Primary health care lessons from the Northeast of Brazil: the *Agentes de Saúde* Program

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ABSTRACT *Market-led economic reforms are usually viewed as being in conflict with government-stimulated socioeconomic development for disadvantaged groups. Nevertheless, Ceará, a poor state in the Northeast of Brazil, has since 1987 pursued both of those strategies simultaneously. One part of that approach has been a program of nurse-directed auxiliary health workers serving about 5 million people—almost all the persons outside the capital city and half of those in the capital. The system requires that the auxiliaries, called* agentes de saúde, *live in the local communities that they serve. The health agents visit each home once a month to carry out a small number of priority health activities. While health agent positions are in high demand, the minimum-wage salary that the agents receive makes up only a small portion of the state budget. A key aspect of the system is timely and comprehensive information, which is based on agent visits and is managed by trained nurses. Since the health agents system was launched, there has been a rapid decline in infant mortality, a rapid rise in immunization, identification of bottlenecks limiting the utilization of other medical resources, and timely interventions in times of crisis. The health agents system has combined administrative decentralization with financial centralization during a period of electoral democratization. The system has strengthened Ceará's commitment to primary care even as market-oriented changes have reduced the overall role of government. The Ceará program is being copied throughout the Northeast and other regions of Brazil. The key role that nurses play in the Ceará program in organizing and leading a system of basic primary care in poor neighborhoods and rural areas may provide useful lessons for other countries. In addition, Ceará does not have many of the favorable characteristics of other countries that have successfully invested in primary health care. Ceará thus represents a more achievable model for other countries, where, like Brazil, income, educational levels, and land tenure equity are limited.*

The state of Ceará is in the Northeast of Brazil. About 5 million of the state's 6.9 million residents live outside the capital, Fortaleza (1). Political changes in Ceará starting in 1986 created the opportunity for the rapid implementation of a primary health care strategy based on paramedical community health workers (2). The Ceará experience appears to be one of the most effective such efforts in the world. It has become a model for eight nearby Brazilian states, and in 1993 became the first Latin American program to receive the Maurice Pate Award from the United Nations Children's Fund for contributions to children's well-being (3). Remarkably, this equity-oriented primary care program came into existence when similar ones around the world were disappearing under the pressures of structural adjustment programs (4). The experience in Ceará also demonstrates that the principles of universal access to primary care can be facilitated by decen-

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tralization even where most hospitals and physicians operate privately.

In this piece we present the characteristics facilitating the Ceará program's success, conditions unique to the state, and lessons for other primary care programs. We report health-related data from representative statewide population-based household surveys in 1987, 1990, and 1994, in which one of us [EC] participated. Using an information system that three of us [MIV, VAC, and EC] began working on in 1991, we relate changes in health indices to actions taken by health agents. We highlight the contribution of health agents to achieving good health outcomes through our description of the evolution, organization, and function of the program, in which all of the authors participated. We also detail the program's guiding principles and the challenges that are now being faced.

BACKGROUND

In 1991, 63% of the households in northeastern Brazil earned less than the country's official monthly minimum salary of US$ 112. Ceará was the state in Brazil with the highest proportion (70%) of persons with a low income, in sharp contrast to the southeastern region of Brazil, where that proportion was just 23% (1). Also in Ceará, 37% of the persons more than 14 years old were illiterate in 1991, compared to 12% in the more developed south of Brazil. Rural poverty in agricultural northeastern Brazil is associated with a chronic lack of rainfall; Ceará is the northeastern state with the greatest proportion of the population living in arid or semiarid regions. There was a great drought in 1987, as well as one that the El Niño weather phenomenon produced in 1998.

In the past, the health situation in Ceará was typical of the poorer regions of Brazil and other countries of Latin America. Forty percent of all registered deaths occurred among infants (5). More than half of the children who died in Ceará in 1986/1987 had not visited a health facility during their fatal illness. Diarrhea accounted for about half of all infant deaths, fewer than half of all children had age-appropriate immunizations, and more than three-fourths of the children in the state lived in homes lacking either a latrine or piped water.[4] Although there were more than 1 000 public medical clinics in the state, 36% of the persons residing outside the capital city lived more than 10 km from one of those facilities. Many of the health centers in remote municipalities lacked personnel and supplies. Eighty-six percent of the 4 266 physicians and a similar proportion of the 1 800 nurses lived in the capital (6). The state's large budgetary commitment to health care provided employment to many doctors and also served as a feeder system for private care in hospitals. Seventy-eight percent of all hospitalizations in the state in 1987 were private (7). Nongovernmental organizations, the mass media, and the business community were little involved in matters relating to health and social welfare, which were seen as a public responsibility.

Brazil was governed by the military from 1964 until electoral democracy was reintroduced in 1982. A reformist state government was elected in Ceará in 1986 (3). This group established what is believed to be among the most open and honest administrations in the country. Reducing "no-show" jobs and decentralizing governmental administration eliminated 15% of all positions in the bureaucracy and freed up about a quarter of the state budget (8). A new development strategy focusing mainly on human resource development replaced one that had emphasized the construction of facilities.

