decline in consumption of the seven protein and three starch foods investigated. Note the difference between towns in the proportion of households with protein scores -7 to -4 and with the worst starch score of -3.

tion²⁰⁻²² was greater in Acoyapa than in El Ostional. In Acoyapa (war zone), 22 of 50 children (44 per cent) were below the 5th percentile compared to 9 of 47 (19 per cent) in El Ostional (non-war zone) (OR = 3.32, 95% CI = 1.33, 8.29). Although many children in both towns showed signs of chronic undernutrition, none of the 81 children ages 12 to 71 months measured in Acoyapa and none of the 69 children measured in El Ostional exhibited signs of severe acute undernutrition as indicated by a mid-upper arm circumference less than 12.5 cm.²³⁻²⁵

Vaccination coverage was better in the non-war zone town than in the war zone town, based on both recorded completeness of vaccination and a crude measure of possession of an immunization card as a proxy for coverage.* In only 20 of 50 households (40 per cent) in Acoyapa compared to 29 of 39 (74.4 per cent) in El Ostional, immunization cards were presented for all children under 6 years of age in the household (OR = .23, 95% CI = .09, .57). Only 18 of 48 (37.5 per cent) children between the ages of 12 and 71 months with vaccination cards were completely vaccinated in Acoyapa compared to 47 of 60 (78 per cent) in El Ostional (OR = .17, 95% CI = .07, .39) (Table 2). A child was considered completely vaccinated if he or she had three recorded doses of DPT, three polio, 1 measles, and either a written record or scar for BCG.

Comparison of the immunization coverage shown in

*Immunization cards are commonly kept in each child's house, in addition to records kept in the health centers.

TABLE 2—Completeness of Vaccination Coverage in Children Ages 12-72 Months by Town

Vaccination	Number (Percentage) of children with complete vaccination*		Odds Ratio	95% CI
	Acoyapa n = 48	El Ostional n = 60		
All vaccinations complete	18 (38)	47 (78)	.17	(.07, .39)
3 DPT	19 (40)	56 (93)	.05	(.01, .15)
3 Polio	39 (48)	57 (95)	.23	(.06, .90)
1 Measles	35 (73)	51 (85)	.48	(.18, 1.28)
1 BCG	35 (73)	60 (100)	—	(-∞, .07)

*Sample excludes children who had no vaccination card

Table 2 with levels in 1980 shows that despite the war, considerable advances have been made. In 1980, the per cent of children one year old who were immunized was 50 per cent with BCG, 18 per cent with DPT, 18 per cent against polio, and 15 per cent against measles.²⁶

Families in both Acoyapa and El Ostional have experienced violence as a result of the war. In both communities, over half of the respondents had experienced the death of a friend or relative, while one-fifth reported a member of the household killed, kidnapped, or wounded.

In Acoyapa (war zone), of the 26 respondents reporting that members of the family in the same household or relatives living in other households had been attacked or killed in the war, 14 indicated that the violence was done to non-

combatant civilians in and around their homes. Of these, 13 were attributed to the *contras* and one was attributed to cross-fire between government forces and the *contras*. Two nieces of one respondent, both under 15 years of age, were kidnapped by the *contra* and still missing at the time of the interview. In one case, the *contra* murdered 11 male cousins and one of their wives at a family party, the respondent thought because of their cooperation with governmental agricultural extensionists. In another case, seven adults were wounded by the *contras*. In one incident, a man crossing lines of fire between the government forces and the *contra* was, according to the respondent, accidentally shot. No similar reports of violence against civilian relatives were offered in El Ostional.

The proportion of households in Acoyapa with children under 14 years of age missing at least one parent due to the war (17 per cent) was twice that observed in El Ostional (8 per cent) (OR = 2.32, 95% CI = .57, 9.47).

Mobility was high in both communities, with 16 per cent of the households in El Ostional and 21 per cent in Acoyapa reporting people moving in within the last year. Thirteen per cent of the households in El Ostional and 24 per cent in Acoyapa had people moving out within the past year. While none of the mobility in El Ostional was reported to be directly related to the war, half of the movement in Acoyapa was due to the war. A larger proportion of the *amas de casa* in Acoyapa (22.4 per cent) had lived in the town for less than three years than in El Ostional (8 per cent) (OR = 3.28, 95% CI = .84, 12.8).

Municipal Death Records

Review of the Municipal Registry of Acoyapa revealed that death by firearms was the leading cause of reported deaths in persons over 6 years of age in 1986, with a marked increase in death by firearms since 1984 (Figure 2). The municipality of El Ostional had no comparable registry. In Region IV, which includes El Ostional, records kept by the regional Ministry of Health showed death from firearms to be the fourth leading cause of reported deaths in persons over 6 years of age in both 1985 and 1986.

