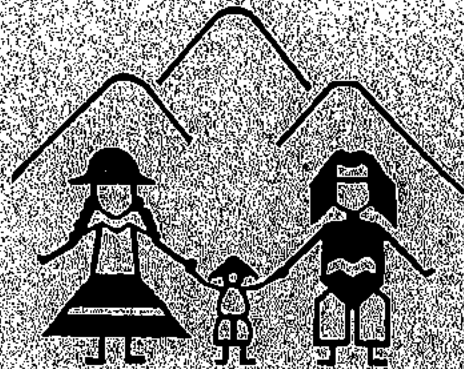


**The Census-Based, Impact-Oriented Approach
and Its Application by Andean Rural Health Care
in Bolivia, South America**

Volume II

**Andean Rural Health Care's
Established Program and Results**



VOLUME II.

ANDEAN RURAL HEALTH CARE'S
ESTABLISHED PROGRAMS AND RESULTS

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VIII. THE DEVELOPMENT OF THE CENSUS-BASED, IMPACT-ORIENTED APPROACH AT ANDEAN RURAL HEALTH CARE

The census-based, impact-oriented (CBIO) approach to child survival which is being developed by Andean Rural Health Care did not arise in a vacuum. Instead, it was the product of a series of unique historical and interpersonal events. The purpose of this discussion is to describe briefly the context in which this approach to health promotion arose and some of the historical events which contributed to its development.

The ideas behind the CBIO approach were developed by Dr. John Wyon, Senior Lecturer Emeritus at the Harvard University School of Public Health. Dr. Wyon's long-standing relationship with Dr. John Gordon, former Professor of Epidemiology at Harvard, his own personal experience of almost ten years directing a field study known as The Khanna Study (Wyon and Gordon, 1971), and his contact with Dr. Sidney Kark, an early leader of the community-oriented primary health care (COPC) movement (Kark, 1974), were influential in the development of the CBIO approach.

Original Concepts (1970-1981)

For my part, I had the privilege of studying from 1970 until 1976 at the Johns Hopkins University as an MPH student, a medical student, a medical intern, and as a graduate student in the Department of Social Relations which then housed the disciplines of Sociology and Anthropology. During this time of fertile academic and professional development, an interest emerged in issues of health care delivery and health manpower. I had planned to pursue a career as a medical missionary with the intent of working on the development of new approaches to health care delivery in the developing world. During the summer of 1979, I visited the Hospital Albert Schweitzer in Deschapelle, Haiti, on my way to Bolivia for an exploratory visit in search of a site for the establishment of a field project.

It was in Haiti that I had my first exposure to a "census-based" approach. I spent a full morning hearing about the census activities and registration of vital events which had been developed by the Drs. Warren and Gretchen Berggren several years earlier, which they had learned from Dr. Wyon. They were then no longer in Haiti, but their work had continued. During that same trip, I returned from Bolivia via Guatemala, where Dr. E. Croft Long, whom I had known as a medical student at Duke University when he was Dean of Students there, was working as Country Director for Project HOPE. Dr. Long sent me to Quetzaltenango, where I had the opportunity of observing the work of Ms. Anna Marie Hanlon, a public health nurse with extensive experience working with midlevel health professionals (known there as "tecnicos de salud") and with village health workers.

During this same trip in 1979, while in Bolivia, I had developed a project proposal for a health program on the Northern Altiplano around the town of Achacachi. This proposal called for the development of a primary health care program in the communities around Achacachi. The Ministry of Health had built a new hospital in Achacachi which had been completed several years earlier but never opened because of a shortage of staff and operational funds. The proposed community health program was to be directed by midlevel professionals with referral medical and surgical support being provided by the Achacachi Hospital.

I had hoped to return to Bolivia under the auspices of the United Methodist Church once I had completed my surgical residency in 1981. This proved not to be possible, however, because of a series of extenuating circumstances within the Church.

When it became clear that there would be no opportunity to work in Bolivia under the auspices of the Methodist Church, it fortunately became possible to develop a relationship with the Department of Community and Family Medicine at Duke University. Duke had agreed to sponsor what we at that time called the Andean Rural Health Project, with the understanding that all funds needed to finance the project would be raised externally from Duke. It was on that basis that plans for a health project proceeded in early 1980. By that time, I was in the final stages of training in general surgery at the Maine Medical Center in Portland, Maine.

Having heard about Drs. Warren and Gretchen Berggren during my visit to Haiti in 1979, and learning that they were both then faculty members at the Harvard School of Public Health, I was eager to make contact with them and to obtain their input as to how we could build a strong evaluation component into the proposed health project. During the summer of 1980, I had the opportunity of meeting with the Berggrens and with several other

members of the faculty of the School Public Health at Harvard to describe the ideas as they then existed for the Andean Rural Health Project. It was there that I first met the Berggrens, Dr. John Wyon, and Dr. Joe Wray, among others. The Berggrens and Dr. John Wyon offered to provide technical advice for evaluation of the project.

An outstanding young Bolivian physician, Dr. Jorge Velasco, had been employed in late 1979 to develop further plans for the Andean Rural Health Project while I was finishing my residency training in surgery. During the summer of 1980, political turmoil erupted in Bolivia. A military coup took place, and the careful plans which Dr. Velasco had made with Ministry of Health officials for a project around Achacachi had to be put on hold. All of the higher officials in the Ministry of Health had been ousted; and, furthermore, because of political repression, it was no longer safe for expatriates to work in rural areas. Consequently, it became necessary temporarily to terminate plans for the project in Bolivia. With work in Bolivia at a standstill, arrangements were made for Dr. Velasco to come to Harvard during the fall of 1980 to spend time with the Berggrens and Dr. Wyon.

During prolonged discussions which Dr. Velasco held with Dr. Wyon and with the Berggrens, the focus of documenting health improvement emerged as the overarching goal for the project rather than the provision of health services. If this were to be the overarching goal, and if the project were to undergo rigorous evaluation, then some way would have to be developed to show that health had in fact been improved. It was at this time that the Narangwal study was about to be published (Kielman et al, 1983; Taylor et al, 1983), and the results of the Berggrens' work in Haiti (Berggren et al, 1981), as well as the seminal monograph by Gwatkin et al (1980) entitled "Can Health and Nutrition Interventions Make a Difference?" had just appeared.

These evaluations all showed that mortality rates among children could be lowered through community outreach efforts involving vaccinations, nutritional monitoring and supplemental feeding, oral rehydration therapy, and treatment of pneumonia. At that time, there were only ten projects which had actually demonstrated an improvement in child survival, and they were all in populations of under 65,000 persons. The challenge in 1980, according to Gwatkin et al, was to develop larger-scale projects which could make similar impacts on child mortality:

The need now is for field research and experimentation focusing on the kinds of problems that will arise in programs serving large populations on a continuing basis. Ways will need to be developed, for example, to institutionalize not only the rules and regulations employed in successful

small-scale projects but also the other factors contributing to their operational efficiency. Means will have to be found to reconcile the degree of large-scale efforts with the full local participation and responsibility that are essential to equitable programs. Experimentation is needed to find how primary nutrition and health care can be integrated with the more comprehensive basic needs programs that seem to offer the best context for nutrition and health care efforts (Gwatkin, et al, 1980, p. 32).

It appeared to me in 1981 that the Andean Rural Health Project could serve a useful role if it could demonstrate that mortality rates had been lowered in a population of greater than 100,000 people. In spite of the political problems which had emerged in Bolivia, we were told these problems were likely to be short-lived. Having never directed a health project in a developing country, I had no concept of the additional problems which might arise nor of the slow pace at which such a project might progress.

Initial Attempt at Project Implementation (1981-1984)

The political problems which had arisen in Bolivia in 1980 had not resolved as quickly as most had predicted initially. Nevertheless, plans for the project continued to move ahead. An Advisory Board for the project was formed under the leadership of Dr. Harvey Estes, then Chairman of the Department of Community and Family Medicine at Duke University. A Technical Steering Committee was also formed with Dr. John Wyon as the Chairperson and Dr. Warren Berggren as a member. Two additional staff were recruited to join the project in Bolivia. These were Ms. Anna Marie Hanlon, who by that time had left Project HOPE in Guatemala due to the political turmoil there, and Mr. Stephan Hornberger, a former Lutheran missionary in Peru who was then a graduate student in sociology at the University of Wisconsin. Dr. Deborah Bender, a medical anthropologist, was hired to direct the "home" office at Duke.

Ms. Anna Marie Hanlon's involvement was possible in part because, at that point, Esperanca had decided to develop a new project in the Andes and had chosen to collaborate with the Andean Rural Health Project. Esperanca, an international health organization based in Phoenix, Arizona, had up until that time sponsored a single project in Santarem, Brazil. With financial assistance from project funds at Duke, Esperanca hired Ms. Hanlon to work with the new Bolivian project.

Although at one point it was decided to shift the location of the project to Peru, by late 1981 political conditions had stabilized sufficiently to resume efforts to begin the project in Bolivia. Unfortunately, because of the prolonged political turmoil in Bolivia, Dr. Jorge Velasco had resigned his position with the project to take a position with the World Health Organization in Venezuela.

Thus, in late 1981, I arrived in La Paz, Bolivia, with my family and with Ms. Hanlon. My official status was as a Duke University faculty member. At that point, relations with the Bolivian Methodist Church had improved and the Church chose to become an active institutional participant in the project. I began working on a part-time basis as a general surgeon at the Methodist Hospital in La Paz, during which time further discussions were being held with the Ministry of Health.