In the late 1980s changes in Brazilian federal law shifted much of the initiative and funding for social service programs to state and local government (7). This included taxation authority, which, because it took mainly from the affluent, was implemented only slowly in much of the country. Federal guidelines required that 10% of the decentralized revenues were to be spent on health. New national laws established state and municipal councils for child rights in 1990 and for health in 1993. The reformist state government of Ceará took advantage of these openings to reduce the concentration of power among traditional elites. Health councils, half of whose members were consumers, were set up and by 1993 were active in 84% of the state's 183 rural municipalities (8, 9). Councils carried out independent assessments and sought public input to recommend health priorities, exercise new taxation authority, and disburse state and federal health moneys for basic health and primary school programs. Health centers, health posts, and some hospitals which had been administered by the state or federal government came under state or municipal authority. Mass media, local leaders, and the business community were involved through training seminars, health education and analysis programs organized by popular radio personalities, and public service announcements on TV, radio, billboards, and newspapers.

HEALTH AGENTS PROGRAM

Ceará quickly developed new health, education, and social welfare programs. Those new efforts were based on statewide maternal and child health surveys in 1987 and 1990 and data from vital events reporting, epidemiologic surveillance, and vaccination systems. Making data available at the municipal level facilitated local population-based planning and was critical to the decentralization of the health authority.

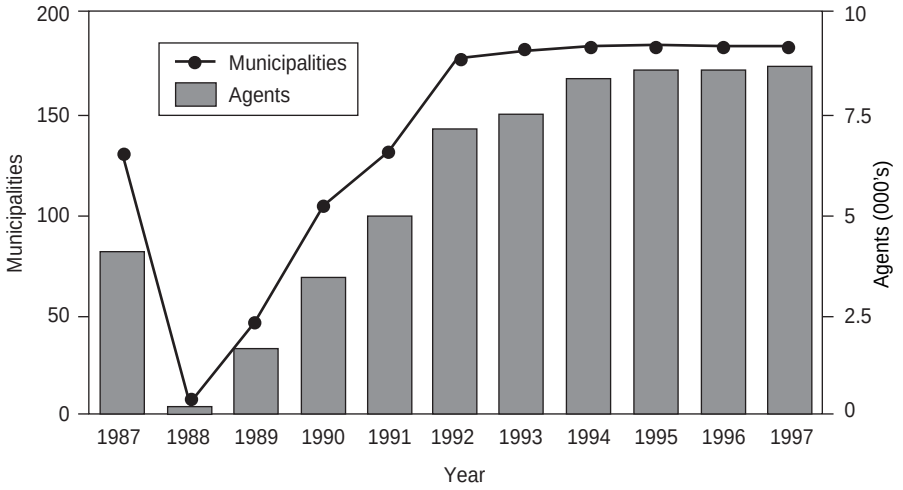
Two experiments in 1987 were forerunners of the new Ceará health agents program. One was a small-scale effort in the state capital of Fortaleza that employed auxiliary nurses for home visits. This program lasted only one year, as it soon became apparent that this level of staffing could not be achieved throughout the state. The second program recruited villagers in

[4] MacAuliffe J. Comparação de dois estudos de abrangência estadual 1987/1990 [unpublished]. Fortaleza: Fortaleza: United Nations Children's Fund, Sociedade Cearense de Pediatria, Secretaria de Saúde do Ceará, Project Hope; 1990.

112 municipalities, using temporary drought relief funding from the World Bank. Within months, 6 000 poor village women were employed and using home visits to promote breast-feeding, oral rehydration, and immunization. Their training lasted only 2 weeks and their responsibilities were few. The only communities included in the program were ones that created leadership committees that included a trade unionist, a local business leader, and a local church representative. Local committees decided whom to employ by selecting a member of each of the families most affected by the drought.

In 1988, following the drought emergency, 45 of the state's poorest municipalities were selected to initiate an ongoing program of primary health care. Starting in January 1989 rural health assistants, called *agentes de saúde*, were recruited from among individuals with at least 5 years of local residence, with a proven commitment to social service, able to work 8 hours a day, and 18 years of age or older. About 1 500 of the 6 000 individuals who had been employed in the earlier emergency program had become part of the new agents system by 1989 (Figure 1).

FIGURE 1. Number of participating municipalities and number of agents, Health Agents Program, Ceará, Brazil, 1987–1997



Source: Secretary of Health, Health Agents Program, Ceará.

In the new health agents program local supervision and central management depended on nurses rather than physicians at referral public clinics. The program was distinguished in five key ways. First, the territories in which agents were to work were well defined geographically, and the persons employed as agents had to live in the area they were to serve. Second, the program sought universal coverage for only a small number of priority concerns. Instead, the overwhelming emphasis was on health promotion and education, and only a few curative (anthelminthic) and symptomatic (analgesic) medicines were included. For other curative care, the program established referral mechanisms to existing public clinics. Third, funds for agent salaries came directly from routine tax revenues of the state government. To secure these funds, local municipal governments had to employ nurse-supervisors. Local governments were able to pay those expenses using the increased funds that had come from newly available state and federal fund transfers and from local taxes. The final distinguishing characteristic of the new program was its low cost, since it provided few medicines and employed no physicians. Nonetheless, it offered attractive salaries to the residents of rural areas, where most other jobs provided lower wages, less job security, and less prestige.

