EVALUATION REPORT

of the

HEALTHCOM PROJECT IN ZAIRE

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ABBREVIATIONS

AED	Academy for Educational Development
CCB/RCB	Central/Regional Coordination Bureau
CCCD	Combatting Childhood Communicable Diseases
FONAMES	Fonds Médico-Sanitaire
HEALTHCOM	Communication for Child Survival
IEC	Information, Education, Communication
EPI	Expanded Project for Immunization
SANRU	Projet de Santé Rural (Rural Health Project)
ORS	Oral Rehydration Solution
PHC	Primary Health Care
SSS	Sugar/Salt Solution
ORT	Oral Rehydration Therapy
USAID	United States Agency for International Development

1. INTRODUCTION

1.1 HEALTHCOM in Zaire

In 1982 the government of Zaire adopted a plan for medical services giving priority to Primary Health Care in the organization of medical services. In addition, the services were to function with a decentralized structure delimiting 306 rural health zones. When the Ministry of Health asked for assistance from the United States Agency for International Development (USAID) in developing its capacity for planning, implementing, and evaluating health programs in the areas of health education and information, USAID proposed the HEALTHCOM project to the government.

The HEALTHCOM project, financed by the USAID and administered by the Academy for Educational Development (AED), began activities in Zaire in August 1988. The project was to work with the Ministry of Health on several levels: the national level, the regional level, and the local level, in the health zones. At each level the project's goal was to improve the capacity of the health staff to provide health education material.

HEALTHCOM's plan of action anticipated four types of principal activities that the project would undertake. First, the project was concerned with how to implement research in the communities in order to better understand the knowledge and attitudes of the population vis-à-vis priority health problems. The project also proposed to assist the Ministry in applying marketing principals to promote the services offered by health centers. Third, the project envisaged showing how monitoring and evaluation of health services could be useful in long-term planning of health services. Finally, the project proposed to help the Ministry of Health better use the information concerning the functioning of health services to enhance the efficiency of the health system.

During the first two year phase the project was to address the problems of diarrheal diseases and, in collaboration with Expanded Program for Immunization (EPI), immunization. The project had to choose two pilot zones for the most intense activities. Two health zones in Shaba were chosen: Kabongo, a rural zone, and Ruashi, a zone in the suburbs of Lubumbashi. The technical advisor of the project was then based in Lubumbashi in order to better direct the activities in the two Shaba zones.

1.2 HEALTHCOM in Shaba

On the regional level, project staff expected to collaborate with the Medical Inspector in establishing an office capable of assisting the Shaba health zones in planning their health education programs. The project also planned to organize a workshop for the professors or medical training schools in Shaba. The goal in organizing this workshop was to introduce IEC (information, education and communication) activities. It was also expected that a library with material concerning IEC and primary health care would be established in HEALTHCOM's principal office in Lubumbashi.

1.3 HEALTHCOM in the Ruashi Health Zone

The implementation plan for the Ruashi health zone was written in January 1989. This plan suggested the following interventions for the first phase of the project.

1. Training of 28 health agents in immunization and care of diarrhea.
2. Training of 40 community volunteers, all women, who would provide education on immunization and diarrheal disease in their districts.
3. Development of instructional materials appropriate for teaching the principles of immunization and management of diarrhea and the distribution of this material to health centers.
4. Support (print and mass media) for the three-phase vaccination campaign in Lubumbashi.
5. Assistance to the AIDS project as requested in research and the development of mass media materials.

The same plan described two principal objectives that the Ruashi zone should try to attain with the interventions before the end of the first phase:

1. Increase from 15% to 50% in the proportion of mothers who know how to correctly prepare sugar/salt solution (SSS) for diarrhea.
2. Increase the percentage of vaccination coverage for 12 to 23 month old children from 35% to 70%.

During the first phase of the project in Lubumbashi, 28 health workers (medical assistants) and 37 community volunteers (Tengeneza mothers) were chosen and print materials for the treatment of diarrhea and vaccination information were developed. The diarrhea materials were not distributed, in part due to ambiguities in the strategy for the promotion of ORT. On the other hand, the project developed and tested a poster of the vaccination schedule which was later distributed to health centers. The project, in collaboration with the Voice of Zaire, produced mass media spots for the special vaccination campaign with the EPI staff. In addition, the project organized a series of qualitative research activities concerning diarrhea, vaccinations and AIDS which provided useful information for the preparation of messages addressed to the public. The project also organized a workshop for training trainers in immunization and diarrhea, and instruction for the staff in the Ruashi and Kabongo zones. The project staff, assisted by consultants, then organized a workshop for 32 professors of medical training schools in Shaba to help them incorporate the elements of health education in their courses.

1.4 Report Objectives

The HEALTHCOM project performed numerous activities in Shaba and this report does not claim to evaluate all of them. Among the many activities of the project in Lubumbashi (and notably in the Ruashi health zone) in 1990, one can cite two interventions which targeted the general population, even in an indirect manner: the education of community volunteers (Tengeneza mothers), and the mass media spots with the EPI staff (Expanded Project for Immunization) for the vaccination campaign in the city. This report focuses on changes in diarrhea and on vaccination coverage in the Ruashi health zone.

This report presents results of data gathered in March 1989 and during a two month period in Lubumbashi in October and November 1990. The evaluation team chose to carry out the research survey in October because the first phase of the project had terminated at the end of July. Since the project still continues in Zaire, this report should not be considered as a final report, especially since many of the project activities, notably formal education, will show a long-term rather than short-term effect.

1.5 Study in the City of Lubumbashi

The survey on diarrhea, use of ORT, and immunization was conducted using a sample of 1,153 women, almost all mothers, with children less than three years old. As in the first survey, 75 clusters were selected at random and 15 women per cluster were questioned using a close-ended questionnaire. With the exception of nine clusters in Katuba and Ruashi, we retained the same clusters chosen for the first study. The responses were entered into a computer using a statistical package developed by Tulane University which allows one to follow the results as data are entered. A total of twenty women took a two week course before beginning the interviews. The medical and administrative authorities facilitated our task at all levels from beginning to end.

1.6 Study of Community Volunteers in Ruashi

During the months of May and June the HEALTHCOM project, directed by the Technical Advisor and the Medical Director of the Zone and with the supervisory team from Ruashi, chose 37 women from the Ruashi health zone to train them in health education . These women were instructed for two days in IEC (Information, Education, Communication), and in the use of ORT for diarrhea, and in immunization for small children. After the end of the training the women spent one day each month in the Mobutu Center to receive updates and supplementary health material. The supervisory team of the zone led the training and supervised the Tengeneza mothers.

The evaluation team wrote a protocol of open-ended questions to guide the discussions with the Tengeneza mothers. The interviews were carried out by Chiwengo Ngwarsungu, Professor and Research Scientist at the University of Lubumbashi. She succeeded in interviewing 35 of the 37 Tengeneza mothers, generally in their homes, asking them about their domestic life, their health education activities in their district, their roles as Tengeneza mothers, and their hopes and goals for the future. The women were happy to provide this information and were very open.

2. SUMMARY OF THE RESULTS

2.1 HEALTHCOM Activities

During the first phase of the project the Technical Advisor, Joan Schubert, participated in numerous discussions concerning IEC (Information, Education, Communication) strategies at the national level with the staff of FONAMES (Fonds National Médico-Sanitaire), EPI (Expanded Program on Immunization), SANRU (Soins de Santé Primaire Rural), the School of Public Health and USAID. In addition, she acted as a consultant for the education workshop in Kinshasa for specialists in IEC from French speaking African countries. This workshop was organized by the School of Public Health, the CCCD project and Tulane University. In this workshop the participants learned how to plan health education strategies for their own countries.

On the regional level, the project organized a workshop for professors of medical training schools in Shaba to show them how to plan an IEC strategy and how to include this strategy in their courses. A group of 32 professors was trained in Lubumbashi in 1990. The project also carried out qualitative research concerning knowledge about AIDS in Lubumbashi in collaboration with the AIDS project of the RCB (Regional Coordination Bureau).

The project carried out numerous activities for the Ruashi health zone during the first phase. Among the most important activities were the following:

1) a three-week workshop for staff in the Ruashi and Kabongo zones to instruct them in how to provide IEC, management of diarrhea, and immunization information;
2) two one-week instructional workshops in health education for the medical assistants in Ruashi;
3) two two-day training sessions for community volunteers;
4) development of written training material for teaching ORT in health centers;
5) development and distribution of a vaccination calendar for the health centers;
6) a two-week workshop for radio journalists and social mobilizers on the production of messages for the vaccination campaign;
7) the development of immunization material for the EPI vaccination campaign, and the diffusion, by journalists from Voice of Zaire, of mass media spots for the same campaign.

In collaboration with AED personnel and the Annenberg School for Communication, the project also organized qualitative research and assisted with health education seminars in health centers. These activities are:

1) two-weeks of instruction for a team of social mobilizers on how to organize focus groups on the problems of diarrhea and immunization.

2) an ethnomedical study in Swahili of the diagnosis of diarrheal disease.

3) periodic observation of health workers giving health education seminars in Ruashi health centers.

2.2 Diarrhea: Knowledge and Use of ORT

The level of knowledge about SSS in the city of Lubumbashi did not change during the time between the two surveys. The 1990 study showed a small increase in the number of mothers who gave the correct recipe for SSS, but this difference is not statistically significant. When one compares the knowledge about SSS in the different health zones on the other hand, one finds that, in the Ruashi health zone, the percentage of people who have ever used SSS is higher than in the other city zones. This difference is statistically significant. Likewise, in the Ruashi and Kampemba zones, the percentage of mothers who knew the correct mixing instructions is higher than in the other zones. It is possible that the project interventions produced higher percentages in Ruashi, but we do not know why the percentages would be higher in Kampemba.