With the entry of the Bolivian Methodist Church into the picture and with the Ministry's formation of a large single health district on the Northern Altiplano from Achacachi to beyond Escoma, it became attractive to alter plans for the location of the project's headquarters from Achacachi to Ancoraimes. Ancoraimes was the geographic center of the new health district. Furthermore, the Methodist Church had a large vacant building there which would serve ideally as project headquarters and as living facilities for the staff. The Church also operated a small hospital in Ancoraimes.

A series of difficult issues arose in 1982 while trying to finalize agreements with the Ministry of Health. Once it was mutually agreed that Duke University would take overall responsibility for the direction of the project, the Ministry of Health required that Duke become a recognized legal entity within the country. This eventually led to Duke's establishing the Andean Rural Health Corporation as a legal entity through which it could operate in Bolivia. This step required special approval of Duke's Board of Trustees and took over six months to complete. The Ministry wanted assurances of financial support from Duke, but since funds were still to be raised, no guarantees could be made. A negotiation group composed of two representatives from the Ministry of Health, two from Duke University, and two from the Bolivian Methodist Church met on a regular basis from early 1982 until the spring of 1983, when a formal agreement was finally reached allowing the project officially to begin its work.

In the meantime, Ms. Hanlon had been allowed to begin preliminary work in the Ancoraimes Health Area, under the auspices of the Bolivian Methodist Church. The staff of the Church's small hospital there (the Frank S. Beck Hospital), was responsible for the MOH activities in the area. Ms. Hanlon had initiated the training of village development committees and

village health workers in early 1982. She had a strong orientation toward integrated rural development, and she had developed working relationships with CARE in water and sanitation and with agricultural development programs as well.

The Perry and the Hornberger families moved from La Paz to Ancoraimes in May, 1982, and were soon joined for a month by Dr. Wyon from Boston. Negotiations with the Ministry of Health were quite tense at that point. The Ministry had heard rumors that Esperanca had killed a large number of children in Brazil in its vaccination programs - a rumor without substance. Ms. Hanlon had difficulty in providing her certified professional documents.

The Ministry insisted that all of Ms. Hanlon's work cease until these issues were resolved, until Duke had obtained its formal legal status in Bolivia, and until a formal agreement was signed with the Ministry. These tensions eventually resulted in Esperanca deciding to leave the Ancoraimes area for a new project area in the Chaco, where it continues to operate programs today.

One of the results of Dr. Wyon's visit to Bolivia in 1982 was that I began spending one afternoon a week doing home visitation in a village near Ancoraimes. This was an exploratory effort to learn about the health problems of the area. Mr. Hornberger, who had been given overall responsibility for project evaluation, was devoting considerable attention to plans for a baseline survey of the proposed project area.

I was working on a limited basis as a physician at the Frank S. Beck Hospital in Ancoraimes and also providing some assistance to the Ministry's hospital in Achacachi which by that time had finally begun to function. In addition, patients I had encountered from the area who required elective surgery were taken to the Methodist Hospital in La Paz, where I continued to operate from time to time. With the departure of Ms. Hanlon and Esperanca from the project in the fall of 1982, community health activities were put on hold until the signing of the formal agreement with the Ministry.

A formal "convenio" (legal agreement) was finally signed by the Andean Rural Health Corporation (then a subsidiary of Duke University) and the Ministry of Health in March, 1983. This agreement called for the development of health services on the Northern Altiplano from Achacachi to beyond Escoma, encompassing well over 100,000 people. The source of the funds to finance this effort had still not been clearly identified. Efforts to raise funds through grant sources at Duke were notably unsuccessful. It was primarily the financial support provided by local churches (mostly Methodist) in North Carolina and Maine which had made it possible for the Andean Rural Health Project to survive the first few years.

With the signing of the "convenio," it became possible finally to hire Bolivian staff and resume the community health work initiated earlier by Ms. Hanlon. A Bolivian physician, Dr. Aida Quintanilla, was hired to direct the community health work initiated by Ms. Hanlon. Unfortunately by this point, the local board of directors of the Frank S. Beck Hospital in Ancoraimes would not allow the project to resume community health work in its area until the project agreed to come up with funds for a new ambulance. After a stalemate of almost two months over this issue, we eventually decided to relocate the pilot community health work to Carabuco, the next health area northwest of Ancoraimes.

Carabuco, a rural area of a dispersed population of 10,000 persons, was being served admirably by a dedicated Catholic nun and nurse from the U.S., Sister Mary Elko. She had been working with mothers' clubs in the communities there and had provided leadership for immunization programs, nutritional monitoring, and curative services. She was receptive to a collaboration with the Andean Rural Health Project. She and I had developed an amiable relationship through our joint efforts to provide treatment of patients from the Carabuco area who had surgical emergencies.

Thus, several months after the signing of the "convenio" with the Ministry of Health, community health work began in several villages in the Carabuco Health Area under the leadership of Dr. Quintanilla. Because of financial constraints, the integrated development approach advocated by Ms. Hanlon had to be abandoned. With encouragement from Dr. Wyon, Mr. Hornberger and I provided assistance in mid-1983 to Dr. Quintanilla for the first community censuses and home visits. Dr. Quintanilla and I together visited the homes of many high-risk children as well as the homes of acutely ill persons of all age groups. I vividly remember going to a home where the children had not been vaccinated. We had brought our vaccination supplies with us, and, much to my surprise, we found the mother highly cooperative and even pleased that we had come.

In addition to establishing exploratory community health work in 1983, the project carried out a baseline household survey. An outstanding Bolivian Aymara social scientist, Mr. Mauricio Mamani, had been hired as the Director of Evaluation. A large-scale survey of 1,000 households throughout the project area from Achacachi to Escoma was undertaken, along with a survey of the health facilities there throughout the project area.

During the fall of 1983, serious strains were developing on several fronts. Bolivia itself was in major turmoil with inflation of over 10,000 percent per year. There were frequent labor strikes and farmers' protests resulting in blocked and impassable roads. The newly installed, democratically elected government was supportive of the grievances of the rural farmers'

union. There had been several international development projects which had been taken over by local political leaders. The Andean Rural Health Project was receiving persistent and serious requests for funds to help with local civic projects in Ancoraimes and in nearby villages. Our courteous refusals were not accepted.

Another source of tension was money. Officials at Duke University were becoming uneasy over the project's inability to put itself on a stable financial footing. The project was based at Duke in the Department of Community and Family Medicine which at that time was in increasing financial distress. Furthermore, the project's continued and growing reliance on churches for financial support led to a perception at Duke that the project was more of a church mission project than an academic international community health project. There was also considerable frustration at Duke over the many problems which had been encountered during the start-up phase in Bolivia and the slow pace of progress.

In addition to these sources of tension between the project in Bolivia and Duke, there was also tension over the role which surgery and hospital services would have within the project. I was a vigorous proponent for a limited but, nonetheless, definite role for hospital-based curative services. There was strong opposition to this at Duke, however.

Finally, there was tension developing over the baseline household survey and Mr. Hornberger's role in it. The Bolivian Director of Evaluation, Mr. Mauricio Mamani, resigned several months after assuming his position. This left Mr. Hornberger in charge of the survey. The survey included a number of questions about previous children, about the mother's pregnancy history, and also about the socioeconomic characteristics of the family. Unfortunately, rumors began to fly up and down the Altiplano that, among other things, the interviewers were asking women how many times a day they were having sexual relations with their husbands, and local politicians developed the idea that the ulterior motive of the survey was to plan a large-scale family planning program for the area. Furthermore, personal tension between Mr. Hornberger and myself was growing because of differing views over whether or not he had sufficient authorization from Bolivian officials to take the survey data back to the University of Wisconsin where he was planning to complete his doctorate in sociology.

In late January, 1984, several local politicians with a small band of drunken, armed followers threatened the project staff, broke into project offices looking for evidence of family planning activities, stole the project vehicles, and on the following day took credit on the radio and in the newspaper in La Paz for having taken over the Andean Rural Health Project. They

claimed the project had been infiltrated by the CIA and had been carrying out family planning.

The project had been specifically prohibited by the MOH from engaging in family planning activities. Since I was a surgeon from the U.S., many local people had assumed that I was sterilizing women. This was not the case, nor were any other staff providing or intending to provide family planning services.

Several weeks earlier, Mr. Hornberger and his family had abruptly left Ancoraines during the middle of the night without notifying any of his colleagues. It was later learned that he had taken copies of the household survey data with him even though Ministry of Health officials had insisted that the data remain in Bolivia for analysis.

Just prior to the eruption of all these conflicts, Duke University had decided to withdraw as an institutional participant in the project. It had found the conflicts and financial uncertainty unsuitable for long-term collaboration.

For six weeks following the takeover, vigorous efforts were undertaken to resuscitate the project. These were unsuccessful. In March, 1984, I returned to the United States in search of employment and a new career path.

The Beginnings of the Implementation of the CBIO Approach: 1984-1987

Following the political crises which led me and my family to leave the country, it was highly doubtful that the work of the Andean Rural Health Project would continue. Duke University had chosen to discontinue its involvement. The Board of Directors of the legal entity which Duke had created for its involvement, the Andean Rural Health Corporation, was given responsibility for determining the eventual outcome of the work in Bolivia.

In the summer of 1984, the local political leaders who had initiated the project takeover began to do all within their power to assist in the rehabilitation of the project. They agreed to the conditions established by ARHC's newly established board.

The political leaders had eventually changed their attitude about the project because the local people had not approved of their actions. In my opinion, it was the curative work which the project had provided prior to the takeover which ultimately saved it. The grassroots community support for the continuation of the project eventually led the political leaders to negotiate a new beginning for project work.