Organization of services

Municipalities in Ceará have an average population of 20 000. The health agents program was designed to select one individual for each 75 homes in rural areas and each 225 homes in urban areas. Ninety-five percent of the agents are women. Most have between a third- and sixth-grade education; none has more than a high school education. Supervision is provided by professional nurses from public clinics.

Many municipal leaders were not initially interested in taking part in the program since they wanted a free hand in determining how to use newly available funds coming from the shift of governmental functions to the municipalities. Demand came mainly from general citizens who had seen the program in neighboring communities. In each community, interest in the program had to be strong enough so that municipal funds would be made available to employ a nurse, thus making the municipality eligible to receive state funds for agent salaries. Unlike most central government programs, then, this one was established only when local financial commitments were made. All 183 municipalities in the state's interior had joined the health agents program by June 1994.

Each municipality was divided into smaller areas for program implementation. By mid-1994, 80% of the families in the interior of the state were covered by the agents program. The 20% of the households without coverage included both some of the poorest and some of the most affluent. In the poorer areas, suitably literate candidates were not always available. Affluent urban areas were not a priority for implementation. Implementation in the poor sections of Fortaleza began in 1995. By the end of 1996 there were 900 agents in the capital city, serving 55% of the city's poorest residents. Statewide, coverage by the health agents program has continued growing in recent years (Table 1).

TABLE 1. Coverage (percentage) of health agents program activities, Ceará, Brazil, 1993–1997

	1993	1994	1995	1996	1997
Families included in participating municipalities	76%	77%	79%	77%	93%
Pregnant women completing all planned prenatal visits	63%	68%	73%	73%	76%
Children 1–4 mo old exclusively breast-fed	34%	38%	42%	46%	47%
Children 0–11 mo old with complete age-appropriate vaccinations	73%	77%	79%	73%	74%
Children 0–11 mo old with weight recorded twice in preceding 60 days	32%	77%	82%	90%	92%
Children 12–23 mo old with weight recorded during the preceding month	31%	54%	81%	89%	90%

Source: Cavalcante e Silva A. Evolução da saúde das crianças no Ceará, um retrato de dois momentos 1987–1994 [MPH dissertation]. Fortaleza, Ceará: Universidade Federal do Ceará; 1998.

Each day, agents typically visit 10 to 15 homes in urban areas or 4 to 10 in rural areas. Each family is to be visited at least once a month. Each agent carries a backpack that typically contains oral rehydration packets, soap, iodine, bandages, a thermometer, scissors, a comb, a measuring tape, and family health record cards.

Supervision

Among the keys to the program's success are the careful selection of agents and the quality of their supervision and training. Initial agent training consists of an 8-week residential course and 4 weeks of strictly supervised field work. Nurses at the nearest public clinic provide training, with the assistance of staff from the State Health Secretariat based in the capital. After that initial 12-week period, ongoing education is provided during local monthly and quarterly meetings. This training is oriented toward local concerns of the agents or clinic staff. Standardized training is provided only when new practices are instituted, such as with care for acute respiratory infections or procedures for reporting causes of deaths.

The health agents program began with little more than immunizations and diarrhea treatment. Agents now spend up to 90% of their time on six priority activities: prenatal health promotion, including encouragement of monthly doctor or nurse visits and follow-up for identified risk factors; encouragement of exclusive breast-feeding during the first 6 months of life; monthly weighing of children until age 2, and nutritional counseling; making referrals for appropriate child vaccinations; oral rehydration for children with diarrhea; and treatment of minor wounds.

In some localities, health agents also provide such services as: contraceptives; promotion of cancer screening; encouragement of water and sanitation improvement; screening and follow-up for treatment for locally endemic diseases, such as leishmaniasis and malaria; screenings and follow-up for chronic diseases, including tuberculosis, diabetes, and high blood pressure; and death and birth notification. Initiated in 1995 in a few municipalities, the promotion of early childhood development and education within families is being added in all municipalities.

A nurse-supervisor visits each agent under her charge at least once a month to review problem cases and collect service data. In addition, one or another of the nine staff members of the agent program at the central office meets with each municipal supervisor every 2 to 4 months.

Agents earn the official national minimum wage, which is about US$ 112 per month. This is about twice the average local monthly income for rural workers. More importantly, selection and payment by the state government prevents local politicians from manipulating the program. Indeed, it is believed that the program might cease to function under the pressures of local patronage if there were local control over agent employment. Central funding has also been key to the local leaders' accepting the program, which employs 30–150 local residents per municipality.

In 1998, the health agents program was employing 225 nurse-supervisors and 8 698 agents. The entire program is directed by an office of the State Health Secretariat that employs seven nurses, one graduate social worker, and one sanitation technician.