Regional Interviews and Records

The two regions studied differ greatly in the extent to which their primary health care systems have been affected by the *contra* war (Table 3). Ministry of Health records showed that in Region V (war zone), 20 health posts and health centers functioning in 1983 have been either destroyed, attacked, or closed due to the *contra* threat to health workers providing services there. By contrast, in Region IV (non-war zone), all of the clinics functioning in 1983 continue to provide services today.

The war has also affected programs of preventable disease control in Region V. Since 1984, five of ten health areas (administrative sub-divisions of the health region) in Region V have not been able to participate fully in the three campaigns held each year to administer measles, DPT, and polio vaccines to children. Half of the areas of Region V have also been unable to participate in the national malaria control campaign.

Community Interviews

In Acoyapa, civilians engaged in health and education work in the rural areas surrounding the town have been subject to attack by the *contra*. Health workers and teachers reported that at one health post, an auxiliary nurse was killed, and another salaried health worker threatened at gunpoint. Of

Deaths Due to Firearms in Persons > 6 years

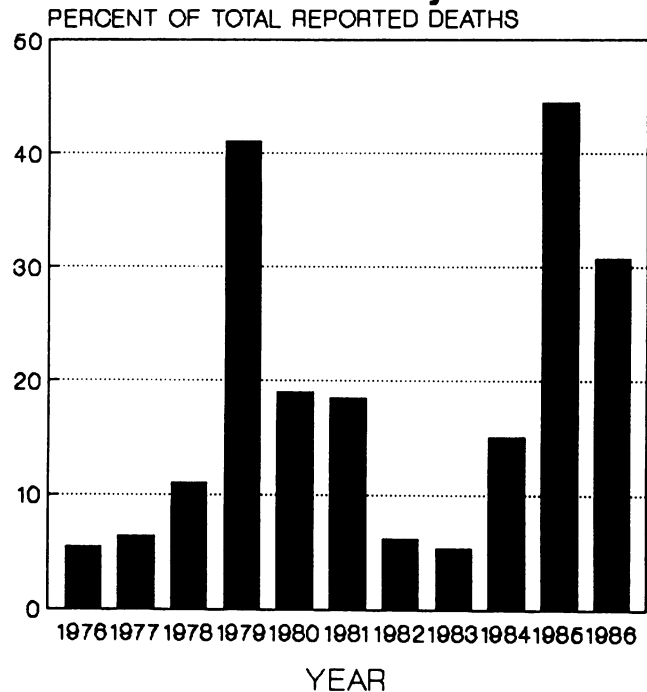


FIGURE 2—Percent of reported deaths due to firearms in persons over 6 years of age in the Municipality of Acoyapa (war zone) from 1976 to 1986. Absolute figures are 1976: 2/36; 1977: 2/31; 1978: 3/26; 1979: 14/34; 1980: 6/31; 1981: 7/38; 1982: 2/32; 1983: 2/38; 1984: 6/40; 1985: 24/54; 1986: 8/26. Source: Municipal Death Records Acoyapa.

TABLE 3—Regional Effects of the War

Health Service	Region V (war zone)	Region IV (non-war zone)
Health clinics:		
destroyed since 1984	3	0
attacked since 1984	2	0
closed since 1984	15	0
Health areas:		
not able to participate in vaccination campaigns where malaria control workers could not provide services	5/10	0
	5/10	0

SOURCE: Ministry of Health regional records

the 20 brigadistas (community health workers) serving the nine *comarcas*, ten have been kidnapped and five have quit due to the threat. Mobile clinics have been stopped and no vaccination campaigns occurred in 1986. Vaccination campaigns under the protection of army escort were planned for 1987. Four teachers in one of the *comarcas* near Acoyapa were threatened by the *contra*, and three requested transfers to other areas. The ongoing adult literacy campaign in the countryside has been discontinued due to this threat of violence.

The economic infrastructure of the area also has been affected by the war. According to the food distribution coordinator in Acoyapa, some 1,300 people moved into the town from its war-torn surroundings from 1983 to 1986. The market in Acoyapa where local producers used to sell their

food no longer takes place because people are too afraid to travel the roads frequently.

A group discussion with displaced persons from 20 different families in Acoyapa produced numerous reports of attacks on health and education facilities, as well as on civilians by the *contras*. These included the burning of an elementary school, an agricultural cooperative and two homes, the kidnapping of 14 people (including seven children), and the killing of at least ten people. An attack on a health center resulted in it, as well as the school, being closed.

The interviews with community leaders and the group discussion with women in El Ostional (non-war zone) showed that while that community has not been subject to armed conflict since the insurrection of 1978-79, the war has been felt in less direct ways. The area was shelled once from the sea in 1985. With the escalation of the war in 1983, the nearby border with Costa Rica was closed, ending the active trade that had existed between communities on either side of the border, and affecting availability of basic goods. Scarcity of resources has prevented the planned construction of a fish packing plant and child care center. Teachers reported young children in their classes expressing fear of violent death at the hands of the *contra*. Trenches have been dug around the health post to defend it from attack. The adult education supervisor reported there are areas in the region to which she no longer travels for fear of *contra* attack. In the group discussion with 35 women from El Ostional, mothers spoke extensively of their anxiety that their families would be harmed by the *contra*, or that they would not be able to adequately feed their families due to economic problems created by the war.