The field work recommenced under the leadership of Dr. Mirta

Morfini. She had been named Executive Director of the project in late 1983. Dr. Morfina chose to relocate the project headquarters to Carabuco and to continue the community health work there.

Surprisingly, many churches and individuals in the U.S. continued their financial support, making it possible for the work on the Altiplano to continue. Although I had begun a practice of general surgery in North Carolina, I continued to be involved in fund-raising efforts.

By the following Spring (1985), it became possible to hire Mr. Simon Saavedra and his wife Rosa, both recent graduates of the Technical School of Public Health in Cochabamba. Mr. Saavedra had been trained in the concepts of community diagnoses and censuses, and was enthusiastic about continuing the earlier efforts in 1983 of censuses and home visitation. He also provided renewed energy for a strong "traditional" child survival program of immunizations and growth monitorings provided to groups of children brought together by their mothers (Perry, 1993).

By 1987, 15 community auxiliary nurses were in training in Carabuco. This provided additional human resources to continue the census effort in a number of the other communities in the Carabuco Health Area. Numbers were being placed on the front of homes for identification, and village maps were being made. A system of family health folders with the same number as the house number was developed by the staff there. Limited and sporadic home visitation was undertaken.

After the political problems which had arisen with our initial efforts in 1982-1984, I was skeptical that a census-based program would be accepted by the Aymara people of the Northern Altiplano. The success which Mr. Saavedra and his staff were experiencing was a surprise to me. They were enthusiastic about their progress.

The Beginnings of US Agency for International Development
 Child Survival Support for the Census-Based,
 Impact-Oriented Approach: 1987-1989

Recognizing this progress, I submitted an application to the EVO Child Survival Program of US AID in early 1987. This proposal was only partially funded, but it provided at that point a source of critically needed funds. The proposal called for ARHC to develop a program of home visitation in Carabuco which would enable vital events to be registered and mortality rates to be calculated.

As a result of AID Child Survival support, it was possible to reincorporate Dr. John Wyon into the field work in Bolivia. Starting again in 1988, after an absence from Bolivia of five

years, Dr. Wyon returned to work with the field staff and with me in the development of this new phase of project operations.

Although there was considerable reluctance on the part of many of the staff, it was eventually possible to initiate routine systematic home visitation beginning in the summer of 1988. By this time, the 15 community auxiliary nurses from the Carabuco Health Area had completed their training. This evolution of program work will be more fully described in Chapter IX.

As experience with home visitation grew, it became apparent that, in spite of the additional effort involved, home visitation provided major benefits to the program which had not been previously anticipated. Children in need of nutritional monitoring and vaccinations who had not been brought to group sessions in the community could be given this service in the home, thereby greatly improving coverage rates. The opportunity for the staff to get to know the community members in their home environments was a major benefit. The trust that developed among the families towards the program because of their appreciation for the program's concern about their well-being was another major benefit (Perry and Sandavold, 1993).

The progress in Carabuco with what we were beginning to call the census-based, impact-oriented approach was engendering enthusiasm elsewhere in the organization. ARHC's National Director in Bolivia, Mr. Nat Robison, became a convert to the approach and provided strong administrative encouragement for its further development at each of ARHC's program sites. By the late 1980s, ARHC had community health programs in the Cochabamba valley (Mallico Rancho) and on the outskirts of the city of Montero (Villa Cochabamba). Dr. Wyon and I provided intermittent support for early efforts at CBIO development in these sites during visits to Bolivia. By 1989, census efforts were underway in both Mallico Rancho and in Villa Cochabamba/Montero. A strong home visitation program began in both places in 1990 after initial pilot efforts.

Consolidation of the Census-Based, Impact-Oriented Approach, 1990-1992

Once the staff in all three locations had had experience with the CBIO approach and were becoming increasingly committed to it on the basis of their own experience, and once we began to observe the high coverage of child survival services which this approach made possible, I began to see the possibility that this approach had potential as a new model for child survival efforts.

The enthusiastic commitment of our staff at all levels and at all locations made a convincing case for the solidity of the concepts involved. In 1990, the ARHC Board of Directors endorsed

the CBIO approach as the central focus of its health programs.

Continued progress with field work in all three areas between 1990 and 1992, along with progress in the simplification of the health information system, made it reasonable to begin to think more seriously about how this approach could be developed as an alternative approach to more traditional child survival efforts. As concerns continued to surface about the effectiveness of more traditional child survival approaches, and as the evidence regarding actual impact of ongoing programs around the world on child survival remained limited, it began to appear that the CBIO approach might have something to offer as a way of improving the effectiveness of child survival efforts while at the same time strengthening local primary health care services.

Conclusions

Through a collaboration with Dr. John Wyon which began in 1980, the census-based, impact-oriented approach gradually emerged, first in Carabuco and then in two other program sites. In spite of numerous difficulties in initiating program activities on the Northern Altiplano, the ideas of community censuses and home visitation were implemented by field staff beginning in 1987. By 1990, the concepts of the CBIO approach had become further developed, were being implemented at ARHC's two other program sites, and had become the central focus of ARHC's organizational identity. Once the field staffs in all three program areas had obtained experience with this new approach, they all became enthusiastic supporters of it.

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CHAPTER IX. THE CARABUCO HEALTH PROGRAM

DESCRIPTION OF THE PROGRAM AREA

The Carabuco Health Program Area consists of 31 communities in an area approximately 25 by 20 kilometers on the Northern Altiplano of Bolivia (see Figure IX.1). This area is mountainous terrain along the shores of Lake Titicaca, which rests at an elevation of 12,500 feet. Some of the communities are at higher elevations up to 14,000 feet. The approximately 10,000 people living here are almost all Aymara Indians who are indigenous to the area and who earn their livelihood as subsistence farmers, as herders of animals (including llamas and alpacas), or as fishermen. For at least the past decade there has been out-migration from this area because of the lack of economic opportunities.

Most all of the communities can be entered by four-wheel drive vehicle over unpaved roads, although several require entrance on foot. The Carabuco Program Area is reached from La Paz by a journey of four hours, two-thirds of which is over unpaved roads. Carabuco is located 160 kilometers northwest of the city of La Paz. The Ministry of Health has had a health center at the outskirts of the small town of Carabuco for almost 20 years. The 31 communities of the Carabuco Health Area are shown in Table IX.1.

Figure IX.1

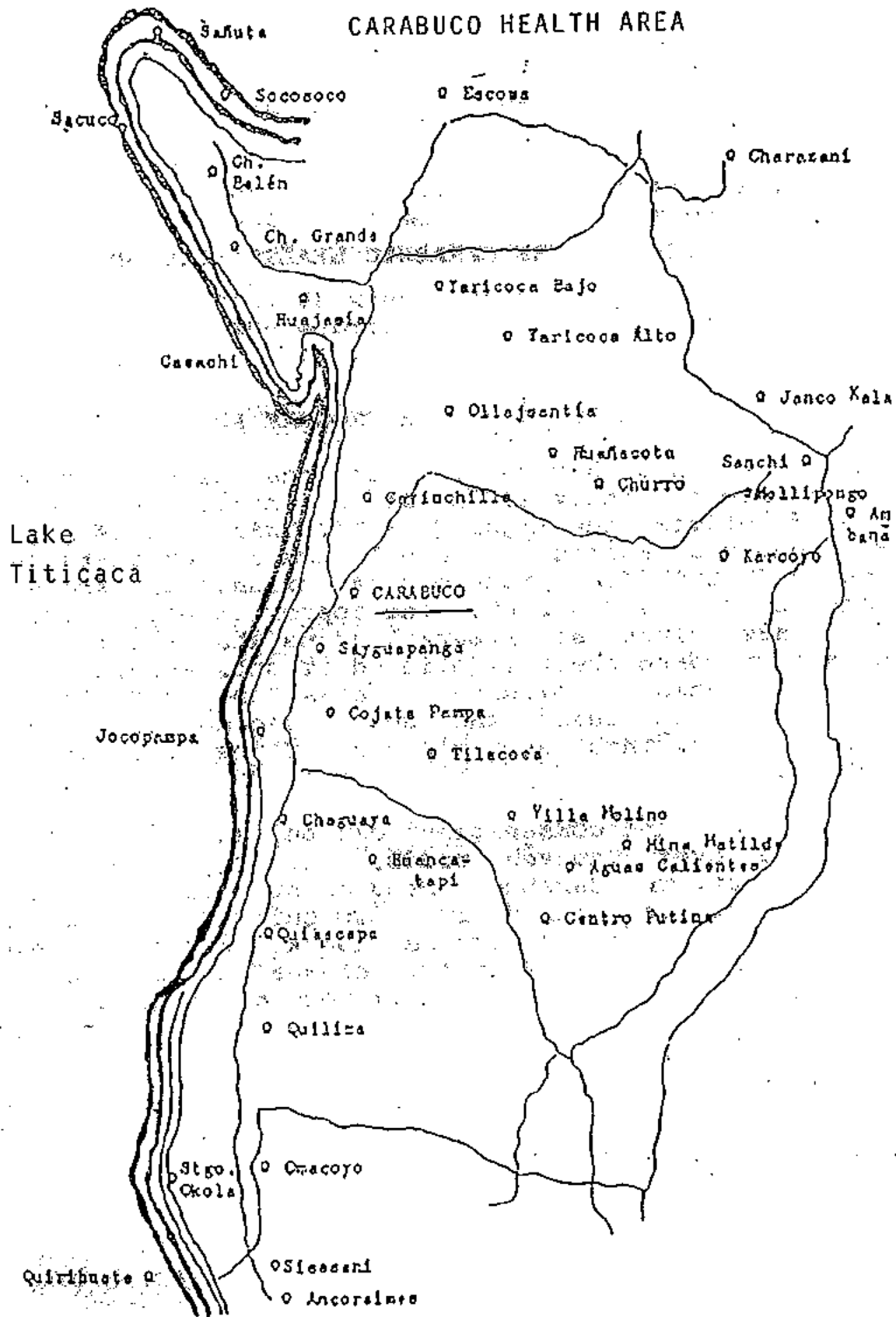


Table IX.1.