Each program nurse generally spends half of her time supervising an average of 30 agents, doing bookkeeping, distributing supplies, and compiling data for the health agents program. During the other half of her time she staffs a clinic. However, where there are many agents, the nurses increasingly work full-time as supervisors.

Most nurses who work half-time directly providing care are engaged in categorical clinical programs in prenatal care, adolescent health, or family planning. The combination of clinical work and supervision of agents seems to be effective and satisfying, by facilitating the integration of the program in the broader health system.

The relationship with a supervisor is key to most agent activities and a major weakness in the system. Where nurses take little interest in supervising agents, the system is less effective. Before the agents program, few registered nurses (RNs) were employed in Ceará outside of the hospitals in the state capital. Those few employed in the interior of the state were paid by the state government exclusively for clinical work with doctors in clinics and hospitals. Public health and administrative activities were not part of their professional identity. While agents receive salaries from the state, RNs are employed by local governments, and thus have become more sensitive to local interests and issues. Only 30% of the interior municipalities employed an RN prior to the agent's program (8).

The health agents system was developed by a group of leading pediatri-

cians. Many nursing leaders viewed the agents as potential future nursing assistants who might replace RNs in hospital positions. The national nursing association in 1992 went on record as opposing such paramedical programs.

Nevertheless, the health agents system has actually increased the demand for nurses. Many more municipalities have been obliged to employ nurses, creating a statewide shortage of nurses and a rapid rise in salaries, especially in rural areas. From 1993 to 1996, the number of publicly employed nurses and physicians rose 72% and 20%, respectively. Due to greatly increased demand, rural nurses now earn about US$ 1 000 to US$ 1 800 a month, more than double the amount paid to their hospital-based colleagues employed by the state. The state's university-level nursing program has responded by developing training modules in public health and administration. The new nursing graduates are now better prepared to participate in the agents program.

OUTCOMES

The health agents program has been broadly popular and was associated with dramatically improved maternal and child health indicators between 1987 and 1994 (Table 2). Coverage of growth monitoring and oral rehydration therapy more than doubled. Such professional health services as prenatal visits and institutional births each rose by 19 percentage points, to cover more than 80% of the target population. The growth that Ceará experienced in immunization coverage between 1987 and 1990 was the largest shown by any of Brazil's 27 states and moved Ceará from one of the lowest levels of coverage to the sixth highest in the country.

Malnutrition, infant mortality, and the proportion of all infant deaths due to diarrhea declined rapidly from 1987 to 1994. There was a much smaller decline in nondiarrhea deaths. The proportion of all children never breast-fed declined from 14% to 6%, and the average duration of breast-feeding rose from 4 to 7 months. Representative household surveys showed that infant mortality nationally declined 10% from 1987 to 1990, from 52 to 47 per 1 000; in Ceará it declined 32%, from 95 to 65 per 1 000 live births (10). Between 1987 and 1994 there were decreases in the proportion of all children in Ceará households without piped water, without sanitary waste disposal, receiving a total income of less than two minimum salaries, and with an illiterate mother (Table 2). Even despite several droughts, diarrhea and malnutrition declined in the state (11).

Several examples can help illustrate the special character of the health agents program. With immunization, for instance, data from the agents program indicated that immunization coverage fell in many municipalities during the first half of 1992. Among the causes identified were problems in coordination with health centers, limitations in vaccine availability, and deteriorating access to care in some rural areas. In the second half of 1992, the situation was resolved through changes in program administration, further training for and encouragement of traditional birth attendants, and the construction of additional rural health posts. Prior to implementation of the health agents program the number of children to be immunized could only be estimated. The program's population-based monitoring made it possible to quickly identify areas with low coverage and then deal with the problem.

Other program data showed that malnutrition rates rose during children's second year of life. Responses included expanded growth monitoring and agent-led education on weaning foods.

One innovative municipality gives families a photo of the mother and child a few days after birth. This low-cost intervention is believed to assist in early parent-child bonding, thus helping to overcome fatalism about childhood illness and death.

The health agents program promoted a variety of intersectoral actions. In the municipality of Icapuí, data collected by agents in 1989 and 1990 showed that infant mortality rose

TABLE 2. Child health indicators, Ceará, Brazil, 1987, 1990, and 1994

	1987	1990	1994
Infant deaths caused by diarrhea	48%	32%	23%
Children (0–3 years old) with at least one visit to a physician during preceding 3 months	5%	47%	50%
Mother received prenatal care	65%	68%	84%
Institutional births	70%	78%	89%
Children (0–36 mo) given oral rehydration solution during last diarrhea episode	23%	56%	52%
Children (12–23 mo) with four EPI vaccines	66%	84%	87%
Children (0–11 mo) with at least one weight recorded on growth chart in preceding 3 months	9%	25%	45%
Women 35–49 years old who have ever had a Pap exam	NI[a]	49%	64%
Population without piped water	74%	NI	66%
Population without sanitary waste disposal	56%	NI	48%
Households with total income exceeding two minimum salaries	22%	NI	27%
Illiterate mothers	42%	NI	30%
No child health card	33%	NI	4%