As for the use of ORT in the entire city of Lubumbashi, the second survey did not show any change over the first survey. This is not surprising because there was no special campaign at the city level. When one compare the results of ORT use at home by health zone, one sees a significant increase in the Lubumbashi and Ruashi zones. One would like to say that this represents an increase due to project interventions in Ruashi, and this may be the case, but we cannot explain why there was also an increase in the Lubumbashi zone.

2.3 Vaccinations: Coverage Levels

The results of the 1990 survey showed a small increase in vaccination coverage in the city according to the two criteria used: Verbal responses of mothers and vaccination cards. For each vaccine, the

proportion of people having received the vaccine increased between 3% to 5% according to mothers' verbal responses and between 0% to 3% according to the vaccination cards. Even if the differences are not statistically significant, one sees a small increase, an upward trend.

The results are presented according to two different bases: Vaccination cards with the date of vaccination, and verbal response of mothers. The group of children 12 to 23 months old children showed a level of vaccination coverage of 36% if one accepts solely the written evidence: a dated vaccination card. We know that this number does not represent the "true" level of vaccination coverage because only 56% of mothers could show a card on the day of the interview. This figure of 36% supposes that every child without an available card was not vaccinated at all and that does not correspond with what actually occurred. What then must be done to arrive at a more reliable number?

Knowing that a large number of children would not have a vaccination card available on the day of the interview, we also asked each woman if her child had received each vaccine, one by one. When these responses are added to the cards, the level of vaccination coverage was 82%, which is clearly too high because we know that the women have a tendency to say "yes" when they are asked such questions. But is the "true" level closer to 36% or 82%?

We believe that the "true" level is between 60% and 65% for the following reasons. One, if only the children aged 9 to 36 months with a vaccination card (without considering the date) are examined, the level of complete coverage is 67%, which seems reasonable for this group. At the same time, the same age group without cards had a level of coverage of 72% based on mothers' responses. We know that this indicator produces a level biased towards the higher numbers, but we do not know how much this bias would be. If we suppose that it is from 10-15%, we would arrive at a level of 61% to 65%. If the level of this group adjusted for bias is added to the level of the group which had cards, the level of complete coverage is around 65%.

Since the survey did not begin before the end of the vaccination campaign, we cannot give a global number for the effect of the special EPI campaign. We have, however, examined the number of vaccines given each month before the month of August 1990, in order to see the increase attained in August and September. The mean number of vaccines given during the seven months before August

1990 was 210. In August 1990, 206 vaccines were given from the 1st through the 28th and 119 vaccines were given from the 29th to the 31st, the three days of the vaccination campaign. In the month of September, the number of vaccines given outside of the campaign fell to 128, but the number given during the days of the campaign remained about the same: 117 this time. All in all, in August and September, the vaccination campaign gave between 20-25% of the vaccines which children were missing. When that number is divided by eight, the number of vaccines required, the mean increase for each vaccine between 1989 and 1990 is 3%.

The study could, however, compare the effect of the first two waves of the campaign by health zone. The Ruashi health zone was able to vaccinate 36% of children who were missing vaccinations before the campaign, while in the other zones this percentage varied from 11% to 19%. We believe that this difference stems from the activity of the Ruashi community volunteers who played the role of social mobilizers during the campaign.

We have examined the relationship between those who listened to the program concerning vaccination coverage on the radio and vaccination coverage. We did not find significant association at the city level.

2.4 Conclusion

During the first phase of the HEALTHCOM project in Ruashi, the team of project directors gave priority to the training of health workers and to the development of written materials on diarrheal disease and immunization. The only attempt to disseminate messages directly to the public was the production and periodic broadcast of spots on the radio before the 1990 vaccination campaign. Thus, it is not surprising that the overall results concerning the use of ORT are the same for the two surveys, and that the increase in immunization was small.

The interventions of the project reached the Ruashi health zone population indirectly through the two types of training mentioned. In Ruashi, knowledge of how to mix SSS increased slightly. We believe that this may be an effect of the training of health workers and community volunteers about diarrheal disease, but the evidence for this is not very strong. The Ruashi zone saw an increase in

vaccination coverage and in the response of the population to the EPI vaccination campaign. We are more convinced that these results are due to the interventions in the Ruashi health zone.

3. SURVEY AMONG THE MOTHERS OF LUBUMBASHI

3.1 Sampling

For the 1989 baseline study, the research team chose a sample of women in the city of Lubumbashi based on statistics for the total population obtained from district leaders. This sample was chosen from the population living in the administrative limits of Lubumbashi, including the annexed zone. We chose 75 subgroups at random by first dividing the total population (640,650) by 75 to determine the sampling interval, then choosing the 75 clusters using this interval. For the 1990 study, we used the clusters selected in 1989 in order to assure a good basis for comparison. Therefore, the women interviewed during the second survey were from the same clusters as those of the baseline survey.

We asked ourselves if, in using the same subgroups in 1990 our sample would be biased by population shifts within the city. Therefore, we compared the demographic characteristics of the populations of the 1989 clusters with the 1988 figures used when choosing the first sample. This comparison rarely found changes at the cluster level. Thus we know that the sample is not biased due to population movement.

3.2 Training of Interviewers

The training team spent two weeks in the Régideso Centre in order to teach twenty interviewers the principles of interviewing and how to conduct interviews. We also spent time working on the questionnaire to be certain that it was written in the Swahili spoken in Lubumbashi. In order to do this, we did role playing as well as a pre-test of the questionnaire.

3.3 Interviewing Mothers

The interviewers, in their selected areas, questioned 1,153 women during twelve days of work in October 1990. In order to conduct the study, we divided the women into six teams of three women

each. In each team one person was the team leader who was responsible for checking the material, identifying the streets for team members, and verifying responses at the end of the day. One woman was responsible for the supervisors of all the teams and another was a replacement for absentees. It was decided that each person would interview five women per day. An interview took from 30-40 minutes per person.

3.4 Entering the Data

Using the statistical package developed by Tulane University, Tshilumba Matenda, information specialist at the School of Public Health in Kinshasa, was responsible for entering the data. He formed a team of three persons who, each day, entered the data from the preceding day. Thus, we ending the data entry the day after the last interview.

4. RESULTS OF THE SURVEY: DIARRHEA

4.1 Diagnosis of Diarrheal Diseases

In the Swahili actually spoken in Lubumbashi one finds the names of five different illnesses that a doctor could classify as being related to diarrhea. They are *kuhara*, *lukunga*, *kilonda ntumbo*, *kasumbi*, and *buse*. The sickness known as *kuhara* or *maladi ya kuhara* is recognized by frequent bowel movements and runny stools, which are considered ordinary diarrhea in biomedicine. *Lukunga* is distinguished also by frequent bowel movements and runny stools, but it is very often accompanied by intense thirst and a depressed fontanelle. Therefore, the child with *lukunga* is dehydrated. *Kilonda ntumbo* is most often characterized by bloody stools and mucus, which suggests dysentery or intestinal parasites. The two other illnesses, *kasumbi* and *buse*, are rather rare. *Kasumbi* is recognized by red spots on the buttocks and seems to be caused by leaving a child too long in a diaper soaked with urine. *Buse* is associated with signs of malnutrition and is considered a serious sickness, thus it is diarrhea with malnutrition.

4.2 Incidence of diarrhea

The vast majority (81%) of the 1,153 women questioned indicated that their children under three years of age had already been sick from one the five diarrheal diseases cited above. For analysis, we divided the cases of diarrhea into three categories according to time: Recent cases, which were current cases or those which began within the two weeks preceding the interview; cases which dated from three weeks to three months prior to the interview; and those cases which occurred more than three months before the interview.

We found 29% of households with a case of diarrhea on the day of the interview and 17% with a case having begun during the two preceding weeks, which is a total of 46% of homes with a recent case. In the category of cases between three weeks and three months the figure was 18%, and for cases more than three months old the figure was 19%. Finally, 17% of households had not had a case of diarrhea among children less than three years old.

In order to analyze the symptoms and chosen treatments, we limited ourselves to recent cases because we consider the responses for these cases more reliable than responses for older cases. If only recent cases are considered Table 1 shows the distribution of cases according the diagnosis of the women.