Communities in the Carabuco Health Area With Their
Respective Populations

community	population
Aguas Calientes	132
Cacachi	271
Cavinchilla	311
Chaguaya	421
Challapata Belén	119
Challapta Grande	95
Centro Putina	388
Cojatapampa	411
Huajasia	261
Huancatapi	43
Jokopampa	288
Karkapunco	177
Marchilata and Carabuco	547
Mermapata	79
Mollipongo	383
Ollasanta	444
Omacuyo	98
Quiascapa	488
Quilima	591
Quirihuati	556
Sacuco	229
Santiago de Okola	298
Sañuta	237
Sayhuapampa	337
Sisasani	144
Tilacoca	598
Villa Cojata	98
Villa Karcuyo	134
Villa Molino	284
Yaricoa Alto	232
Yaricoa Bajo	141
Total	9,887

source: 1992 annual census

HISTORY OF THE CARABUCO HEALTH PROGRAM

Exploratory Phase: 1983-1985

Beginning in 1982, efforts were underway on the Northern Altiplano to establish community health work under the auspices of what was known at that time as the Andean Rural Health Project. The field headquarters for this effort was in the small town of Ancoraimes, one-half hour southeast of Carabuco. Although some community health work had been developed in the Ancoraimes area under the leadership of Ms. Ana Maria Hanlon, who had joined the project in 1981 as Advisor for Community Health, local political problems described in Chapter VIII had made it necessary to consider a new location.

Carabuco was an attractive alternative. The people of the area were eager for additional assistance in primary health care. Sister Mary Elko, a graduate nurse, had been active with mothers' clubs in the area for a number of years. She had also been active in the training of health volunteers from the local communities. She worked relatively independently of the Ministry of Health's physician who was assigned on an annual basis to the Carabuco Health Center for obligatory rural service. With the signing in March, 1983, of the legal agreement between the Ministry of Health and Andean Rural Health Care, it was then possible for ARHC to enter into active, formal community health work in the Carabuco area.

Thus, beginning in mid-1983, Dr. Henry Perry, who was at that time serving as ARHC Director in Bolivia, along with Dr. Aida Quintanilla, who had been hired as the Director of Community Primary Health Care, began to assist Sister Elko and the MOH staff in Carabuco with their activities. During the remainder of 1983, it was possible for the ARHC staff to provide health care services in a number of the communities around Carabuco and to carry out home visitation and censuses in several communities.

Because of the political problems in Ancoraimes described earlier, all ARHC field work stopped in February, 1984. Dr. Perry and his family left the country soon thereafter. Field work resumed in mid-1984 under the leadership of Dr. Mirta Morfini, the project's Executive Director at that time. Because of continued political problems and difficulty with staffing, the community health work in the Carabuco area progressed very slowly until mid-1985. By that time, Dr. Morfini and Dr. Quintanilla, the project's first Director of Community Primary Health Care, were no longer working with the project.

Early Program Activities: 1985-1988

In mid-1985, Mr. Simon Saavedra and his wife, Rosa, both rural health technicians who had been trained by Dr. Orlando Taja at the National Technical School of Public Health in Cochabamba, joined the Carabuco field staff. Also, Mr. Ernesto Mendizabal joined the ARHC program staff as Administrator of the La Paz office for the Carabuco Health Program. As a result of the leadership provided by Mr. Saavedra and Mr. Mendizabal, the Carabuco program began to make strong progress.

Under the terms of the legal agreement which ARHC had negotiated with the MOH, the MOH staff assigned to Carabuco worked under the direction of ARHC. In 1985, the primary health care activities in the Carabuco Health Area began to expand as a result of the stronger outreach services provided. Each of the 31 communities around Carabuco were visited on a regular basis every three months or so by staff to provide care for the ill. At the same time, mothers were encouraged to bring their children to the center of the village for immunization, growth monitoring, and health education sessions.

In 1986, Sister Mary Elko was transferred to another area of Bolivia. She was replaced for a short time by another Catholic nurse, but afterwards the Catholic Church withdrew its involvement in Carabuco health care activities.

Mr. Saavedra provided leadership for community health work and for carrying out community censuses. In 1986, censuses were completed in three communities. The growing volume of primary care and child survival activities proved to be taxing for the health staff which by that time consisted of one physician, two rural health technicians, and one auxiliary health nurse (see Table IX.2).

Staff were insufficient to begin a program of regular home visitation which had been envisioned since 1982 as a method of recording vital events. In order to move to this next phase of the program, it was necessary to expand the field staff. After much discussion, it was eventually decided that the communities would be asked to name 15 candidates who would be trained by ARHC to become community auxiliary health nurses. It was envisioned that they would then return to their communities to carry out local primary health care and child survival activities. The communities made formal commitments to provide sustenance to these persons once their training had been completed.

A nine-month course, sponsored by the MOH exclusively for the 15 young men who had been chosen by their communities, was begun during the Spring of 1987. This was financed by ARHC. During this period of formal training, practical experience in community diagnosis was arranged. Mr. Saavedra provided

supervision for this experience. Thus, during 1987 it was possible to carry out censuses in 20 additional communities. By the end of 1987, censuses had been completed in 26 of the 31 communities in the Carabuco Health Area.

Beginning of Systematic Home Visitation: 1988-1989

In early 1988, the 15 community auxiliary nurses had completed their formal training and began to participate in the day-to-day program field work. In mid-1988, routine systematic home visitation began. The health team at that time was stationed in Carabuco. The work continued as it had up until then except that when the team went to a village every three months to provide health care and to immunize and weigh the children, systematic home visitation was also carried out.

Visits to the communities involved 5-10 members of the health staff going to a community for 2-3 days. The community would have been notified ahead of time that the health team was coming. During the first morning, all of the homes in the given village would be visited. In those homes in which there was a child who needed a vaccination or growth monitoring, the mother would be encouraged to bring her child to the immunization/monitoring session in the center of the village.

Later that same day, the immunization/monitoring session would be held. Usually on the following day, those children who failed to come to the immunization/monitoring session were sought out in their homes. At the time of the follow up home visit, these children were vaccinated and weighed in the home if the parents consented.

The presence of the census and the home numbering system made it possible to determine which children were in need of immunizations and growth monitoring and where these children lived. Thus, this method of work made it possible to improve vaccination and growth monitoring coverage considerably.

This method was referred to by the staff as "rastrillaje," or "combing" the area in search of children in need of basic child survival services. After several days of work in a given village, children at high-risk were identified. These included children with acute respiratory infection, children with diarrhea, children with other acute illness or with malnutrition.

Depending on the severity and the nature of the case, these high-risk children were seen in follow up by one of the health team who would return to the village. Acutely ill children were usually seen within two or three days, and malnourished children within one week. This type of follow up had not been possible prior to the incorporation of the community auxiliary nurses into

Table IX. 2.

Staffing of the Carabuco Health Program, 1985-1993

	Number of Paid Staff by Staff Category (with program population per staff member category shown in parentheses*)									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	
physicians	1 (9,500)	1 (9,500)	1 (9,500)	1 (9,500)	1 (9,500)	1.5 (6,333)	2 (4,750)	2 (4,750)	2 (4,750)	1.5 (6,333)
midlevel health staff (graduate nurses, rural health technician)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	0
lower level health staff (auxiliary nurses)	1 (9,500)	2 (9,500)	2 (4,750)	13 (731)	13 (731)	13 (731)	12 (792)	12 (792)	10 (950)	
ancillary support (driver, groundskeeper, etc.)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	2 (4,750)	
administrative support staff (administrator, other office staff)	3.5 (2,714)	3.5 (2,714)	3.5 (2,714)	3.5 (2,714)	3.5 (2,714)	2.5 (3,800)	2.5 (3,800)	2.5 (3,800)	2.5 (3,800)	2.5 (3,800)
TOTAL	9.5 (1,000)	9.5 (1,000)	10.5 (905)	21.5 (442)	21.5 (442)	21.0 (452)	20.5 (463)	20.5 (463)	16 (583)	

* an average population of 9,500 over this time period is assumed.

the health team. This methodology was carried out throughout most of the entire program area until the end of 1989.

Dispersion of the Health Team: 1990-Present

With financial support provided by the "Fondo Social de Emergencia" (Social Emergency Fund) of the World Bank, it was possible to construct and equip 11 small health posts throughout the Carabuco Health Area.

These health posts were placed in strategic locations to provide locally accessible health services. Each post served approximately three communities. Once these health posts had been constructed, the 11 community auxiliaries still working with the program were deployed back out to the areas from where they had originally come. Prior to that time they had been based in Carabuco and had worked in groups of five or more.

As a result of this significant change in the style of work, each of the community auxiliaries had his own designated group of communities for which he was responsible. Previously, a team of community auxiliaries had been responsible for a given community.

Curative health services became available on an ongoing basis at each of the community health posts, where the community auxiliaries were available most of the time. The community auxiliary began to carry out a program of home visitation in the communities for which he was responsible.