Sources: Data for 1987 is from: Victora C, Barros F. PESMIC1: A saúde das crianças cearenses [unpublished]. Fortaleza: Fundação Cearense de Pesquisa e Cultura, Instituto de Planejamento do Estado do Ceará, United Nations Children's Fund, Project Hope; 1990. Data for 1990 is from: Victora C, Barros F, MacAuliffe J. PESMIC2: Saúde materno-infantil do Ceará [unpublished]. Fortaleza: United Nations Children's Fund, Project Hope, Programa de Ações Integradas de Saúde/Universidade Federal do Ceará, Sociedade Cearense de Pediatria, Hemocentro do Estado do Ceará; 1992. Data for 1994 is from: MacAuliffe J. PESMIC3: A saúde da mulher e da criança no ceará [unpublished]. Fortaleza: United Nations Children's Fund, Project Hope, Sociedade Cearense de Pediatria, Secretaria de Saúde do Ceará; 1994.

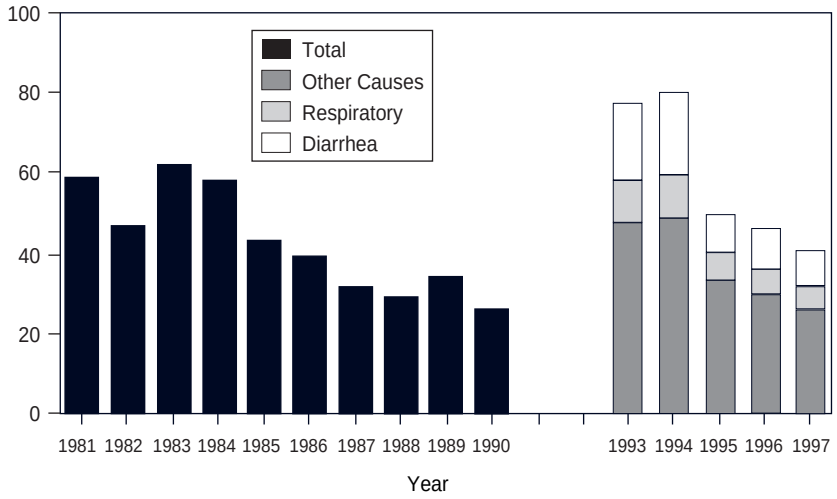
[a] NI = information was not included in the study.

sharply during the February-April period. Villagers depended on lobster fishing, which was banned from January though April each year. This led to impoverishment and severe malnutrition among young children, thus worsening the problem with diarrhea. In response, in 1991 the village bought a freezer to hold fish during the off-season. This both directly improved nutrition and maintained local incomes. While 59 infants died in Icapuí in 1990, in the following years there have been 20 or fewer infant deaths annually. About 20% of these deaths have been due to diarrhea.

A low breast-feeding rate was a stimulus to action in Iguatu, a city with some 90 000 inhabitants. When the two maternity services in the community implemented prenatal and postnatal counseling in 1991, exclusive breast-feeding among infants 0–4 months old rose from 35% to 50%.

By 1995, when the coverage of antenatal visits had substantially grown, Ceará's figures showed that most neonatal deaths no longer occurred among mothers without prenatal care or professional assistance at birth. Instead, overmedication in hospitals and poor coordination between primary and secondary care were responsible. As a result, training was instituted so that specialist physicians would work better with the health agents and with primary care teams.

FIGURE 2. Registered infant deaths per 1 000 live births, Ceará, Brazil, 1981–1997[a]



Source: Secretary of Health, Ceará.

[a] The higher death rates shown for the period beginning with 1993 are indicative of more complete data collection rather than an increase in actual infant mortality levels over those for the 1981–1990 period. Data for the earlier period were based on birth and death certificates, with very low coverage. The data for 1981–1990 cover the entire state of Ceará (with the under-reporting already mentioned); the data presented for 1993–1997 are for all areas of the state except the capital, Fortaleza.

Using program data

The official vital statistics reporting provided through birth and death certificates in Ceará probably gives a reasonable indicator of infant mortality *trends*. However, the system is slow, incomplete, and inadequate for comparison of one locality with another. As in most of the developing areas of Latin America, this vital statistics system provides information on fewer than half of all of these deaths (12). In Ceará this system indicated an infant mortality rate of 33 per 1 000 live births in 1987 and 24 per 1 000 in 1990 (Figure 2). In contrast, statewide stratified random surveys calculated rates of 95 and 65 per 1 000, respectively, in those same two years.[5, 6]

Also as reflected in Figure 2, better information collection by the health agents has greatly improved the quantity and quality of vital statistics data in Ceará. In the first years of the agents program, there was comprehensive data on program activities and child mortality by cause in only 17 municipalities. The monitoring system has since grown to include all 183 municipalities in the interior of the state, with information covering more than 90% of the people outside of Fortaleza.[7]

Since 1993 the health agents system has provided much more timely and complete indicators of mortality trends (Figure 2). Excluding the state capital of Fortaleza, the infant mortality rate in Ceará fell from 77 per 1 000 live births in 1993 to 47 in 1996 and 40 per 1 000 in 1997. From 1993 to 1996 cause-specific deaths per 1 000 live births declined from 20 to 10 for diarrhea, 10 to 7 for acute respiratory infections, and 47 to 30 for all other causes. In Fortaleza, data for the poorest 55% of the residents showed infant mortality rates of 38 per 1 000 in 1996 and 32 per 1 000 in 1997.