TABLE 1

CATEGORIES OF DIAGNOSIS OF DIARRHEA

Sickness	Percent(N=536)
Kuhara	46%
Kilonda ntumbo	34%
Lukunga	12%
Kasumbi	2%
Buse	2%
Other	4%
	100%

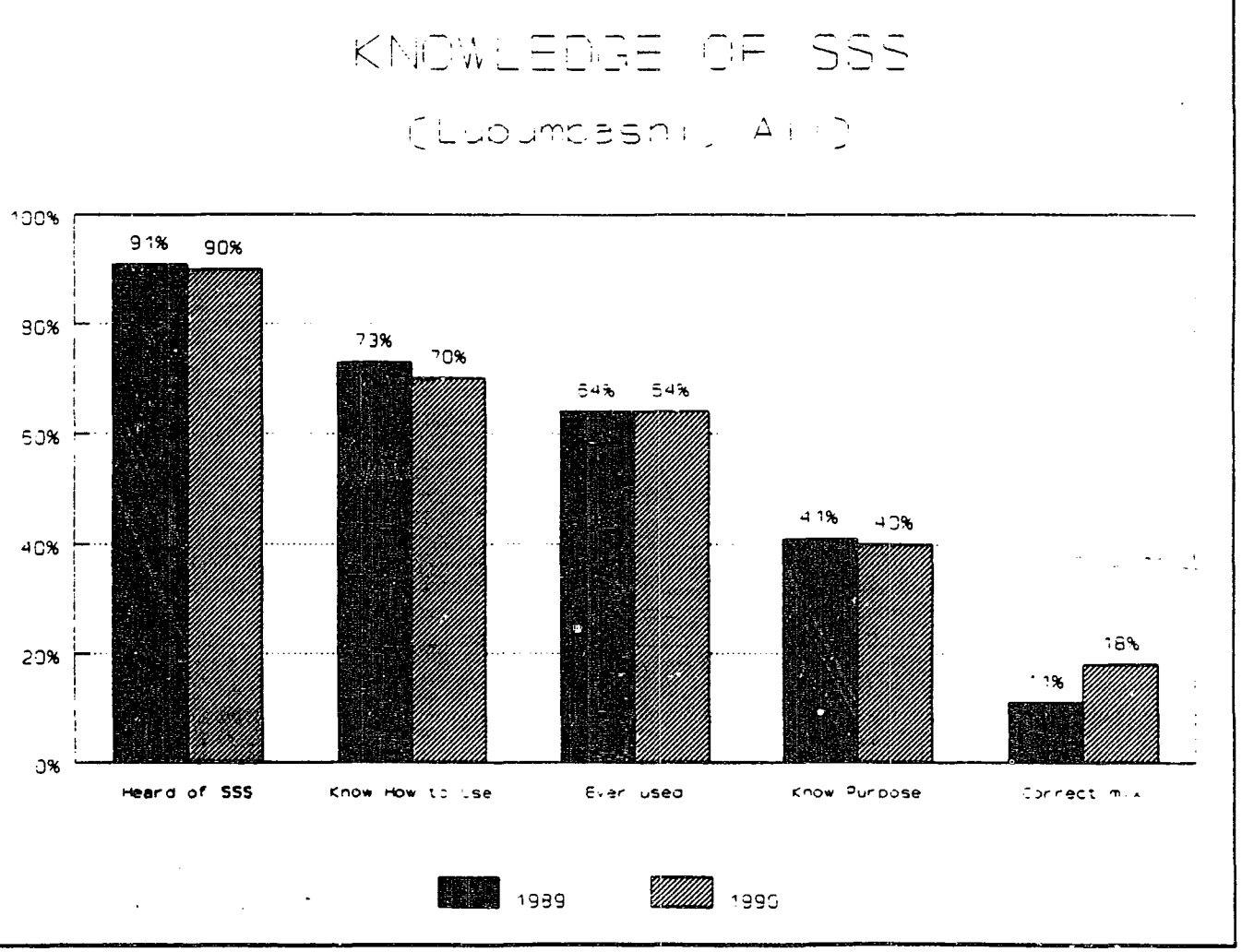
The table shows that cases of *Kuhara* are the most frequent followed by *kilonda ntumbo*, that the cases of *lukunga* (dehydration) are less frequent than the first two and that the cases of *kasumbi* and

buse are rather rare. In most of our analyses we will consider only cases of *kuhara*, *kilonda ntumbo*, and *lukunga* given that they constitute together 92% of the diagnoses given by the women. This distribution does not differ greatly from that of the first study.

4.3 Knowledge and Experience with SSS

During the two surveys, women responded to the same series of questions concerning the preparation and use of SSS and ORS packets. We expected to find much the same results in 1990 as those found in 1989, because there was no special effort to promote the use of ORT for diarrhea. Figure 1 presents the results of the two surveys for SSS.

Figure 1



The percentages in the two studies are almost identical, which provided evidence that the samples were comparable in the city as a whole. The slight increase in knowledge of how to correctly prepare SSS is encouraging, but the difference is not statistically significant.

Although we found no changes for the entire city in knowledge and use of SSS since the first survey, the 1990 study did show differences among the five city health zones. We looked for indicators of the impact of the HEALTHCOM project in Ruashi where the medical assistants were trained in health education and where the community volunteers were also trained. Table 2 shows the 1990 results for certain questions by health zone.

TABLE 2

EXPERIENCE WITH SSS BY HEALTH ZONE IN 1990

	H	K	U	C
Lubumbashi	93%	76%	64%	14%
Kenya/Kamalondo	86%	64%	62%	12%
Kampemba	91%	70%	66%	23%
Katuba	91%	66%	55%	10%
Ruashi	91%	73%	70%	23%
Lubumbashi City	90%	70%	64%	18%

H - Heard about SSS
K - Knew how to prepare SSS
U- Had ever used SSS
C - Correctly prepared SSS

The column entitled "H" gives the proportion of women who had heard of SSS. The column entitled "K" gives the proportion of women who said they knew how to prepare the solution. The percentage of women ever using SSS is shown in column "U", and the percentage of women who gave the correct mixing instructions for SSS during the interview is shown in column "C".

The percentage of responses in the different zones are very similar, but there are four key differences which should be noted. One, the Lubumbashi zone seems to have a higher proportion of women who had heard of SSS and who said they knew how to prepare the solution, but these differences are not

significant. Two, in the Ruashi zone, the percent of women who had ever used SSS is much higher than in the other zones. This difference is statistically significant (at $p < .009$). Third, the Kampemba and Ruashi zones have a higher proportion of women who knew the correct preparation of SSS; this difference is statistically significant. Fourth, in the Katuba zone, there were fewer women who had used SSS and even less who knew the correct mixing instructions.

The higher percentages of women in Ruashi who had ever used SSS and who knew the correct preparation is perhaps the result of the training of staff in the Ruashi health center in IEC, ORT, and immunization as well as in how to carry out health education. It is also possible the difference is an effect of the work of Tengeneza mothers who were active during the month of June in the Ruashi zone. We do not understand why the Kampemba zone had a higher percentage than Ruashi of women who knew the correct mixing instructions for SSS.

4.4 Sources of Treatment

In choosing mothers' sources of treatment, it was necessary to look at four possibilities: No treatment at all; one treatment (or several) at home; a treatment outside the home; treatments both inside and outside the home. The 199 survey found that in 19% of diarrhea cases there was no treatment at all, 41% received only treatment at home, 14% received only treatment outside the home, and 25% received treatments both in and out of the home. When the cases treated solely at home are added to those receiving treatment both in and out of the home, the total of cases receiving any home treatment is 67%. This figure demonstrates the essential importance of home treatment for cases of diarrhea.

A comparison of the 1990 survey results with the 1989 results shows that there was no change in the source of treatments. Table 3 shows the results of the two surveys.

TABLE 3

SOURCES OF TREATMENT FOR RECENT CASES

	1989	1990
No treatment	20%	19%
Home treatment only	39%	41%
Out of home treatment only	14%	14%
Both in and out of home treatment	27%	26%
	100%	100%
In home	65%	67%
Outside the home	41%	40%
	N=444	N=536

Two lines have been totaled at the bottom of the Table which show the number of cases treated at home (67%) and the total number of cases treated outside the home (40%). It must be noted that three-quarters of the cases cared for outside the home were taken to a health center, 30% of which received treatment at a health center. The fact the there was no change in the source of treatment suggests that without special effort in promoting ORT for diarrhea, the method of treatment will not change.

4.5 The Use of ORT

It is encouraging to note an increase in knowledge of ORT (rice water, SSS, and ORS packets), but what really counts is the use of ORT for diarrhea. The fundamental question is this: Was there an increase in the percent of cases of diarrhea which were treated with ORT both in the home and at health centers when the two surveys are compared?

We first consider the results for treatments given at home for recent cases in the entire city. Table 4 shows the use of ORT for the two surveys.

TABLE 4

USE OF ORT AT HOME

	1989	1990
Rice water	4%	5%
SSS	10%	13%
ORS (packets)	2%	1%
Total	17%	19%
	N=444	N=536

The table shows that in 1989 17% of all recent cases of diarrhea received ORT at home, and in 1990 19% of cases received the same treatment. Thus, one sees no change overall.

However, if one considers the same question by health zone, subtle differences may be seen. Table 5 shows the percent of recent cases which received ORT treatment at home in 1989 and 1990 classified by health zone .

TABLE 5

USE OF ORT BY HEALTH ZONE

	1989	1990	
Lubumbashi	14%	31%	p=.042
Kenya/Kamalondo	25%	16%	NS
Kampemba	13%	17%	NS
Katuba	20%	17%	NS
Ruashi	9%	21%	p=.016
Lubumbashi (city)	17%	19%	NS

The two columns of numbers show the percent of recent cases of diarrhea which were treated with ORT in each health zone. For example, the 1989 study indicated that 14% of cases in the Lubumbashi health zone received ORT and that 25% of cases in the Kenya/Kamalondo zone received ORT at home. In the same manner, in 1989 9% of cases in the Ruashi zone received ORT; this number rose to 21% in 1990.

Comparison of the two columns shows two large changes: The Lubumbashi zone rose from 14% to 31% and the Ruashi zone rose from 9% to 21%. We do not know why the level of use of ORT rose in Lubumbashi. With regard to the Ruashi zone, we believe that the increase is the result of project interventions among health workers and community volunteers.

It is also necessary to look at the change which occurred in the percentage of recent diarrhea cases which received ORT in health centers or hospitals. In 1989, 32% of 444 recent cases were taken to health centers. Among these 140 cases, 42 (30%) received rice water, SSS or ORS as treatment. In 1990 the results are similar. Among the 536 recent cases, 169 (32%) were taken to health centers and 55 (33%) of the 169 cases received ORT. For the entire city, therefore, the percent of cases which received ORT in health centers did not change from 1989 to 1990.