Prior to 1990, there had been three communities which had not chosen to participate in the census program. In 1990, however, all three of these communities requested that the Carabuco Health Program work with them in carrying out a census and in enumerating all the houses. In addition, a health post in Chaguaya, which had been constructed by the Bolivian Methodist Church, and its auxiliary health nurse became a formal part of the Carabuco Health Program. Prior to this time, the Chaguaya program had functioned independently.

The gradual development of program activities between 1983 and 1992 was made possible by a dedicated local field staff, by ongoing support from the La Paz office of ARHC, and by continued financial support ARHC had been able to obtain from the United States, including the Child Survival Program of USAID. The Carabuco field staff had grown from four in 1983 to a current staff of 16 (see Table IX.2 and Appendix II). From late 1989 until early 1991, Dr. Orlando Taja served as Executive Director of the program, dividing his time between Carabuco and Mallico Rancho. The staff now consists of a part-time physician-director, an MOH physician, one field work supervisor, and nine community auxiliary health nurses. Support staff at the La Paz office

include an accountant, a supplies coordinator, and a part-time office assistant. Prior to late 1992, this program had a full-time physician-director and two rural health technicians, in addition to the above-mentioned staff. Staffing levels are now being slowly reduced as part of ARHC's long-term sustainability strategy.

CURRENT PROGRAM ACTIVITIES

At the present time, the Carabuco program activities are decentralized and are focused around the community auxiliary and his health post. The MOH physician and one auxiliary health nurse, who are based at the Carabuco Health Center, continue to provide primary health care services on demand there. Dr. Carolina Hilari, who had been based in Carabuco as Program Director on a full-time basis, moved to Ancoraimes in 1992 to direct ARHC's new program there. She continues on a part-time basis as Director of the Carabuco Program. One of the original community auxiliaries, Mr. Luciano Tintaya, has been named Field Supervisor, replacing Mr. Simon Saavedra (rural health technician) who has been relocated to Ancoraimes as well.

As shown in Table IX.2, the number of staff were reduced by about 20% between 1992 and 1993. There is now one physician per 6,333 people, and one auxiliary per 950 people.

There are no satisfactorily functioning hospitals with surgical capabilities on the Northern Altiplano. Consequently, patients in need of surgical care must be transported to the city of La Paz, an arduous, four-hour journey.

There are presently nine community auxiliaries who staff the 12 community health posts throughout the Carabuco Health Area. Three auxiliaries staff two health posts each. Three of the more isolated posts are now connected to Carabuco via two-way radio communication. The community auxiliaries have been provided with bicycles, but much of their travel of necessity is by foot.

Typically, the community auxiliaries work six days per week, generally in one of the communities under their responsibility. They work approximately 40 hours per week. They meet in Carabuco twice a month for continuing education, for program planning and for coordination. Each community auxiliary now has 3-5 communities under his responsibility, depending on the community population and the degree of geographic dispersion of the communities in his area.

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Home visitation is carried out most days. The policy for routine home visitation is the following:

- a. families with children under one year of age are visited monthly;
- b. families with children 12-23 months of age are visited bi-monthly;
- c. families with children 24-59 months of age are visited tri-monthly;
- d. families with a woman of childbearing age are visited every four months;
- e. all other families are visited every six months.

"High-risk" children and mothers are visited more frequently. Those considered at high-risk include the following:

- a. children who are not gaining weight, who are losing weight, or who are moderately or severely malnourished according to the SVEN program of the MOH*
- b. children with diarrhea, acute respiratory infection, or other acute infection;
- c. children in need of vaccination;
- d. children in need of growth monitoring;
- e. pregnant women after their fifth month of pregnancy.

The frequency of home follow up visits depends on the severity of the case. In the case of acute illnesses, follow up usually is carried out daily or every other day. Malnourished children are usually followed weekly.

Families with a pregnant woman are visited twice a month after her fifth month of pregnancy. Prenatal care consists of educating the mother about the importance of seeking assistance if any problems arise, the importance of good nutrition, and the importance of not working too hard during her pregnancy. The mother's blood pressure is monitored, tetanus toxoid vaccination is administered if possible, and the woman's height and weight is measured using a scale which the auxiliary carries to the house. Women at high risk are usually visited more frequently than twice a month.

Those pregnant women judged to be not at high risk are encouraged to call the community auxiliary to her house to attend the delivery. Mothers with high-risk pregnancies are encouraged to go to the Carabuco Health Center to deliver so that if a problem occurs, the mother can be more rapidly transported to a

* SVEN (sistema de vigilancia epidemiologica nutricional) is a nutritional epidemiologic surveillance system based on classifying children in various stages of malnutrition depending on their height for weight percentile based on National Center for Health Statistics norms.

hospital for further care.

High risk pregnant women are defined as the following:

- a. less than 18 and more than 35 years of age;
- b. more than five children previously;
- c. previous Caesarean section;
- d. first pregnancy;
- e. presence of hypertension, diabetes, generalized edema, or tuberculosis.

Vaccinations for children are provided along with growth monitoring on a selected day in each community, usually once every two months. The community authorities are notified in advance and are asked to inform the community members. For those children who are not brought to the immunization/growth monitoring session, the community auxiliary makes a special visit to the home to carry out these activities.

The policy for immunizations is that established by the MOH: all doses of polio (OPV), DPT, BCG, and measles, should be administered by the end of the first year of life. The policy for growth monitoring is measurement of weight and height every two months during the first two years of age and every three months for children 24-59 months of age. Children who are falling behind in their immunization or growth monitoring schedule are vaccinated and weighed at the time of a special home visit.

Children who are falling behind in their growth are enrolled in a nutritional rehabilitation program which consists of teaching the mother to prepare a special mixture of "api nutricional," composed of foods generally available in the home.

Api is a local traditional drink. The nutritional "api" consists of barley or wheat, quinoa (a local grain), and beans, peas or corn. This drink is cooked and sugar is added. If available, milk and cooking oil are added along with cinnamon for flavoring.

If the community auxiliary learns of a birth in one of the families for which he is responsible, he goes to that home to examine the newborn, to cleanse the umbilical cord, to weigh the infant, to administer BCG vaccination against TB, and to register the infant in the community birth registry. The mother is also checked to be sure that she has no signs of postpartum bleeding or infection. Her blood pressure and temperature are checked at that time.

If the community auxiliary learns of a death in one of the families for which he is responsible, he usually visits the

family several days after the death has occurred if he did not have contact with the family just prior to the death. At the time of the visit, he tries to determine what happened. A formal verbal autopsy is usually carried out at a later time. The death is recorded in a registry which the community auxiliary maintains for the area under his responsibility.

Once a year, each village undergoes a follow up census. People who have been present in the community for six months or more during the previous 12 months are considered to be residents. Births and deaths, if they had not been previously detected and registered, are registered at that time.

Role of Health Volunteers

The Carabuco Health Program has made many efforts over the years to incorporate volunteers into its work. The community auxiliaries were originally supposed to be supported either with cash or with agricultural products provided by the communities which they served. When the time came for them to return to work in their communities, they insisted on continuing to receive a salary from ARHC because the communities had retracted their prior commitment to provide sustenance for them. From 1988 until 1990, the Carabuco program trained a number of "responsables populares de salud" (local health advisors) according to the MOH guidelines at that time. The training for these volunteers lasted one day a week for almost a year. Out of approximately 50 who chose to begin training, fewer than half completed the course.

In 1991, the name for these volunteers was changed to "educadores en salud" (health educators). Their training and function remained unchanged. There are now approximately 30 trained "educadores" providing assistance and another 15 in training.

The high turnover rate of volunteers has been attributed primarily to the disillusionment that the volunteers experience when they realize that they will not receive any financial remuneration or educational opportunities as a result of their involvement. Of course, the strictly voluntary nature of the involvement had been clearly explained to them in the beginning, but there was apparently an underlying hope that somehow they would receive either a paying job or an opportunity for further education. Other reasons that "educadores" discontinue their involvement with the program are to return to their responsibilities at home or to seek employment elsewhere.

The current role of an "educador" is as follows:

- a. notify the community auxiliary in the event of a birth, death, pregnancy, or illness;
- b. carry out home visits for high-risk mothers and children;
- c. assist the community auxiliary with his work;
- d. carry out nutritional monitoring in the home when indicated;
- e. assist the community auxiliary with preparation of medical and nursing supplies in the health post;
- f. meet at the Carabuco Health Center approximately every three months for continuing education and supervision.

The Health Information System

The Carabuco health information system (HIS) began as a cumbersome system of extensive data collection. It required a major amount of time from the community auxiliaries and from the supervising rural health technicians. Community auxiliaries commonly devoted 4-5 days per month simply to fill out forms. Mr. Saavedra, the Field Supervisor at that time, spent usually five days per month consolidating the relevant information for reports which were submitted to the MOH and to the La Paz office of ARHC.

During 1992 and early 1993, the HIS was streamlined extensively as a result of the efforts of Ms. Jennifer De Luna and the Carabuco staff. Ms. De Luna was a Health Information Systems Specialist for ARHC during this time. She and the field staffs worked together to define the information needed, to eliminate unnecessary duplication of recording of information, and to simplify the forms being used. As a result, the community auxiliaries now report that they spend approximately two days a month completing their reports. The current Field Supervisor, Mr. Luciano Tintaya, now spends only two days per month in consolidating this information for submission to La Paz. The field staff now feel that the system is no longer cumbersome and that it does not consume an exorbitant amount of time. The information required by the MOH has been incorporated into this system.

The basis of the HIS is still the "carpeta familiar" (family health folder), which contains all the relevant family health information including a growth chart for each child under five. This family health folder is identified by the number which corresponds to the number of the house, assigned at the time of the census. This same number is placed on the front of the house. When a family member comes for a health service outside of the home, this number, which is known to the family, is communicated to the health care provider at that time so that the person's family health folder can be located.