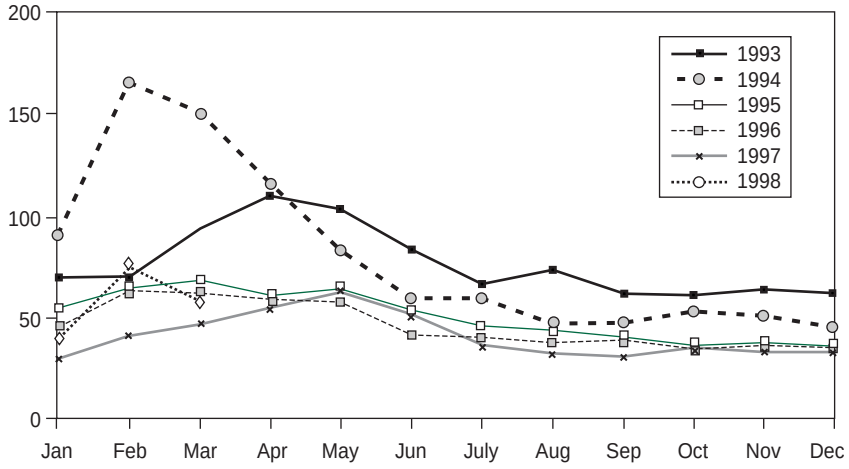
Data from both the official vital statistics routine reporting system and from the agents system indicate seasonal differences in infant mortality rates. Data from the agents system, however, show a more pronounced rise in infant mortality during the rainy season of January-April than had previously been recognized (Figure 3). The clear increase in death rates during these months is associated primarily with an increase in diarrhea. Municipalities where data from the health agents showed the greatest rise in malnutrition and mortality were identified. Each municipality was supplied with information on infant death rates relative to a statewide target of 50 (later 40)

[5] Victora C. Barros F. PESMIC1: A saúde das crianças cearenses [unpublished]. Fortaleza: Fundação Cearense de Pesquisa e Cultura, Instituto de Planejamento do Estado do Ceará, United Nations Children's Fund, Project Hope; 1990.

[6] Victora C, Barros F, MacAuliffe J. PESMIC2: Saúde materno-infantil do Ceará [unpublished]. Fortaleza: United Nations Children's Fund, Project Hope, Programa de Ações Integradas de Saúde/Universidade Federal do Ceará, Sociedade Cearense de Pediatria, Hemocentro do Estado do Ceará; 1992.

[7] United Nations Children's Fund. Child health monitoring in municipalities of the state through the community health agents programme information system [unpublished]. Fortaleza; 1992.

FIGURE 3. Infant death rate by month and year, per 1 000 live births in municipalities participating in the health agents program, Ceará, Brazil, 1993–1998



Source: Secretary of Health, Ceará.

per 1 000. These data led to increased awareness, training, and, where needed, modified treatment regimes for clinicians. To facilitate the preparation of homemade oral rehydration solutions with the appropriate quantity of salt and sugar, the health agents distributed a special plastic measuring spoon to every family in December of 1994, 1995, and 1996. This feedback loop of timely, population-based data from the agents system improved the effectiveness of the curative care system.

Costs

The total annual costs for the Ceará health agents program are approximately US$ 7 million for the 5.5 million people covered, or US$ 1.30 per person per year. An estimated 80% of these funds go for agent salaries, 13% for nurse-supervisor salaries, and 7% for transportation, training, and medical supplies. The US$ 1.30 is likely the most efficient single activity of the estimated US$ 80 per capita invested annually in the state health system. Eighty-five percent of the health agents program funding comes from the state; the remaining 15% comes from the municipal governments.

Decentralization and multisector collaboration

The health agents program was supported by several concurrent developments in Brazil in the 1990s. Many aspects of governmental administration were decentralized and shifted to the municipalities. Most funding for educational and health services is now generated and allocated by the municipalities. The Ceará state government facilitated these changes by providing the municipal authorities with extensive training and technical support in administration and data analysis.

This decentralized administration in Ceará involves shared decision-making with nongovernmental groups, especially through the new municipal health councils. To help assure that these councils function substantively, nongovernmental groups and the media have been encouraged by Ceará state agencies, particularly the State Health Secretariat, and assisted by the United Nations Children's Fund to analyze and develop their own priorities in maternal and child health. This social mobilization process has included education on the rights of children, the importance and effectiveness of major child health interventions, and actions to address the hemispheric cholera epidemic (13). Municipalities in Ceará with an elected health council secretary rose from 30 in 1990 to 150 in 1996.