5. RESULTS OF THE STUDY: VACCINATIONS

5.1 Knowledge about Immunization

The same series of questions concerning knowledge about immunization was posed in 1989 and 1990 with almost the same results. In 1990 61% of women could name of the first vaccine required (BCG) and another 15% indicated that it is the vaccination given in the forearm. Sixty-four percent gave the correct age for the first vaccination and 79% gave the correct age for the last vaccination. Also, 78% of women knew that the last vaccination given is for measles. Finally, 81% said that children are vaccinated to protect them against disease. Table 6 compares the responses to questions concerning the knowledge of vaccinations for the two surveys.

TABLE 6

KNOWLEDGE OF VACCINATIONS

	1989	1990
Knew the name of the 1st vaccine	64%	61%
Knew the age for the 1st vaccine	75%	74%
Knew the age for the last vaccine	80%	79%
Knew the name of the last vaccine	75%	77%
Knew the purpose of vaccinations	87%	81%

It can be seen that the two surveys obtained the same results to the questions. The difference in knowledge of the purpose of vaccinations is not significant.

5.2 Criteria for Vaccination Coverage

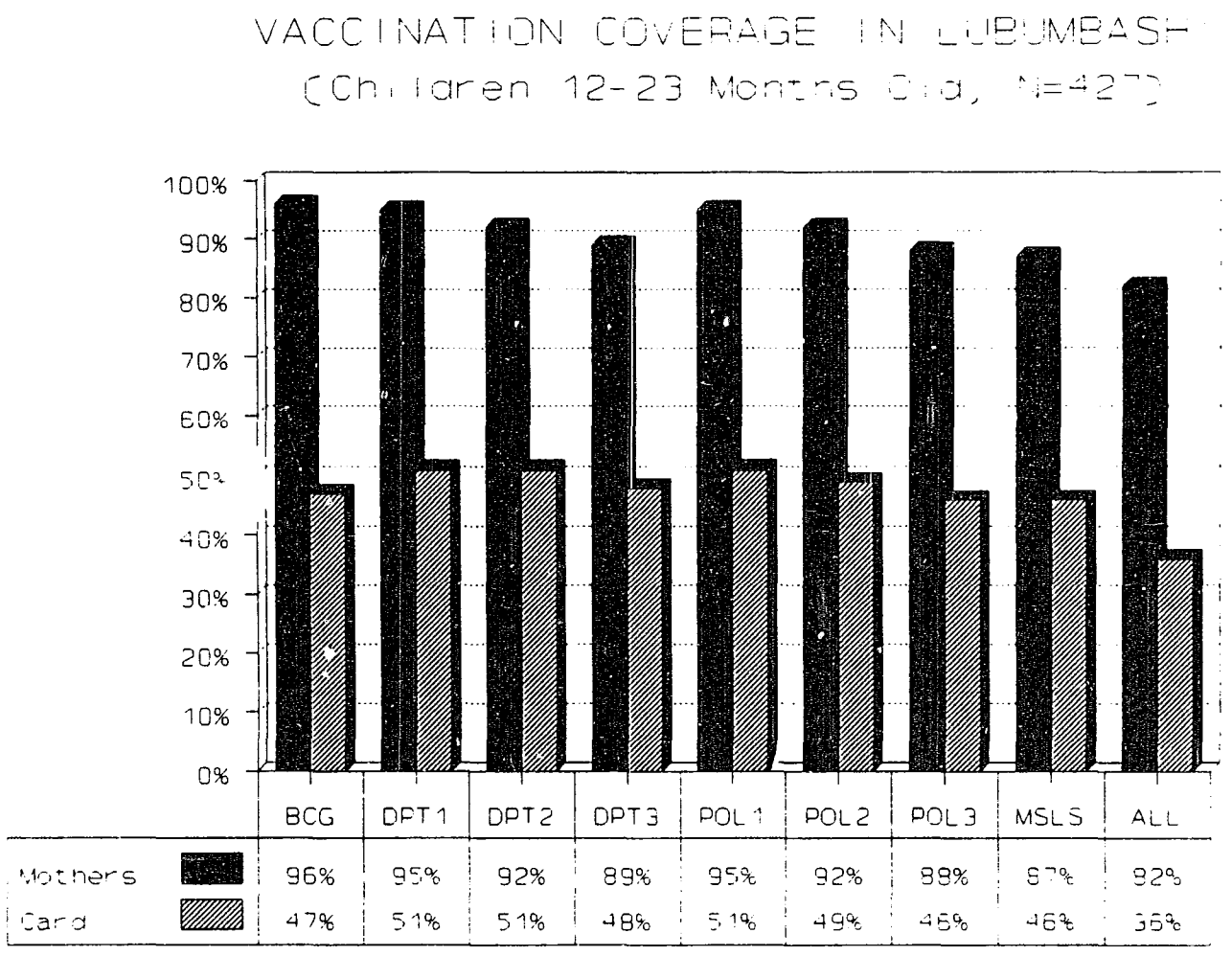
This section answers three fundamental questions often asked, notably the following:
1) What was the vaccination coverage of children in Lubumbashi at the time of the study?
2) In what way does the actual rate differ from the 1989 rate?
3) What was the impact of the 1990 vaccination campaign on vaccination coverage in the city?
To better answer these questions, it is necessary to point out the criteria for coverage and presentation. We first show the results for children from 12 to 23 months of age since this group is most often used in WHO and EPI projects. We show the rates of coverage according to two types of results: for children who had a vaccination card we used the information written on the card, and for those without available cards, we used the responses of mothers when they were asked if their children had received each vaccination (vaccinations were asked one by one). Finally, for children with vaccination cards, we show coverage according to age. One cannot present age-appropriate coverage for children without cards, because we do not have the dates of vaccination for these children.

5.3 Coverage Levels for 1990

In the sample there were 427 children from 12 to 23 months of age. The coverage rates by vaccine for this group are shown in Figure 2 based on two criteria: Vaccination cards and verbal responses.

The hatched columns show the coverage rate by vaccine according to vaccination cards only, while the solid columns show the rate of coverage by vaccine according to verbal responses added to the information obtained from the cards. If the information written on the cards is the only valid source, the complete rate of coverage for the group would be 36%. This number is not valid as an overall rate for two reasons: 1) the denominator includes all children in the age group and 2) it supposes that children not having a card were not vaccinated at all. We have found that 44% of mothers could not show a vaccination card for their child. Therefore, at least 44% of children, according to this criteria, were not vaccinated because they did not have a card.

Figure 2

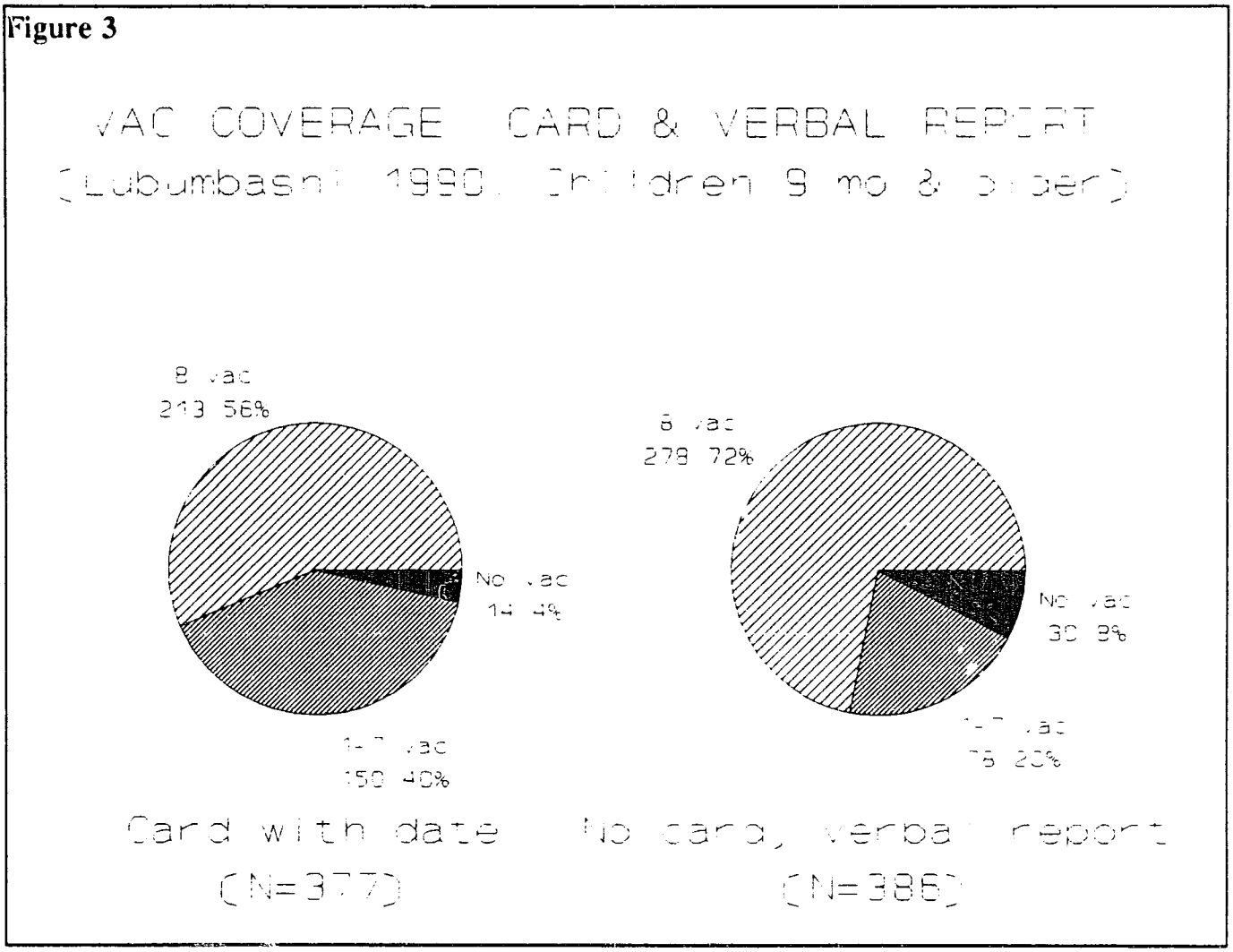


If the responses from the cards are added to mothers' verbal responses, the complete coverage rate would be 82%. Given the tendency of women to say "yes" to certain question and possible errors, we find this number to be inflated. But the figure shows for each vaccine a range of 41-49% in vaccination coverage according to the two criteria used. Note that the percentage of children without cards is located in the middle of the scale between the two rates (41% to 49%). Therefore, the range is the result of the fact the so many children did not have cards. Is this to say that they were not vaccinated? We do not believe so.