These "carpetas familiares" are kept at the community health post. Only current information is kept in them. These folders are used by the community auxiliary to plan his home visitation schedule and are taken along at the time of home visits. A second set of records, referred to as "archivos" (archives), is also kept at the health post. These "archivos" contain inactive information, such as growth charts for children who have completed their fifth birthday or a census sheet from a previous year. These "archivos" are maintained separately by house number for each household.

A recent addition to the HIS has been the placing on the wall at each health post a chart which lists all children under the responsibility of the community health auxiliary for that post. This chart lists the vaccination and nutritional status of each child as well as information about the treatment of ARI and diarrhea. In addition, a summary graph showing the current estimate of vaccination coverage (based on numbers of doses each month and childhood population) is displayed. These provide a graphic comprehensive view of the status of child survival efforts in the geographic area for which the health post is responsible. Births and deaths are recorded in the birth and death registries maintained at the health post. They are also recorded in the family health folder and included as well in the program's consolidated monthly report. The community auxiliaries now feel that they are recording almost 100% of the births and deaths in the communities for which they are responsible.

Another refinement is a form designed by Ms. De Luna which the auxiliaries use each month. After completing it they send it to the Carabuco office of the Field Supervisor, Mr. Luciano Tintaya, to consolidate the information it contains to express the health status of the whole Carabuco Health Area. This form summarizes all the data required each month from the communities served by the 11 health posts. The work of assembling the data takes each auxiliary one day each month. This also serves as an excellent tool for the supervisor to review the work of the auxiliary.

There has been some feedback of information from higher levels back to the health staff of the Carabuco Health Program. This has been primarily in the form of reports about evaluations of the overall program area which have been carried out every 18 months or so since 1988. Unfortunately, there has not yet been any systematic feedback of health information about a given specific community back to that same community or its leaders. The community auxiliaries feel that it would be a great help to them in their relations with the community authorities if a system were developed to assist them with this. Following the 1989 Mid-Term Evaluation of the program's first child survival grant, a brief brochure was prepared describing the overall results of the evaluation. This was distributed to each community

but was a general statement about the entire Carabuco Health Area, not about individual communities.

Health Education

Over the years, talks on child survival topics have been given by field staff to meetings of mothers' clubs. In addition, brief talks about child survival topics as well as about sanitation and hygiene have been given at the time of a home visit when appropriate. Standard child survival talks have included such topics as the symptoms of acute respiratory infection and the importance of initiating early antibiotic treatment, the preparation and use of oral rehydration therapy, nutrition, and the need for vaccinations. In 1993, messages were standardized throughout the program area so that during a two-month period, the same message continues to be emphasized by field staff in all of their activities.

Supervision Program

The supervision of community work is directed by the Field Supervisor, Mr. Luciano Tintaya. Mr. Tintaya began his involvement as a community auxiliary in 1987. In late 1992, the two rural health technicians who had been in Carabuco since 1985 (Mr. Saavedra and his wife Rosa) were transferred to the Ancoraimes Health Area where ARHC was beginning a new field program. At that time, Mr. Tintaya was elevated to the responsibility of supervisor of his fellow community auxiliaries. He has a motorcycle for his use and visits the community auxiliaries on an average of once a week. Some of these visits are scheduled and others are unscheduled.

At the time of a supervisory visit, the following activities usually take place:

- a. family health folders are reviewed;
- b. the registers of vital events are reviewed;
- c. the community auxiliary's work plan is reviewed;
- d. the inventory of drugs at the community health post is reviewed;
- e. the supervisor may assist the community auxiliary with his scheduled activities such as vaccinations, nutritional monitoring, home visitation, education, and so forth;
- f. the supervisor may assist in carrying out a verbal autopsy;
- g. the supervisor may meet with community authorities to discuss issues pertaining to program functioning in the community.

The supervisor usually stays about half a day for his supervisory visit but may occasionally spend the entire day. The Carabuco Program Director, Dr. Carolina Hilari, currently works with the Carabuco staff on a half-time basis. In late 1992, she relocated to the Ancoraimes Health Area to provide leadership for the new program there. She returns to the Carabuco Health Area several times a week to assist with the work and to provide overall supervision. The community auxiliary nurses usually meet with Dr. Hilari and with Mr. Tintaya twice a month for half a day at the Carabuco Health Center for planning and evaluation of community work and for continuing education.

Specific Issues Related to Home Visitation

Since the beginning of the CBIO approach in Carabuco, homes have been identified on the front door or door post with a number assigned by the program. At first, a number was painted on the door. Later, a special plaque of either metal or wood was placed on the door. This proved to be more satisfactory because, not infrequently, the painted numbers were painted over when the door was repainted. Families who are frequently gone from the program area often take down the numbered plaque and put it inside the house so that it will not be lost or taken while they are away. Thus, not all houses have their number visible on the front. Those families with stable residency generally do keep a number in front, and it is used by the community auxiliary in his work. In June, 1992, when a program-wide cluster sample survey was carried out, 73% of the houses had a visible number at the front.

As mentioned before, the family members themselves know their house number and convey this to health staff when they or their children receive a health service at a location other than the home. Using this number, the health staff can readily locate the family health folder for the person receiving the health service. The Carabuco staff is in agreement that this numbering system is very important in facilitating the home visitation program and in maintaining an effective health information system.

About one-third of the time, the father is present at the time of a home visit. In some communities, fathers are rarely present because they are away earning money for the family. In communities which have greater opportunities for local income generation (such as in those communities along the lakeshore where men can fish), fathers are commonly present at the time of a home visit. It is usually the case that when the father is present, the mother defers to the father to talk with the community auxiliary. This is very likely related to the fact that all the community auxiliaries are males. As a result, the fathers not uncommonly become more involved in matters pertaining to maternal and child health than they would if services were

provided only to concentrated groups of mothers and children at locations where fathers were not present.

The Carabuco staff feel that home visitation has been a great help in establishing confidence in the program. Families are now pushing for more frequent visits. It is rare that the staff encounters a family which considers a home visit to be an intrusion or a bother. The staff also feel that the home visitation program has given them an in-depth knowledge, not obtainable in any other way, of the families for whom they are responsible.

In spite of the strong advantages of the home visitation program, there are, nonetheless, some drawbacks. Perhaps the major one mentioned by the Carabuco community auxiliaries is that some families are finding it more convenient to receive services in the home instead of going to the health post or coming to vaccination/growth monitoring sessions. Therefore, "dependence" upon the community auxiliary providing services in the home is a source of concern.

In addition to this, some families think that community auxiliaries are paid on the basis of the number of home visits carried out and that, therefore, they are earning money "at the expense" of the family receiving a home visit. The staff have also noted that families are less prone to pay for curative services provided in the home than if they had come to the health post. In spite of these problems which are in fact relatively minor and infrequent, there continues to be strong sentiment among the staff that the merits of the home visitation far outweigh the drawbacks associated with it. One of the main reasons the community auxiliaries feel this way is because they know it would be impossible to achieve such high levels of coverage of child survival services otherwise.

Specific Issues Related to Community Relationships

Relationships with the 31 communities in the program area are quite satisfactory, although initially and for several years afterwards there was a small number of communities which chose not to participate in program activities except for vaccinations and growth monitoring. Now, however, all 31 communities are fully incorporated into the program, all receive routine systematic home visitation, and all cooperate with the community auxiliaries in their work. According to the community auxiliaries, the local people have a strong desire for the program to continue on a permanent basis.

The local people do mention to community auxiliaries from time to time that they are aware the program has made an impact on the area because not as many children are dying as before.

They also mention that the nutrition education provided by the program has made them healthier, and that the program's promotion of clean water, latrines, and household cleanliness has improved their lives.

The Carabuco program does not work with health committees per se, but rather with the community authorities who are elected each year to represent the community. All community health activities are coordinated through these officials or through community-wide meetings which the local community auxiliary attends.

The issue of fostering local community support for ongoing expenses of the program remains a difficult one. The area is extremely poor and the families have very limited resources to pay for health care services. The average family income is probably not more than \$200 per year.

Families are usually, but not always, able to pay for the cost of drugs. They are able to help with the maintenance of the local community health post. Beyond this, the potential for support is extremely limited except in terms of labor or local materials when they are needed. The staff do feel that drug prices possibly could be raised some to generate additional local funds. The continued search for a secure and effective role for volunteers ("educadores") and for a way to provide support for them with local resources is important in order to lower program costs in the future.

Issues Regarding Coordination of Child Survival Work With Related Activities

The Carabuco staff feel that there are strong advantages to combining child survival activities with other ongoing primary health care work. Without the child survival activities, those at greatest risk of death would not receive appropriate attention from the program. Without other primary health care services, it would be more difficult for the staff to respond to the needs of the people with whom they work and to the health priorities as perceived by the local people.

The staff do not see any disadvantages in integrating their work with the MOH. CARITAS, a Bolivian Catholic-related organization which distributes food throughout Bolivia, is active in the Carabuco Health Area. ARHC has a policy not to participate formally in food distribution programs because adequate foodstuffs are available locally. However, since many of the mothers' clubs in the Carabuco Health Area do participate in this program, ARHC does assist the program with the nutrition education and the nutritional monitoring which are required in order to receive food.

Table IX.3.

