

**FINAL EVALUATION REPORT  
AGADEZ EMERGENCY HEALTH PROJECT  
CARE INTERNATIONAL  
PN- 40**

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**Acknowledgments:**

The evaluation team would like to take this opportunity to congratulate the Project PN-40 for what is clearly a job well done! They have worked tirelessly to provide important health services to communities that, due to many factors, previously had none. They have done so by using their hands and feet, heads and most importantly their hearts. The results described here would not have been possible if the entire team had not been truly dedicated to improving the health and well-being of the population in their target areas. They have clearly believed in what they set out to do and its importance. In conditions such as these, technical know-how alone is not sufficient to get the job done. For their efforts and dedication then they should be congratulated and thanked. Thanked on behalf of CARE for representing their organization and its mission so well and on behalf of the women and children of northern Niger who will not suffer from preventable illness and death. The evaluation team sincerely hopes that their efforts may in some small way be seen as a contribution to this effort.

It is important, also, to thank a number of persons for their input and assistance to this final evaluation exercise. The CARE/Niger country team under the leadership of both Jan Schollert and Douglas Steinberg should be acknowledged for their assistance in putting the evaluation team together and facilitating their work. CARE/Atlanta's role must be mentioned as well. They worked hard to support the project without the benefit of being able to directly see its results and success. Without the efforts of both headquarters and Niamey, however, this success would not have been possible.

The Team would also like to acknowledge the United States Agency for International Development (USAID) for its willingness to support the project during a period of difficult relations with the Government of Niger.

Special and sincere thanks must go, above all, to the Project PN-40 team. They did everything possible to make their project and this evaluation a success. Their effort, dedication and team "can-do" spirit was obvious and inspiration to the team. Their patience in assisting the team and answering its endless questions and needs was admirable.

Despite the effort and support of all, errors may still persist in this report. The evaluators apologize for these errors and take responsibility for them. We hope these factual errors do not diminish the reader's appreciation of the Project Team's effort and success in any way.

## Executive Summary:

The Agadez Emergency Health Project was initiated in October 1996. It was intended to demonstrate the feasibility of providing vaccination and limited curative health care services to rural and isolated communities in the Departement of Agadez. The project was subsequently extended and its scope expanded to include similar communities in Tahoua and Diffa departments as well. These are mobile, nomadic communities, many of which had received little or no modern health services during the last decade.

A final evaluation of the project, and a survey of vaccination coverage in the are most recently vaccinated by the project (Arrondissement of N'Guigmi in Department of Diffa) were conducted in July 1999.

Results of the evaluation and survey are summarized in the flowing tables:

Reported Number of Doses Delivered by Antigen, Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N'Guigmi (Jan 99 – Present)	Total
<b>BCG</b>	16,221	24,380	10,925	51,526
<b>3 Doses Polio*</b>	14,164	21,454	6,684	42,302
<b>3 Doses DTP*</b>	13,286	21,187	6,689	41,162
<b>Measles</b>	18,421	58,695	10,961	88,077

\* : These figures are totals for DTP and Polio "third dose" as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

Estimation of "Coverage"<sup>1</sup> by Antigen, Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	Percent of Estimated Target Population
<b>BCG</b>	107%
<b>3 Doses Polio*</b>	88%
<b>3 Doses DTP*</b>	86%
<b>Measles</b>	184%

° : Calculations based on revised estimations of target population by project as discussed above.

Reported Number of Doses Tetanus Toxoid Delivered, Women 15-49 Years, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N'Guigmi (Jan 99 – Present)	Total
<b>2 Doses TT**</b>	16,984	26,754	6,010	49,784

\*\* : These figures are totals for TT "second dose" as reported on project activity reports. It is assumed that women recorded as having received the second dose actually received the first.

Estimated "Coverage"<sup>2</sup> Tetanus Toxoid, Women 15-49 Years, All Departments, Project PN-40, October 1996-June 1999

	Percent of Estimated Target Population
<b>2 Doses TT**</b>	90%

° : Calculations based on revised estimations of target population by project as discussed above.

Comparison of Reported Rates of "Coverage" Project PN-40 and DHS 1999 Results for Individual Antigen Coverage

<sup>1</sup> The term "coverage" is used loosely here for the purposes of the Table title. It actually refers to the comparison of doses reported delivered against the project objectives. True coverage estimates can only be established based upon a population survey.