In order to know more, we divided the group of children from 9 to 36 months of age (N=763) into two groups: Children with cards (N=377) and children without cards (N=386). Then we calculated the vaccination status for each of the two groups but with separate denominators: For the group with cards the calculations are based on the numbers indicated on the cards; for group without cards, the calculations are based on the verbal responses of mothers. Figure 3 allows us to compare the

vaccination status of the two groups. Attention must be directed to the levels of complete vaccination coverage: If the level of complete coverage (eight vaccinations) is calculated using children with a card as denominator, a rate of 67% is obtained for that group. If the same calculations are made using the verbal responses, a complete coverage rate of 72% results. What does this mean? Is it possible to simply add the two rates together to obtain the complete vaccination figure for the entire population?

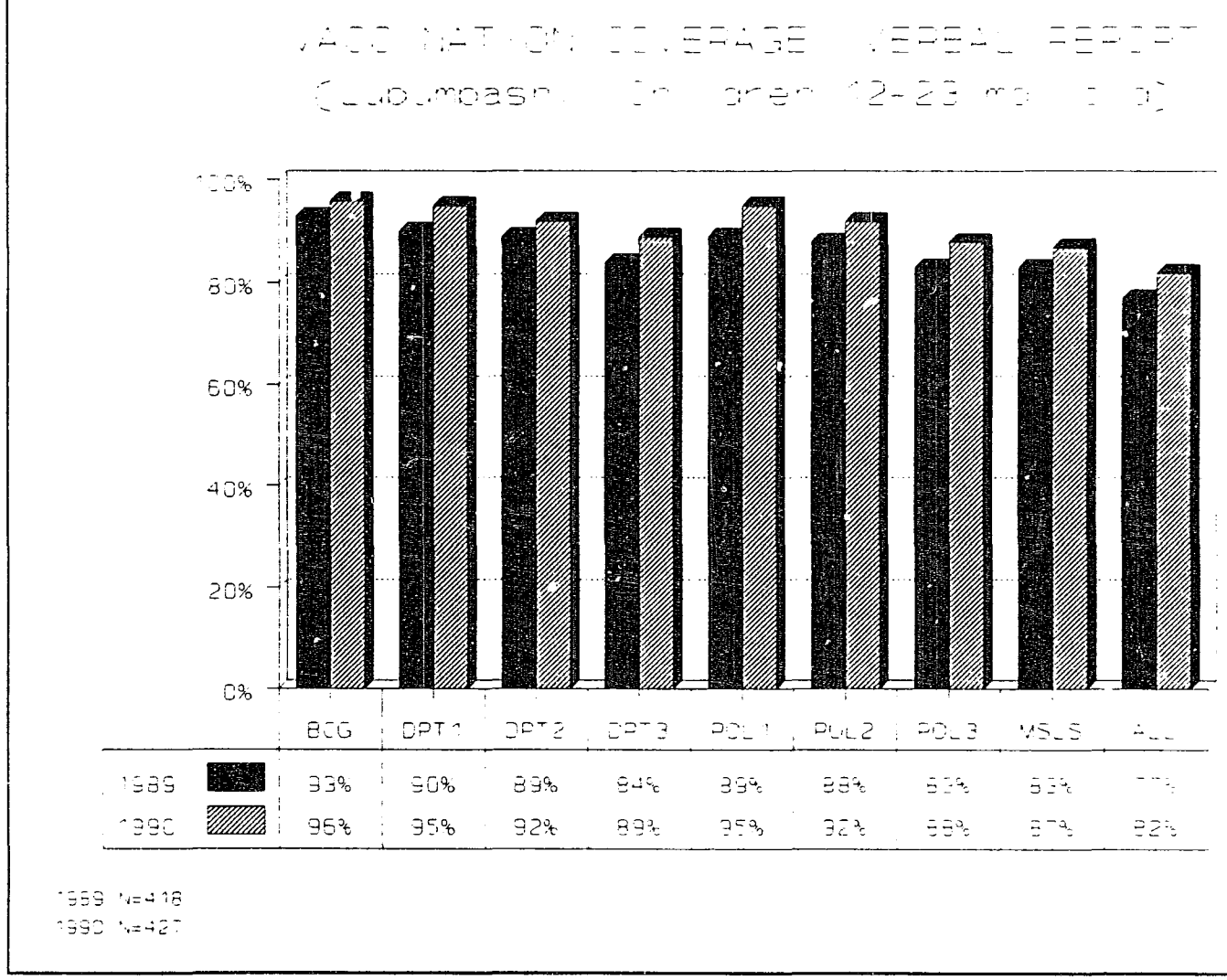
Figure 3



Let's look first at the figure of 67%. This figure shows that for the group of children with cards, 67% received all their vaccinations. This number is a bit low, because we know that some children received BCG without the health worker indicating this on the card. In our group of children, 5.5% received all the vaccinations except BCG according to their cards. These children certainly received BCG since they had all the other vaccinations. Therefore, the number must be at least 72% instead of 67%.

It is also necessary to examine the second figure (72%) based on verbal responses. Based on other analyses of coverage by age, it seems that mothers' oral responses are valid but that they are inflated from 10-15%. If they are inflated by 15%, the true vaccination rate would be 58%. Inflation of 10% would give us a vaccination rate of 65%. Let us say then that the rate of coverage of this group of children without cards is approximately 60%. This seems to us to be logical, because the results of many vaccination studies have indicated that children without vaccination cards receive fewer vaccinations than those with cards. Therefore, the rate of coverage of children without cards is lower than those children with cards.

Figure 4



If the two groups are added together using 72% for children with cards and 60% for children without cards, a complete coverage rate of 66% is obtained. We believe that the "true" figure is 66%

5.4 Comparison of Vaccination Coverage: 1989 and 1990

Figure 4 looks at change in vaccination coverage during the period from March 1989 to October 1990. This figure shows coverage levels by vaccine for children 12 to 23 months old regardless of the specific age at which the children were vaccinated based on mothers' verbal responses.

According to mothers' verbal responses, for each vaccine the 1990 rate is a bit higher than the 1989 rate. Although the differences are not statistically significant, given the regularity of differences, it is unlikely that they are random. Therefore, it can be seen that there was a small increase in vaccination coverage in the city as a whole.

Figure 5

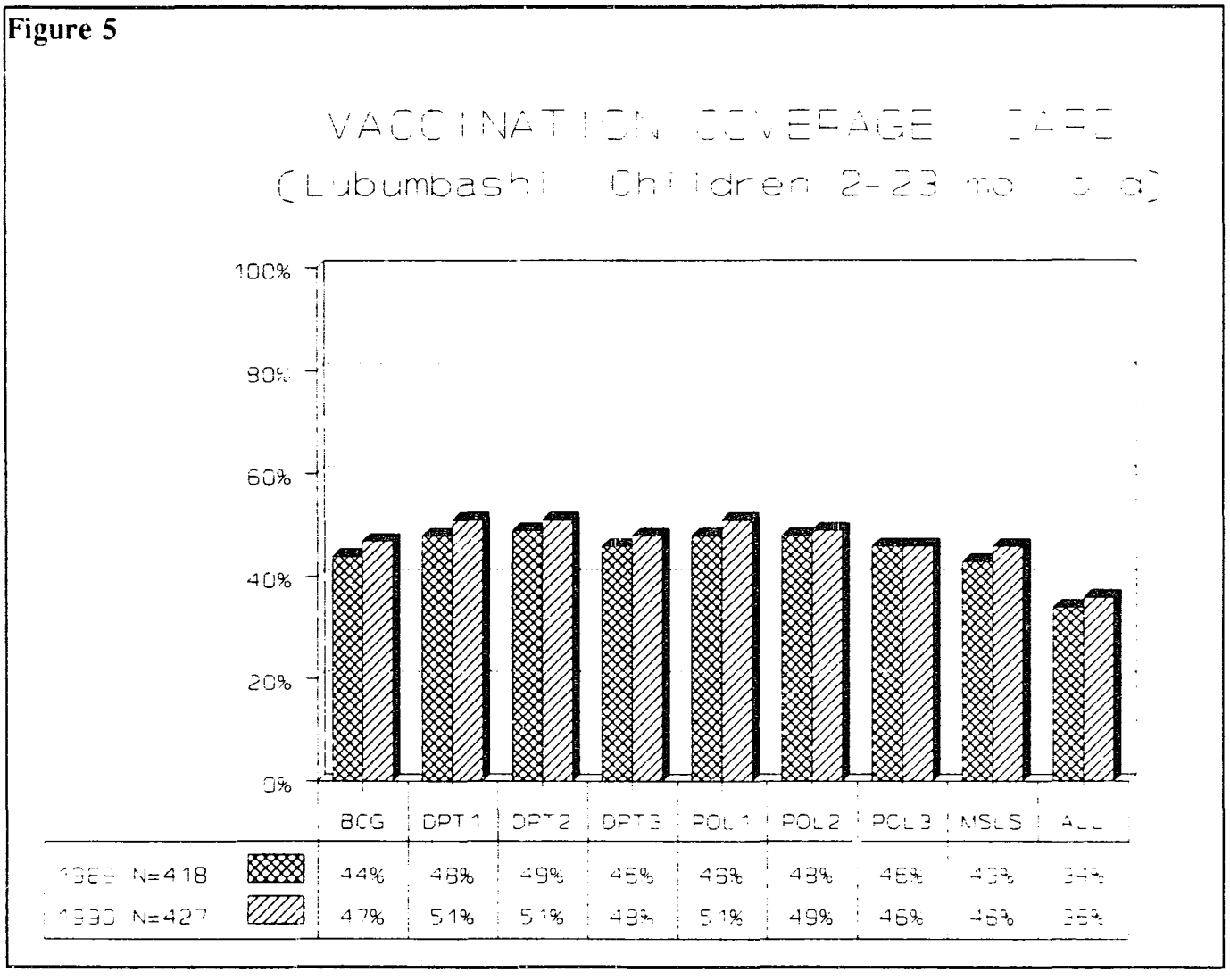


Figure 5 shows the vaccination rates for children 12 to 23 months of age based solely on vaccination cards.