Number of Patient Consultations in Health Facilities and
in Homes Per Year in the Carabuco Health Area,
1983-1992

year	number of consultations
1983	333
1984	na
1985	1,211
1986	2,622
1987	1,236
1988	3,231
1989	2,244
1990	3,536
1991	3,240
1992	3,845
Total	21,498

na: not available

source: monthly program reports

total number of consultations

The total number of vaccination doses given in the Carabuco Health Area since 1983 is shown in Table IX.4. After administering a small number of vaccinations for several years, there was a large increase in 1986 to 4,200 doses. The number of doses more recently has been in the range of 2,500 to 3,000 per year.

Table IX.4.

Total Number of Vaccination Doses Given per Year in the Carabuco Health Area, 1983-1992

year	number of vaccinations given
1983	267
1984	408
1985	627
1986	4,200
1987	2,099
1988	2,772
1989	2,164
1990	3,019
1991	2,676
1992	2,447
TOTAL	20,709

source: monthly program reports

The number of children receiving nutritional monitoring has increased substantially as shown in Table IX.5. This number has continued to rise throughout the life of the program to its current level of almost 6,000.

Table IX.5.

Total Number of Nutritional Monitorings (Weight and Height Measurement) Among Children Under Five Years of Age in the Carabuco Health Area, 1983-1992

year	number of nutritional monitorings
1983	na
1984	na
1985	1,045
1986	3,708
1987	2,518
1988	3,772
1989	4,363
1990	3,982
1991	5,013
1992	5,807
Total	30,158

na: not available

source: review of program monthly reports

Finally, the number of home visits carried out is shown in Table IX.6. Home visitation did not begin in significant enough numbers to record separately until 1987. After that time, the numbers of home visits rose abruptly to its current level of 4,000 to 6,000 visits per year.

Table IX.6.

Number of Home Visits Carried Out in the Carabuco Health Area, 1983-1992

year	number of visits carried out
1983	0
1984	0
1985	125
1986	0
1987	522
1988	6,365
1989	7,774
1990	5,024
1991	4,183
1992	6,018
Total	30,001

source: monthly program reports

Coverage of Basic Child Survival Services

Since US AID child survival support for the Carabuco program began in 1987, there have been four cluster sample surveys in the program area. These were carried out in January, 1988 as a Baseline Survey for the Child Survival (CS) III grant; in May, 1989, as part of the Mid-Term Evaluation of the CSIII grant; in November, 1990, as part of the Final Evaluation of the CSIII grant; and in July, 1992, as part of the Mid-Term Evaluation of the CSVI grant. These surveys, along with reviews of health post records undertaken at the same time, provide a basis for comparing the coverage of basic child survival services. We will review here the coverage of immunizations, nutritional monitoring, and knowledge and use of ORT.

The first three cluster sample surveys were of children 12-59 months of age. The fourth survey, carried out in July, 1992, was among children 0-35 months of age. We will report here only the vaccination status of the children 12-23 months of age who were included in these surveys.

Table IX.7. includes the coverage of the complete vaccination series for children 12-23 months of age (OPV3, DPT3, measles, and BCG). In 1988, only 48% of the children 12-23 months of age in the Carabuco Health Area had received all of their vaccinations. Since 1990, coverage rates for this age group have been maintained at 85% or above. The levels of coverage observed through household surveys are similar to levels observed through reviews of health post records, giving credence to the high rate of coverage of families in the HIS.

The data for the percentage of children who had received all of their vaccinations prior to completing their first year of life do not show quite the same degree of improvement or of overall coverage. These data are shown in the third row of Table IX.7. The decline observed in 1992 was based on a review of only 7 of the 31 villages, so whether this represents an actual decline for the whole health area is not clear.

These data do demonstrate that very high levels of vaccination coverage have been achieved and have been maintained in the area. This is a particularly remarkable achievement considering the traditional nature of Aymara society, the degree of population dispersion throughout the program area, and the degree of resistance to vaccination programs among local people in the past.

Coverage rates for specific vaccines are shown in Appendix III. These tables show that the percentage of children 12-23 months of age who had completed their DPT and OPV vaccines by 12 months of age had fallen slightly from 72% to 69%. Otherwise, these tables indicate that coverage rates have maintained themselves or improved over the period of observation.

Tetanus toxoid coverage among women is extremely low. Only in 1991 did the staff feel comfortable in beginning the vaccination of women. There has been a long-standing local suspicion on the Northern Altiplano that women who are vaccinated become infertile. Only because of the trust and confidence which the program had earned over a number of years was it possible to finally begin vaccinating women against neonatal tetanus. At the time of the July, 1992, cluster sample survey in Carabuco, only 7% of the women participating in the survey had received three or more doses of tetanus toxoid. As we shall see shortly (Table IX.20), only one of out 130 deaths of children less than five years old was diagnosed as neonatal tetanus. Thus, it is not clear at this time that neonatal tetanus is an important cause of infant death. Nevertheless, since (as we also shall see) the neonatal death rate is high and the immunization level of mothers against tetanus is low, there still remains the possibility that tetanus is a major cause of neonatal death in the Carabuco Health Area.

Table IX.7.

Percentage of Children 12-23 Months of Age in the Carabuco Health Area with Completed Vaccinations, 1988-1992

type of assessment	date of assessment			
	1988	1989	1990	1992
percentage of children 12-23 months of age with complete vaccinations (css*)	48%	77%	86%	85%
percentage of children 12-23 months of age with complete vaccinations (rhpr**)	na	64%	89%	88%
percentage of children 12-23 months of age with all vaccinations completed by 12 months of age (rhpr**)	na	57%	72%	64%

* css: cluster sample survey
 ** rhpr: review of health post records
 *** 7 communities were randomly selected from the 31 communities in the area for the 1992 analysis
 na: not assessed
 sources: AID child survival grant-related evaluations

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Coverage of nutritional monitoring (defined as measurement of weight and height) was assessed also during the period from 1988 until 1992 through the cluster sample surveys. These findings are shown in Table IX.8. These data show that the coverage of nutritional monitoring has continued to improve over the period of observation. In July, 1992, 89% of the children 3-24 months of age had been weighed four or more times during the previous 12 months, and the average number of weighings per child was 5.5.

Table IX.8.

Coverage of Nutritional Monitoring Among Children Under Five Years of Age in the Carabuco Health Area, 1988-1992

type of coverage measure	date of assessment			
	1988	1989	1990	1992
average number of monitorings during the past 12 months	2.1 (children 12-59 mo.)	3.3	3.7	5.5 (children 3-24 mo.)
% with at least two monitorings during the past 12 months	na (children 12-23 mo.)	na	89%	94% (children 3-24 mo.)
% with at least four monitorings during past 12 months	11% (children 12-23 mo.)	29%	69%	89% (children 3-24 mo.)

na: not assessed

sources: AID child survival grant-related evaluations

Knowledge about and use of oral rehydration therapy (ORT) for cases of diarrhea were also assessed as part of the cluster sample methodology. These results are shown in Table IX.9. The data are all subjective, based on recall and on interpretation by the interviewer. They do, nevertheless, suggest that the level of knowledge and actual use of ORT has gone down during the period between the most recent two surveys. This could represent a difference in the methodology of assessing a mother's knowledge and use or it could represent a real decline in knowledge and use. If, in fact, there has been a decline in knowledge and use, it does raise the question of how effective the educational messages given by the community auxiliaries have been. This issue has been raised in previous evaluations. Even so, ORT knowledge and use rates remain over 50 percent. More important than this, perhaps, is the low number of diarrhea deaths which were reported. We will review this later in the analysis of childhood deaths.

Table IX.9.

Mothers' Knowledge About and Use of Oral Rehydration Therapy for Childhood Diarrhea in the Carabuco Health Area, 1988-1992

percentage of mothers who:	date of assessment			
	1988	1989	1990	1992
had heard of ORT	54%	78%	89%	79%
knew that ORT was used to treat dehydration caused by diarrhea	47%	75%	86%	72%
know how to prepare ORT	na	44%	75%	53%
actually had used ORT	28%	43%	64%	52%

na: not assessed

sources: AID child survival grant-related evaluations

In 1992, ARHC began initial efforts for a new program in the Ancoraimes Health Area, adjacent to and just south of Carabuco. A baseline household cluster sample survey was carried out in Ancoraimes among children under 36 months of age during the Spring of 1992. The Ancoraimes area has had a long-standing collaboration between the MOH and the Bolivian Methodist Church. As mentioned in Chapter VIII, ARHC had an earlier involvement in Ancoraimes from 1982 until 1984.

Table IX.10. compares the coverage of child survival activities for the Ancoraimes Health Area with comparable data for Carabuco. Striking differences between the two health areas are apparent in both immunization and nutritional monitoring coverage. The differences in ORT knowledge and usage are less striking but, nonetheless, readily apparent.

Table IX.10.

Comparison of Child Survival Coverage Between the Carabuco and Ancoraimes Health Areas in 1992

	Carabuco	Ancoraimes
percentage of children 12-23 months with complete vaccinations	85%	2%
percentage of children 12-23 months with all vaccinations completed by 12 months of age	64%	0%
average number of nutritional monitorings in past 12 months	5.5	0.2
percentage of children with at least two monitorings in the past 12 months	94%	3%
percentage of mothers who had heard of ORT	79%	66%
percentage of mothers who knew ORT was used to treat dehydration caused by diarrhea	72%	53%
percentage of mothers who knew how to prepare ORT	53%	17%
percentage of mothers who actually had used ORT	52%	32%
percentage of cases of diarrhea in previous two weeks treated with ORT	48%	33%

source: AID child survival grant-related evaluations

Progress in the Application of the CBIO Approach

1. Development of the CBIO Approach

As previously indicated, the CBIO approach has been gradually developed over a number of years in the Carabuco Health Area. Once the health program had become established, it then (and only then) became possible to conduct censuses throughout the area. After that, home visitation gradually expanded (see Table IX.10). Three-fourths of the homes have a number visible at the front. Those houses without numbers generally belong to families who are frequently away from the area or who have painted over the previous number. The average number of visits during a 12-month period to homes in which there is a child under five has increased from 0 in 1988 to 3.2 in 1990 to 4.0 in 1992.