Discussion

The findings of this study provide a consistent picture of the damaging effects of the war on the civilian population in Nicaragua, especially in the war zone. Reports of deliberate targeting of health, education, and food production facilities by the *contras* are particularly apparent. Regional Ministry of Health officials in the war zone described a pattern of *contra* attacks on food production and transport facilities, as well as on the health care infrastructure. Community leaders and displaced persons interviewed in the war zone reported *contra* attacks on agricultural cooperatives, small farms, clinics, and individual health care and education workers in the countryside surrounding Acoyapa, the war-zone community. More than a fourth of the surveyed households in Acoyapa reported attacks on family members or relatives in non-combat situations in or around the families' homes. Attacks in the countryside are forcing people to leave subsistence farming, a principle source of food, and the population of Acoyapa has grown by 15 per cent in the past four years. Municipal death records show a marked increase in the firearm-related death rate among civilians in the Municipality of Acoyapa since 1984.

This study was a pilot of a method to assess the effects of low intensity conflict on the lives of a civilian population at the community level. The comparison of a community-based household survey in the war zone to one in the non-war zone was designed to measure the direct effects of *contra* or other combat activity on the civilian population. The method of random sampling was chosen to avoid possible bias in the respondents. Despite the relatively small number of households interviewed, a consistent pattern of more persons being

forced from agriculture, worsening availability of food with attendant greater prevalence of chronic undernutrition, poorer vaccination coverage, a greater decline in the standard of living, as well as a greater direct experience of violence against civilians in the war zone emerges from the results of the household survey. The low prevalence of severe acute undernutrition in both towns suggests that existing food distribution systems, which include a government rationing system for staple commodities, have prevented frank starvation.

Several methodological problems limit interpretation of the comparative results of the sample survey. Generalizability of the results from the communities to their respective regions is limited because of the one-to-one comparison of the towns and the non-random selection of the communities to be studied. Differences in a one-to-one comparison may be due to many different factors, and particularly in this case to the difference in size of the towns studied. Information gathered from the other sources is, however, consistent with an interpretation that the differences are due to the war. Safety considerations prevented implementation of the original plan to study more than one town in the war zone and to study small towns of comparable size. In addition, it was impossible to blind the interviewers to the exposure status of the two study groups. The possibility of safety considerations and non-blinding of interviewers as sources of selection and interviewer bias, respectively, are two methodological problems inherent in studying the effects of low intensity conflict and political violence.²⁷

Our findings are consistent with other reports by medical investigators from the US²⁸⁻³¹ that the *contras* have deliberately killed, kidnapped, and injured civilian health workers and destroyed health facilities. The *contras* have reportedly killed more than 100 Nicaraguan health workers.³² Through May 1986, the Nicaraguan Ministry of Health reports that 65 health facilities have been completely or partially destroyed by the *contras*, and an additional 37 health units have had to be closed due to the threat of *contra* attack.¹⁵ The disruption of vaccination and malaria campaigns has been associated with measles outbreaks and a rising prevalence of reported malaria cases in the areas of the country most affected by the war.³³ Of 4,429 war-related deaths reported in Nicaragua on the Nicaraguan side of the conflict through May 1986, one-third were civilian non-combatant deaths, including 210 children under 12 years of age.¹⁵

This study provides further documentation of the destructive effects the war against Nicaragua is having on the lives of civilians in two rural communities, with these effects being most severe in the war zone. This raises several important concerns for health professionals and the US public. The data suggest that continued US support for the *contra* war may lead to continued suffering of the Nicaraguan civilian population, the ostensible beneficiaries of US foreign policy in Nicaragua. Reports of the deliberate targeting of health and education facilities are particularly disturbing, raising questions of the violation of the Geneva Convention protection of health workers during war.³⁴ Lastly, the pattern suggested by this and other reports should lead the US public to consider carefully the effects of "low intensity conflict" on the welfare of civilian populations before its further application in the Third World.

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Call for Papers:

Society for Health and Human Values Annual Meeting

The Society for Health and Human Values has announced a call for papers for its annual meeting, to be held October 26-29, 1989 in Washington, DC. Topics are sought in the humanities and health sciences, including, but not limited to, ethics, philosophy, religious studies, literature, history, creative arts, and law. Social science, educational evaluation, and health policy studies related to the humanistic aspects of health care are also welcomed.

Papers should have a maximum reading time of 20 minutes. Provide author identification on a separate cover sheet to ensure blind review. *Send papers* by June 15, 1989 to: SHHV Annual Meeting Program, 6728 Old McLean Village Drive, McLean, VA 22101. For *meeting information*, contact the program chair, John Moskop, PhD, Department of Medical Humanities, East Carolina University School of Medicine, Greenville, NC 27858-4354. Tel: (919) 551-2797.