One sees the same difference as in Figure 4; a slight increase of about 3% for each vaccine. The next section discusses the effects of the EPI vaccination campaign in the city during the months of August, September and October, 1990.

5.5 Effects of the EPI Vaccination Campaign

The Expanded Project for Immunization (EPI) in Shaba, together with the HEALTHCOM project, UNICEF, and the Rotary, mounted a special campaign for vaccinating young children and women of childbearing age. During three days at the end of the months of August, September and October, the EPI project established additional vaccination sites and led a public awareness campaign. In each health zone the medical administration organized teams of social mobilizers to circulate and encourage women to take their children for vaccinations during the special days. In Ruashi, Tengeneza mothers played this role. In addition, during two weeks in July, Voice of Zaire, with the help of the HEALTHCOM project, broadcast radio spots promoting vaccinations for children.

The end of the study coincided with the last day of the campaign in October. Therefore, our results cannot show what occurred during the third wave of the campaign. Only the effect of the first two waves (August and September) can be shown.

The results of the study allow us to answer three questions:

1) In what way did the campaign increase the number of vaccinations given each month?
2) Are the ages and vaccination status of children vaccinated during the campaign different from those of children vaccinated at other times?
3) Is it possible to see a difference in the size of the increase in vaccinations given among the health zones?

To answer the first question, it is necessary to consider the mean number of vaccinations given each month during the months preceding the campaign and compare it to the number from August and September. We must limit ourselves to children having vaccination cards since the cards tell us the date of vaccination.

Figure 6

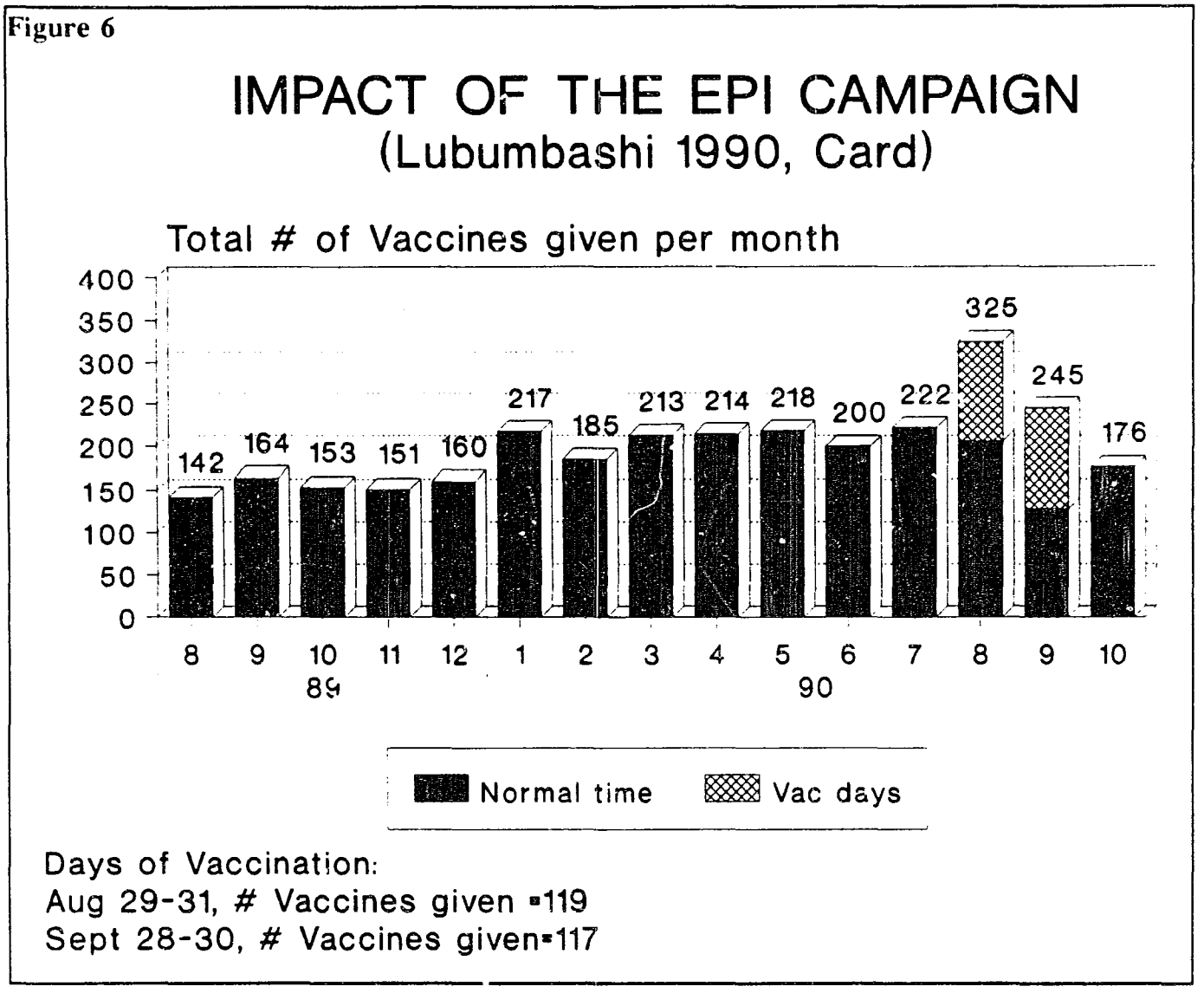


Figure 6 shows the total number of vaccinations received each month for each of the 644 children with cards in our sample. Months are indicated by numbers below the x-axis (8 is August, 9 is September, etc.). In August 1989, 142 vaccinations were given to these children while in January 1990, 217 vaccinations were given. The total is interesting only in comparison with the number of vaccinations given during the campaign in August and September. It can be seen that 119 and 117 vaccinations were given in August and September respectively during the 3 campaign days each month.

One could also ask how many children missing vaccinations were vaccinated during the campaign. Among the 644 children in the sample, 460 had not yet completed the series of vaccinations. This figure includes those who were too young. Nonetheless, let us say that 460 should have been vaccinated during the campaign days. We find that 103 of the 460 children received at least one

vaccination during the first two waves of the campaign, which is 22% of the children needing vaccinations. If this figure is divided by eight (eight vaccinations should be given in a complete series), we obtain an increase of 3% per vaccine between the first and second study. This number is the same as the increase in the 1990 figures.

To answer the question concerning age and vaccination status of vaccinated children, we must compare the mean age of children vaccinated for BCG during the campaign days with the age of those vaccinated at other times. *Figure 7 shows the mean age of children vaccinated for BCG during the special campaign days in August and September. The mean age of children who received the BCG* vaccine in general is 5.0 weeks, while the mean age of children vaccinated during the campaign days is 15.0 weeks.