Social mobilization in Ceará has been critically important in developing popular support and understanding for the health agents program. The leadership vacuum left at the end of military rule in Brazil, combined with a shift toward empowerment of local government, provided a ripe opportunity to focus on community-oriented maternal and child health promotion in the Northeast of Brazil, in electoral fora and elsewhere. Public attorneys were similarly mobilized to push for child protection and education laws.

The Ceará health agents have also proven essential for promoting public education. In 1995 and 1996 agents screened more than one million families to identify illiterate persons 11–17 years old and children 6–17 years old who were out of school. Their names and addresses were given to municipal public schools. This linking of dropouts to a teacher and classroom led to a 17% increase in elementary school enrollment between 1995 and 1996.

While there has been a noticeable decline in mortality among children 1–12 months old in Ceará, there has been much less improvement in maternal mortality and in mortality among children in the first month of life. The basic lack of appropriate skills in dealing with neonatal diseases and a diffuse reluctance of hospitals to admit parturient women with complications early are partly responsible. This demonstrates a weakness in the health agents program. Referrals from agents to health centers and hospitals may not receive an appropriate response, leading to limited effectiveness where municipal government is weak in its coordination role or where curative services, such as those required when a suspected case of pneumonia is confirmed, are of poor quality. These issues are being addressed mainly through training and education. In 1993 the state government established a school of public health, in part to train medical leaders to improve primary care.

DISCUSSION

In terms of public attitudes toward health and health care, much has changed in the Northeast of Brazil in recent years. Primary health care has become a popular topic in Ceará. Elected officials now often address health issues during public appearances, and, to gain support, candidates for office recount their involvement with social welfare issues. The mass media donate air time for health education and promotion efforts.

The success of the health agents program in Ceará has depended on several key policies. The agents' primary responsibility is to their own local communities, where they must continue living if they are to keep their jobs. Local involvement has helped to produce a broad consensus on the importance of maternal and child health. The program's focus is on the home, rather than a clinic. The agents program has functioned mainly to provide information rather than curative care. Funds for the program come from outside the community and are insulated from local politics.

The health agents program has focused mainly on the rural poor, who seldom visit private practitioners. Therefore, there was little physician opposition when the system began operating.

Since 1986 the state government has played a key role in focusing on human resource development in rural areas and in encouraging popular participation. The last three state health commissioners, who had helped design the health agents program and also elect the reform government of 1986, have strongly supported the agents program. This backing provided stable political commitment during the program's startup years. In addition, Brazil's new constitution of 1988 strengthened the legal and administrative authority of local government, limited the often-abused power of the Brazilian presidency, and facilitated decentralized mobilizations to deal with concerns relating to primary health care.

The other state governments in northern and northeastern Brazil have also adopted the health agents program. During the first half of 1992, those states selected 19 000 agents to serve in 750 out of their 1 700 municipalities. By 1997 health agents were providing coverage to 30 million people, or about 70% of the population in those states. Because the program depends on coordination with health facilities in local communities, the quality of implementation varies.

In Ceará, the agents program since 1994 has been integrated into the Family Health Program (FHP), which focuses on primary care provided by teams. The FHP organizes medical teams to take responsibility for geographically defined areas within the catchment area of each of the existing public clinics. Teams are composed of one physician, one nurse, and five to ten health agents. A team covers about 2 000 families or 10 000 individuals. The FHP is a logical next step for Ceará. For the first time in Brazil, preventive health services are being integrated on a large scale with curative care provided by doctors, thus improving efficiency and coordination between preventive and curative activities.

The Family Health Program goes against much of the ingrained culture of Brazilian medical practice. Ceará is the Brazilian state with the highest participation in the Family Health Program. In 1998 about a third of all people in the interior of the state were covered, with 341 teams in 151 of Ceará's 183 rural municipalities (14).

Ceará does not exhibit many characteristics of such major international examples of "good health at low cost" as Costa Rica, Sri Lanka, and the Indian state of Kerala (15). Those countries and that state benefited from relatively equitable income distribution, long and sustained investments in infrastructure, and good general education levels prior to the initiation of a health takeoff. Such conditions are present in few developing countries.

Ceará provides a more realistic and perhaps more achievable example of affordable strategies to achieve improved health for all. Income, educational levels, and land tenure equity are poor. These are major limitations to health improvements. Yet even with such conditions, and during a period of economic hardship, this primary care strategy has been associated with dramatic improvements in maternal and child health. Its successes are related to high levels of coverage of basic protective measures, decentralized supervision, and the monthly generation of population-based health indicators used for social mobilization, planning, and technical supervision in each municipality. Moreover, the program seeks to redress continuing social inequities by promoting legal rights, especially the right to education.