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Table IX.10.

Progress in the Development of the CBIO Approach in Carabuco, 1988 - 1992

	1986	1988	1990	1992
percentage of communities with census	19%	90%	90%	100%
percentage of project population enrolled in census	na	87%	87%	100%
percentage of homes with number visible on the front	na	na	81%*	73%**
average number of home visits during previous 12 months	0	0	3.2*	4.0**

na: not assessed

* based on cluster sample survey in 1990 of homes of children under five

** based on cluster sample survey in 1992 of homes of children under three

source: previous AID-related grant evaluations

As described earlier, the CBIO approach involves identifying every person in the program area through a census and home numbering system, maintaining contact with each family through periodic home visits, and recording vital events (births, deaths, and migrations) at the time of a home visit. In addition to this, however, the CBIO approach involves the identification of the most frequent, serious preventable or treatable diseases in the program area as well as the determination of the health priorities which are perceived by the communities themselves.

We will leave for the moment an assessment of the most frequent, serious preventable or treatable diseases and return to it later during the discussion of the analysis of deaths. An assessment of the community's perception of its major health problems will be considered at this point.

How one actually goes about determining the community's perception of its health priorities is an important methodological issue. In our program sites now, there are four ways in which this takes place. The first is through the multitude of relationships which the program staff have with the people. Through these relationships, the people express to the program staff the health priorities as they see them. The second approach is through discussion with the political authorities in the communities. A third approach is through the spontaneous demands for health services that arise in the area. A fourth method is actually to ask people in a structured way through a household survey approach.

In effect, the primary health care program which has emerged in the Carabuco Health Area is a response to the local demand on the health program for services. The program is also the result of extensive personal contacts between the program staff and the families over the years, as well as between the program staff and local leaders.

As part of the CSIII Final Evaluation in December, 1990, local leaders were called together and, among other things, they were asked what they thought were the greatest health needs in the area. These leaders, all of whom were men, focused their comments on improving health services for adults. They were keenly aware of the emphasis that the program had given to child survival activities. They felt that a similar level of effort should be given to the health needs of adults. Among the specific needs they identified at that time were an expanded program for the detection and treatment of patients with TB, medicines for adults, as well as dental, ophthalmologic, and radiologic services.

Locally-perceived health priorities were also assessed by asking mothers of children participating in cluster sample household surveys what they thought were the greatest health

needs in the area. At the time of the 1990 cluster sample survey, mothers were asked, "What is the greatest need for improving health in your community?" At that time, the four most frequently mentioned categories of need were: (1) water, sanitation, and hygiene, (2) curative medical services, (3) agricultural improvement, and (4) improved nutrition. In July, 1992, mothers participating in the cluster sample survey were asked, "What are your suggestions for improving health in your community?" The priorities in 1992 were quite similar, with the exception that there was a substantial increase in the number of women requesting education about and assistance with family planning. At the time of the 1992 survey, mothers were asked if they would like for the program to offer family planning services. Ninety-five percent responded that they would.

The CBIO approach calls for the health program to develop programs which respond to the epidemiologic priorities (that is, the most frequent serious, frequent preventable or treatable diseases) and the health priorities identified by the communities. We will address shortly the issue of how the Carabuco program has addressed local epidemiologic priorities. The response of the program to the priorities identified by the communities has been to continue its commitment to expanding the availability of curative health services. Primary health care services have been made substantially more accessible through the construction of health posts throughout the area which are no more than an hour or so away by foot. Primary health care services have also been expanded through the provision of basic curative services at the time of the home visit.

In addition to this, the Carabuco Health Program has been fortunate to have received assistance from CARE over the past few years in installing water and latrine systems. Since many of the communities are rather dispersed, handpumps are more suitable in some locations. ARHC has also assisted communities with the construction of wells and the provision of handpumps.

Efforts have continued to improve nutrition in the area, most recently with the introduction of "api nutritional," previously described. Family planning services have recently been introduced into the program after extensive preliminary discussions with local leaders and political authorities. Thus, it seems fair to conclude that the program has responded to community priorities. The only type of priority expressed to which the program has not responded has been in the area of agricultural improvement.

The epidemiologic determination of the most frequent, serious preventable or treatable diseases has been based primarily on death registration data. The community auxiliaries maintain registries of births and deaths for their respective areas. This information is combined with the census data to

obtain the number of persons by age group. With this information, age-specific death rates and the leading causes of death for age groups can be determined. It is this information which we will now review.

2. Analysis of Death and Population Data for Carabuco

Although home visitation did not begin in a regular systematic fashion until 1988, deaths were recorded prior to that in family health folders. In 1988, the community auxiliaries began keeping birth and death registries, and deaths were recorded in the monthly report to La Paz. In 1989, all of the health folders were inspected as part of the CSIII Mid-Term Evaluation. Deaths noted there were recorded separately.

Since 1985, there have been 541 deaths recorded and placed into the death registration system. The actual number of deaths registered has increased each year from only one in 1985 to 111 in 1992 (see Table IX.12). Since 1988, the numbers of deaths has remained between 89 and 111 except for 1989 when only 61 deaths were registered. The health staff in Carabuco is quite confident that they are now registering 95%, if not 99%, of the deaths that occurred in the communities in 1992. Deaths of community members which occurred outside the Carabuco Health Area are also included in this registry if the person had not emigrated from the area. Out-migration is considered to have occurred if the person has remained more than three consecutive months outside of the geographic area. A person is counted as a resident at the time of the annual census if he or she resided in the community for at least six months during the previous twelve months.

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Table IX.12.

Number of Deaths Registered in the Carabuco Health Area.
by Year of Registration, 1985-1992

year of death	number of deaths registered
1985	1
1986	15
1987	54
1988	89
1989	61
1990	105
1991	105
1992	111
Total	541

source: Carabuco death registry

The number of deaths observed over this period by five-year age groups is shown in Table IX.13. Taking into account the obvious limitation that registration appeared to be incomplete for at least the first several years, one can observe the following:

- a. there is a marked concentration of deaths among those under five years of age and among those 75 years and older;
- b. among the remaining age groups there is a relatively small number of deaths for each age group under 60 years of age (especially in the periods 5-14 and 25-59). After age 55, the numbers of deaths increases with each successive age group.

Table IX.13.

Numbers of Deaths Registered in Carabuco by Five Year Age Groups, 1985-1992

age group (in years)	numbers of	
	deaths recorded	percent
00 - 04	130	24%
05 - 09	9	2%
10 - 14	5	1%
15 - 19	16	3%
20 - 24	14	2%
25 - 29	9	2%
30 - 34	6	1%
35 - 39	19	3%
40 - 44	18	3%
45 - 49	20	4%
50 - 54	21	4%
55 - 59	15	3%
60 - 64	36	7%
65 - 69	37	7%
70 - 74	40	7%
75 +	147	27%
Total	541	100%

source: Carabuco death registry

Table IX.14 shows the distribution of ages at death for children under five years of age who died in Carabuco between 1985 and 1992 and whose death was registered. The number of deaths observed in the first three months compared to the numbers observed during the remainder of the first 59 months of age is striking. After the first nine months of life the number of deaths registered is only two or less at each month of life throughout the remainder of the first five years of life except for the 12-13 month period when five deaths were recorded.

These same data are also shown in a more collapsed form in Table IX.15. Thirty percent of the registered deaths among children under five occurred during the first month of life, and two-thirds during the first year. There are progressively fewer older children dying at each year of life up until the age of five.

Table IX.14.

Number of Deaths Recorded Among Children Under Five Years of Age in the Carabuco Health Area, 1985-1992

	age in months	number of deaths
single month age groups	00-<01	39
	01-<02	15
	02-<03	12
	03-<04	4
	04-<05	3
	05-<06	3
	06-<07	4
	07-<08	2
	08-<09	3
	09-<10	2
	10-<11	1
	11-<12	1
	12-<13	5
	13-<14	2
	14-<15	0
	15-<16	2
	16-<17	0
	17-<18	1
	18-<19	1
19-<20	1	
20-<21	2	
21-<22	0	
22-<23	0	
23-<24	1	
six month age groups	24-<30	12
	30-<36	4
	36-<42	4
	42-<48	5
	48-<59	3
	54-<60	1
	Total	130

source: Carabuco death registry

Table IX.15.

Number of Deaths Recorded Among Children Under Five Years of Age by Age Group in the Carabuco Health Area, 1985-1992

age at death	number of children dying	percent	cumulative percent
00 - 30 days	39	30%	30%
01 - 11 months	50	39%	69%
12 - 23 months	16	12%	81%
24 - 35 months	12	9%	90%
36 - 47 months	9	7%	97%
48 - 59 months	4	3%	100%
Total	130	100%	

The distribution of deaths during the first month of life is shown in Table IX.16. Almost half (41%) of the neonatal deaths occurred during the first week of life, and the remainder are relatively evenly distributed throughout the remainder of the first month.

Table IX.16.

Age at Death (in days) for Children Dying in the Carabuco Health Area During the First Month of Life, 1985-1992

age at death (in days)	number of deaths observed	percent	cumulative percent
00 - <01	3	8%	8%
01 - <07	13	33%	41%
07 - <14	7	18%	59%
14 - <21	8	21%	80%
21 - <28	8	20%	100%
Total	39	100%	

source: Carabuco death registry