Figure 7

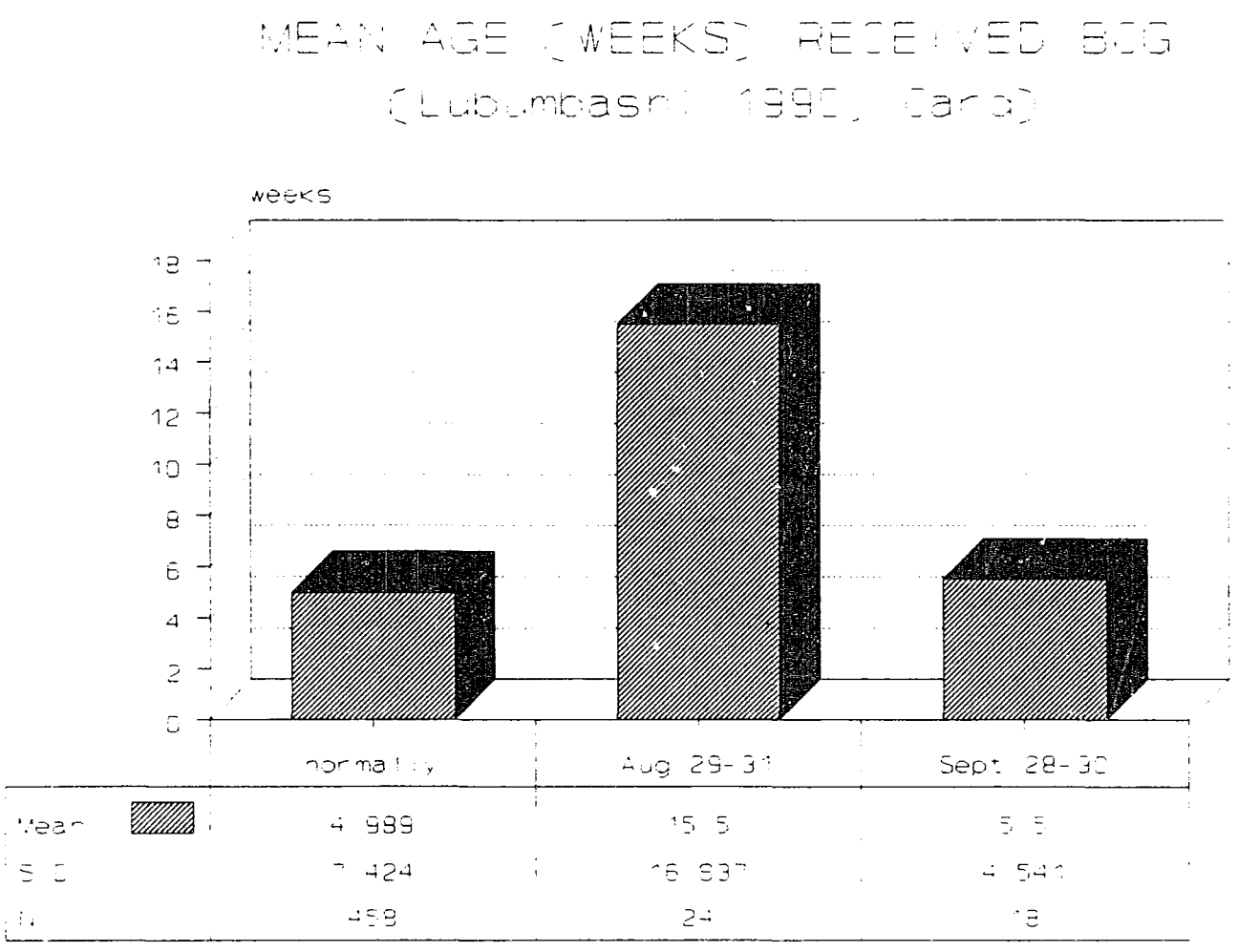


Figure 7 clearly shows that the children vaccinated during the campaign were much older than those vaccinated at other times. This indicates that the campaign succeeded in finding a certain number of children who had not been vaccinated for BCG on time.

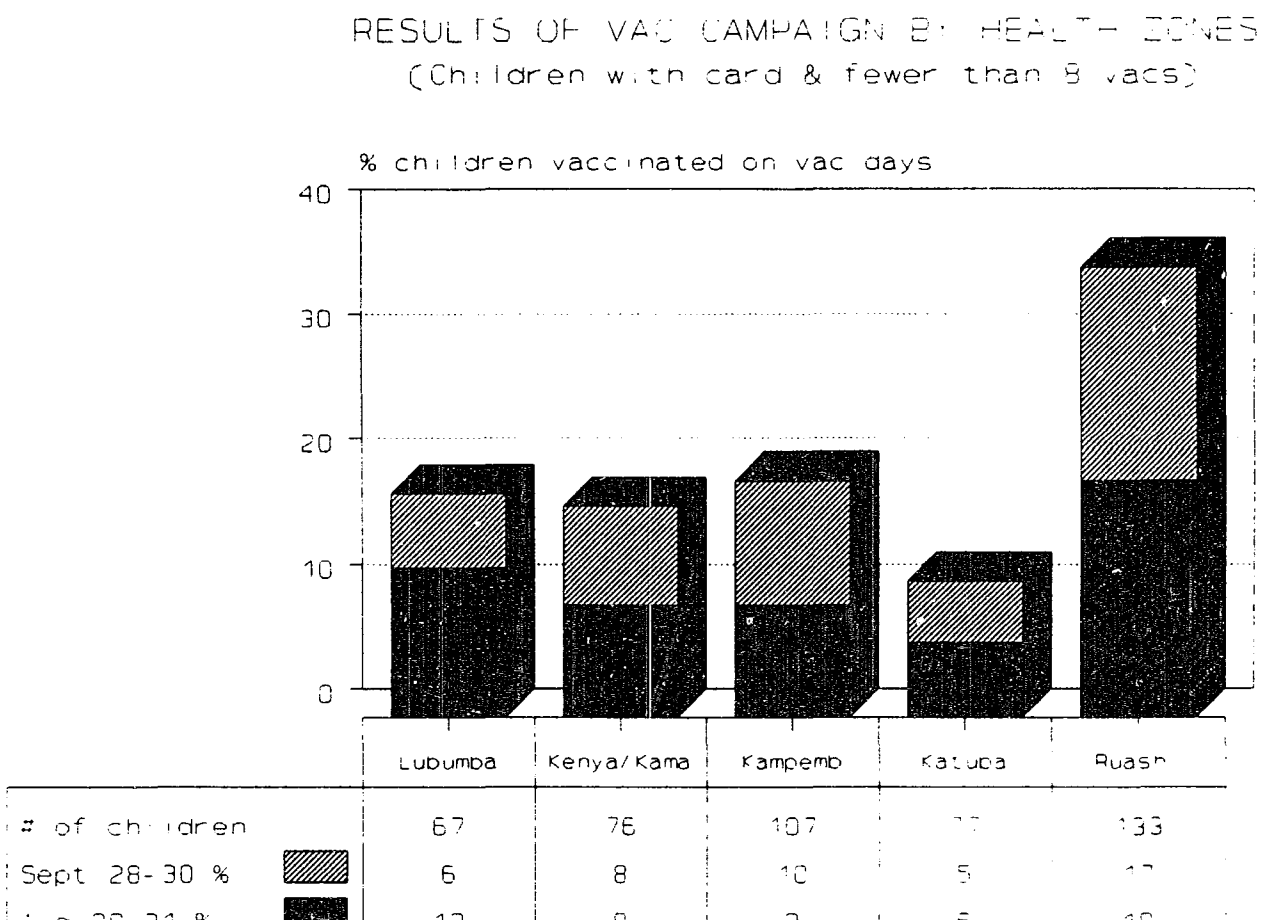
According to the same calculations, it was found that the mean age for receiving DPT1 was ordinarilly 9 weeks, but during the campaign the mean age rose to 14 weeks. The same effect, therefore, is seen for both vaccines.

To answer the third question, we compared the number of vaccinations given in each health zone during the campaign days in August and September. Since the number of clusters differed by health zone and the proportion of children who had not completed the vaccination series also varied, we corrected the figure according to the number of clusters in each zone compared to the total 75 clusters in the city. Figure 8 shows the result of this analysis.

Under the figure are the number children who were missing at least one vaccine in each zone. In the Lubumbashi zone there were 67 children who had not received the complete series of vaccinations. In Ruashi there were still 133 children needing vaccinations. The raw number from the Ruashi zone is higher since we had doubled the number of clusters in Ruashi. The two other lines show the percent of children needing vaccinations who received them. In Lubumbashi, during August, 6% of these children were vaccinated and in Ruashi, 17% were vaccinated. In order to know the percentage of children vaccinated during the first two waves of the campaign, it is necessary to add the percentages from both months. Thus, in Lubumbashi the percentage is 18% (6% + 12%), and in Ruashi it is 36% (17% + 19%). The figure shows that in the Ruashi zone, the percentage of children vaccinated is almost two times higher than elsewhere.

We see two possible reasons for the difference between Ruashi and the other zones. Either the immunization program in general was more effective, or the mobilization effort was more effective. The most likely explanation is the second option, that the social mobilization effort proceeded better in Ruashi thanks to Tengeneza mothers.

Figure 8



5.6 Immunization and Radio Listeners

The HEALTHCOM project collaborated with staff from the Voice of Zaire in the production of radio spots on immunization in general and on the vaccination campaign organized by the EPI program in particular. During the vaccination campaign several broadcasters spoke about immunization during their programs to increase public awareness of the importance of the campaign. The question can then be asked: Is there a correlation between listening to the radio and immunization knowledge or between listening and having taken a child to be vaccinated? In other words, does a person who listened to the radio messages concerning EPI know more than those who did not listen? Are these people taking their taking their children to be immunized in as greater numbers than those who did not listen?

To answer these questions, we created a knowledge scale from five questions about immunization and another scale based on questions about radio listening. The knowledge scale ranges from zero to five and is reliable (a=.62). Almost half (45%) of the sample received five points (all responses were correct), while only 16% received 2 or fewer points. The mean score is 3.88 with a standard deviation of 1.31. Comparison of the scores obtained by persons who listened to the radio with those who did not shows several significant differences. Table 7 shows the difference between those who owned radios and those who did not.

TABLE 7

IMMUNIZATION KNOWLEDGE & RADIO OWNERSHIP

	Total number	Points
Have a Radio	N=653	4.03
Do not have a Radio	N=500	3.68

Persons having a radio at home knew a bit more about immunization than those who did not have a radio. The difference is significant, but if one controls for wealth, the difference disappears. In fact, we found that for wealther people radio listening was not associated with higher immunization knowledge, but for people with fewer resources this association was statistically significant. In the same manner, for education, radio listening is positively associated with higher immunization knowledge among persons with little education, but not among people with more schooling. This indicates that a health education program will have more impact among the relatively poor population and be less instructive for other population groups.

The group of people with the highest scores were those who listened to the health programs on the radio. They received a mean score of 4.30 points compared to those who listened to the radio but did not follow the health programs who received 3.94 points. However, we did not find a relationship between those who heard an immunization program and those who did not. The people who listened to the health programs were better informed about immunization in general, but having heard a program on immunization in previous months did not increase their knowledge. We did not find a difference in vaccination coverage of children of mothers who listened to the programs compared to those who did not. Therefore, there is no evidence that radio spots or programs about immunization influenced people to have their children immunized.