The Ceará health agents system has avoided the "model centers" strategy, applied elsewhere, of creating a few model areas with pilot programs directed by state governments or international agencies. Instead, the Ceará health agents system has used social mobilization in the municipalities to generate local commitment, participation, and financial support. The Ceará system has recommended simple interventions that could be applied universally and has sought to use public pressure to gradually achieve universal coverage.

While training in other health programs has focused almost exclusively on physicians and others working at the central level, the Ceará agents program has concentrated instead on training municipal nurses and local agents. Training in the agents program has also centered on management objectives rather than on individual diseases. For example, instead of just recognizing and treating a child with measles, the Ceará program teaches agents how to recognize barriers to the goal of 100% immunization coverage in their local communities.

Many persons recognize the importance of decentralization for the strengthening of primary care. Administrative decentralization has worked in Ceará in part because program norms were backed up by central financial controls. In addition, the decentralization occurred in the context of democratization, with the public participating in setting local priorities and selecting representatives. Local

business groups, religious organizations, and the mass media were motivated to promote primary care. The ready access to population-based indicators of program coverage and outcomes further encourages responsiveness on the part of local governments.

In many countries the national government is responsible for funding curative care; health promotion and education are usually funded via less stable local or external sources. Ceará, in contrast, has reversed this relation. And even though the agent salaries are relatively high for their communities, the program's total costs are modest in comparison to those for physician-based curative services.

Like most of Latin America, Ceará is under pressure to privatize much of the health sector. Indeed, much of the curative care system in Ceará is already private (mostly nonprofit), and downsizing and restructuring is occurring among hospitals in the state. Yet it does not appear that privatization will threaten the health of people in Ceará as long as the government guarantees funding for the basic elements of universal coverage for primary care, particularly preventive services and monitoring, which are low in cost and are highly effective when they reach every household. Moreover, the Ceará state government has the prestige and authority necessary to properly regulate the private sector.

Major concerns, however, remain with the health agents program (8, 15). One is the lack of job stability and a long-term career ladder for agents. Another issue are the demands placed on nurse-supervisors. To advance their interests, the agents have formed regional community health workers associations. These associations cover 2 000 agents and are used by the state government as subcontracting agencies for the payment of salaries. By the year 2000 a primary school education will become the required norm for health agents throughout the state. Eventually agents are expected to have a secondary school education and function as nursing auxiliaries specialized in community health. They will then be able to provide a wider range of services at the community level, while maintaining universal coverage. The demands on professional nurses for training, leadership, and supervision will thus become even greater. Nurses will also need new job profiles and specialty training to adapt to these expanded roles. If all this is achieved, this health system—originally established for primary care in the context of poverty—will evolve into a structure useful for middle-developing areas as well.

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Manuscript received on 17 May 1999. Revised version accepted for publication on 15 December 1999.

RESUMEN

Lecciones del Nordeste de Brasil sobre la atención primaria de salud: el Programa de Agentes de Salud

Generalmente se considera que las reformas económicas dirigidas por el mercado entran en conflicto con el desarrollo socioeconómico de los grupos desfavorecidos dirigido desde el gobierno. No obstante, desde 1987, Ceará, un estado pobre del Nordeste brasileño, ha seguido simultáneamente estas dos estrategias. Parte de este abordaje ha sido un programa de auxiliares sanitarios, dirigido por personal de enfermería, que cubre cerca de 5 millones de personas: casi todas las que habitan fuera de la capital y la mitad de las residentes en la capital. El programa requiere que esos auxiliares, llamados *agentes de salud,* vivan en las comunidades que sirven. Los *agentes de salud* visitan cada domicilio una vez al mes para llevar a cabo un pequeño número de actividades sanitarias prioritarias. Aunque hay una gran demanda de empleo como *agentes de salud,* el salario que reciben representa tan solo una pequeña fracción del presupuesto estatal. Un aspecto clave del sistema es la provisión de información integral y oportuna, basada en las visitas de los agentes y gestionada por enfermeros entrenados. Desde que se implantó el sistema de los *agentes de salud* ha habido una rápida disminución de la mortalidad infantil y un rápido aumento de las inmunizaciones, se han identificado obstáculos que limitan la utilización de otros recursos médicos y ha habido intervenciones oportunas en momentos de crisis. El sistema de los *agentes de salud* ha combinado la descentralización administrativa con la centralización financiera en un período de democratización electoral. El sistema ha fortalecido el compromiso del estado de Ceará con la atención primaria, a pesar de los cambios dirigidos por el mercado que han reducido el papel global del gobierno. El programa de Ceará está siendo copiado en todo el Nordeste y en otras regiones de Brasil. El papel clave desempeñado por el personal de enfermería en la organización y liderazgo de un sistema de atención primaria básica en barrios pobres y áreas rurales puede proporcionar lecciones útiles a otros países, sobre todo teniendo en cuenta que Ceará carece de muchas de las características favorables de las que disponen otros países que han invertido con éxito en la atención primaria. Por tanto, Ceará representa un modelo asequible para otros países donde, al igual que en Brasil, la equidad de ingresos, nivel educacional y propiedad de la tierra es limitada.