5.7 Vaccination Coverage in Ruashi

Since the HEALTHCOM project worked primarily in the Ruashi health zone, we will present a summary of the situation in this zone concerning vaccinations. Table 8 shows the percent of women who responded to the vaccination knowledge questions in 1989 and 1990 in the Ruashi health zone.

TABLE 8

IMMUNIZATION KNOWLEDGE IN RUASHI

	1989	1990	
Knew the name of the 1st vaccine	49%	60%	p=.03
Knew the age for the 1st vaccine	65%	70%	NS
Knew the age for the last vaccine	75%	84%	p=.09
Knew the name of the last vaccine	65%	71%	NS
Knew the purpose of vaccinations	83%	81%	NS

The table allows us to compare the level of immunization knowledge in Ruashi for the two surveys. There was a significant increase in mothers' knowledge of the name of first vaccine required and the age for the last vaccination. This indicates that for the two elements, women knew a bit more about vaccinations in 1990 than in 1989. It is not possible to say why this is so, but we can suggest three possible explanations: 1) after the immunization training given to health workers in the zone, they improved their method of approaching women and talking to them about immunization; 2) this change could be the result of the instruction given to the Tengeneza mothers in speaking to their neighbors about immunization; 3) the women learned more from hearing immunization news on the radio.

The improvement in knowledge is a positive accomplishment, but changes in behavior are more important. We looked at whether there was an increase in vaccination coverage in the Ruashi health zone. Table 9 shows the percent of children more than nine months old according to their vaccination status: No vaccination, one to seven (1-7) vaccinations, and all vaccinations (8). The calculation of percentages was done according to the method used Figure 3, that is to say, by dividing the children into two groups. Coverage of children with a card was calculated by using the cards. For those without cards we used mothers' verbal responses corrected to account for the tendency to say "yes" when asked if their children have been vaccinated.

TABLE 9

VACCINATION STATUS OF RUASHI CHILDREN: 1989 AND 1990

	1989	1990
No vaccinations	4%	6%
1 to 7 vaccinations	39%	23%
8 vaccinations (all)	57%	71%
	N=71	N=237

Vaccination coverage in Ruashi rose from 57% in 1989 to 71% in 1990. This indicates that the Ruashi zone greatly improved its vaccination coverage. We believe that this improvement is the result of project interventions: The training of health workers, the training of community volunteers and efforts of the zone staff.

6. STUDY OF COMMUNITY VOLUNTEERS IN RUASHI

6.1 General Information

The Ruashi health zone includes the administrative zone of Ruashi and several districts of the Annexed Zone. It is a suburb of the city of Lubumbashi. Almost 85,000 people live in the zone, which receives medical services from the Centre Mobutu, a hospital and health center. The health zone also runs a health center in the Mamba district and supervises activities of several private health centers as well as a health center for the SNCZ, the National Railway Organization of Shaba.

In May 1990 the health zone, under the direction of Dr. Tshiula and the supervisory team from the zone, and in collaboration with HEALTHCOM, launched project to train female volunteers to provide health education in the communities and to encourage women to take their children for vaccinations on time. A group of twenty-eight women were trained for two days during May and a second group of seventeen women were trained during June. Since that time, these women have visited homes to talk about health problems; they encouraged women to take their children to pre-school consultations (CPS) and showed mothers how to prepare rehydration solution for cases of diarrhea.

Since the first phase of the HEALTHCOM project was ending, we wanted to obtain information concerning the activities of these volunteers before launching the second phase. Therefore, we prepared a protocol with open-end questions which allowed the volunteers to talk about their experiences, their activities and their problems. We were particularly interested in hearing the women talk about their own lives. The comments varied widely on certain topics, but we decided to include all of them in order to obtain a global view of the thoughts of these women. In summary, we wanted to know how Tengeneza mothers experienced being "Tengeneza mothers" and how their experiences determined or contributed to their activities. Thus, in October 1990 we interviewed 35 of the 37 Tengeneza mothers who had been trained in the Ruashi health zone.

6.2 Training of Volunteers

According to Tengeneza mothers themselves, several procedures were used to select them. They were chosen by the community, by the head of the neighborhood, by staff responsible for the monthly weighings or from the Mobutu Center, by women frequenting the weighing clinics, or by a minister. Some were visited at home in order to see if they corresponded to the necessary criteria. Some enrolled when they heard about the project. It should be noted that they all made the personal choice to become a voluteer, whether they had been chosen, designated or elected. What prompted them to accept this task was primarily the desire to gain more education, to increase their knowledge and to help the population. These were relatively young women (21 - 43 years old), married and engaged in some small commercial activity. Most were active in a church.

Once the Tengeneza mothers were chosen, they received training for two days in the Mobutu Center to learn how to provide health education in the districts, how to care for diarrhea and when and why to vaccinate children. After the training, they spent one day each month at the Mobutu Center giving their monthly reports and getting additional training in nutrition, weighing children and malaria.

Tengeneza mothers are generally happy with the instruction they received in the two sessions in the first month and the subsequent training sessions each month. They learned and relearned information on the importance of vaccinations and the vaccination schedule, and problems linked to poor nutrition, diarrhea and malaria. They hoped that their activities would continue over the long term. Two sets of expectations have developed among the group. Some women are satisfied with the nature

of the program and are waiting for new training on other topics related to babies' health. A large number hoped to become midwives through sufficient training to allow them to provide routine health care or assist with first aid or vaccinations.

6.3 Activities of Tengeneza mothers

Tengeneza mothers occupied themselves primarily with providing education in their districts. For Tengeneza mothers, educating the public means to simplify and convey the information to the mothers in their communities. They most often covered the following themes: Importance of immunization and problems related to malaria, diarrhea and nutrition. Tengeneza mothers carried out work with much enthusiasm. This work, they affirmed, helped them and allowed them to serve the public and their country. The work offered them the means to enrich their own lives and meet new people. It was a labor of love. It was with the blessing and assistance of their spouses that they succeeded in their work.

In reality, the frequency of work varied from volunteer to volunteer. Generally, they worked one to four days each week, on average one to two times each week. Some did not limit themselves to visiting homes, but also taught in their religious organizations. At times women from the district came to consult them at home. The volunteers spoke about their work with enthusiasm and devotion.

Our discussions with Tengeneza mothers revealed some ambiguity in the concept these women had of their own role in the community and their connection to the Mobutu Center. They considered themselves the link between the Mobutu Center and the public without knowing exactly what that meant. They expressed a desire to know more about what the Mobutu Center expected from them and to know more about the future of their project. We must note that the Tengeneza mothers encountered a lot of material, moral and intellectual difficulties. Nonetheless, the mothers did not want their activity to be temporary; to be fully functioning, it needs to have a permanent structure. This is an activity that is worth continuing.

6.4 Everyday Life

The volunteers spoke to us about their everyday life and how they constantly had difficulty finding water, food and money necessary for their families. According to them, it appeared to be more and more difficult to feed their children and to find medicine in Ruashi. In the districts there was no water or electric service and health centers did not always have medicine. The high unemployment level also added to the difficulties of all families.

It has to be recognized that actual life in Lubumbashi is not easy and to include this fact in the structure and planning of the project. The women did not let themselves become discouraged by this. In spite of all obstacles, in spite of the difficulties of daily life, Tengeneza mothers remained with the project. They wanted to learn more, to obtain more in-depth training. They wanted to feel competent and capable of responding to questions of even the most informed people that they approached or who approached them.

6.5 Conclusion

The universal enthusiasm of these women for their task greatly impressed us. They wanted to continue educating their neighbors but they also wanted supplementary training and financial support. This can happen in different ways; among others, it could be started by production activities which would allow them to generate funds - selling various objects, knitting, sewing, etc. Funds generated from this sort of activity would go to the group of Tengeneza mothers and the benefit derived would serve to help or remunerate the members. It should be noted that some mothers did not completely condone this idea; they preferred to receive articles which they would sell personally.

From our conversations with Tengeneza mothers, three aspects of the program merit the attention of the project directors. One, the role of these women is not clear to everyone. Two, the supervisory system is not completely in place. Three, the women do not know if they will have financial support or not. Without this support they will find it difficult to continue as they have begun.

It is not easy to define the role of these women so they will completely understand it. To give the mothers full instruction in nursing, medical assistance or midwifery would, in our opinion, be a

mistake, because there is the risk that they might open dispensaries or sell pharmaceuticals without having enough knowledge to do so. How can one control their activities in the districts? Who will pay their salaries in the hospitals? Also, such education further removes them from their essential roles, knowing how to help the people in their districts.

It would be better to move towards the following solution: health education - first aid - neighborhood cooperatives. While visiting homes in their neighborhoods to provide ORT and other information, Tengeneza mothers could provide first aid (limiting their possibilities of opening unofficial dispensaries) and also participate in some income generating activity in a neighborhood center or cooperative two or three days a week. The combination of first aid training and income generation through a neighborhood center or cooperative would resolve the problems of providing Tengeneza mothers with the additional health training that they desire and would allow them to earn money which they need to continue their community work.

Having spent all this time with Tengeneza mothers, we are convinced that the excellent work initiated by the health zone of Ruashi with the aid of the project must be maintained. The women are convinced of the value in their activities and want to continue at all costs. Good will is not lacking, they are available to work and they believe in their work. The supervisory team of Ruashi has begun a project which merits support and development. Besides, the results of the study have shown that vaccination coverage has risen in 1990 and we believe that this in part due to the work of Tengeneza mothers. The perfect formula for encouraging and sustaining them in their work over the long-term remains to be found.