	<b>Project PN-40 (Agadez, Tahoua, N'Guigmi)</b>	<b>DHS Reported National Coverage</b>
<b>BCG</b>	104%	47.3%
<b>3 Doses Polio*</b>	84%	25.0%
<b>3 Doses DTP*</b>	82%	24.0%
<b>Measles</b>	182%	43.9%

\* : These figures are totals for DTP and Polio "third dose" as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

Coverage Of Children 12 - 59 Months By Antigen (verified by vaccination card only), N'Guigmi, Niger, August 1999

	<b>Percent Of Estimated Population</b>
<b>Verifiably immunized at least once</b>	87.6%
<b>BCG scar</b>	85.3%
<b>BCG</b>	79.1%
<b>DPT 1</b>	79.6%
<b>DPT 2</b>	69.3%
<b>DPT 3</b>	52.8%
<b>Polio 1</b>	77.9%
<b>Polio 2</b>	68.7%
<b>Polio 3</b>	53.7%
<b>Measles</b>	71.4%
<b>Completely Vaccinated</b>	45.1%
<b>Vitamin A</b>	70.2%
<b>VAM</b>	37.2%

Vaccination Coverage of Women 15 - 49 years, N'Guigmi, Niger, August 1999

	<b>Percent of Estimated Population</b>
<b>TT 1</b>	77.1%
<b>TT 2</b>	64.5%
<b>TT 3</b>	3.5%
<b>TT 4</b>	2.1%
<b>TT 5</b>	1.2%
<b>Meningitis</b>	33.4%

Key findings of the final evaluation included:

© **Project PN-40 vaccinated a significant proportion of the population of its target areas under insecure, physically hostile and extremely difficult conditions and deserves to be congratulated! This was accomplished in areas that have had no health services at all for a number of years. There still exists an obvious and significant demand for health services of all types in these areas.**

© **Project PN-40 has demonstrated the feasibility of operating in these underserved areas. CARE does not currently have resources to neither sustain project activities nor maintain a presence in the area. CARE has learned many lessons that would be of importance to other NGOs who wish to strengthen the delivery of health services in the area(s). CARE is in a position to provide important insight and/or technical leadership to groups wishing to support the development and improvement of services in these areas.**

© **Based upon project data for numbers of doses administered Project Pn-40 appears to have exceeded targets for individual antigen vaccination coverage.**

© **Coverage survey results indicate that despite its efforts, the project did not meet project objectives for percentage of children 0-59months of age completely vaccinated (60%). None the less, the results achieved by the project are many times greater than estimates of national (especially rural) vaccination coverage rates. PN-40 represents a successful model for the**

delivery of vaccination services in these areas. This model will require modification and adaptation if it is to be expanded to include other curative or preventive services.

© The project made every effort to implement the recommendations of the mid-term evaluation report. Its efforts are evident in the improvement of coverage rates seen between the mid-term and final evaluations. The monitoring and supervisory systems were well conceived and implemented and had a direct effect on the project's ability to achieve high levels of coverage. These systems should be shared with the national PEV program should it undertake efforts to improve services in these or similar areas.

© The project made every effort to improve its performance and coverage through management "by the numbers", training and rigorous and frequent supervision. The failure to meet project numeric objectives as measured by the coverage survey is due, in the opinion of the evaluators, more to the difficulty of reaching the target population than a lack of effort or adequate management and supervision on the part of the project.

© The project sought to establish appropriate levels of contact and collaboration with local administrative and MSP officials. These relationships proved highly beneficial to the project. The project also sought the support and assistance of armed rebel groups. The project effectively "walked the line" between these groups and was seen (correctly) as an independent and neutral body seeking to improve the lives and well-being of communities in the area and without political ties or agenda.

© The rates of coverage attained by the project are not (currently) sustainable by the MSP and PEV mechanisms in place. The PN-40 project was designed to address an acute shortage of services not to build the capacity to maintain acceptable levels of coverage in the project areas. Project implementation was consistent with this "emergency" or "catch-up" approach. Had sustained coverage been an objective, implementation would have been very different and emphasized systems and capacity building of public and other permanent structures and institutions more than it did.

**Most importantly it must be remembered that:**

**© There are few things more sustainable than the immunity developed by a child who has been correctly and completely vaccinated and immunized. For all of the many women and children who were immunized by Project PN-40 the impact is 100% sustainable!**

The project is to be congratulated. CARE/Niger should seek opportunities to share the project's successful management and supervision systems and tools with the national PEV program. CARE/Niger should initiate dialogue and discussion within the Ministry of Health as to the development and testing of appropriate models of health service (not just vaccination) delivery to these communities.

## **Introduction/Background:**

Culture, geography and insecurity/armed conflict conspire to make much of the vast rural areas of the Republic of Niger into possibly one of the most under-served regions of the world from the standpoint of modern health services. This is especially true of the areas north of the so-called "T line" stretching across the country from Tillabery to Tahoua, Tanout and on to the border with Tchad. This area includes the entire Department of Agadez as well as large portions of the Departments of Tahoua, Zinder and Diffa. Population estimates for these areas based upon Niger's most recent census in 1988 are considered highly unreliable and their utility for planning purposes limited. Many of the populations living in this area are highly mobile, following ancient trade routes and/or the availability of pasture lands for their livestock often making it difficult to locate them for large parts of the year. The challenge of developing systems capable of providing basic services to such populations are obvious and considerable.

Reliable data on either health status of the population or the delivery of services in these areas are only recently available with the finalization of the Demographic and Health Survey (DHS) completed in April 1999. Many of the indicators suggest that the health status of populations in Niger may be among the worst in the world. The 1998 DHS estimates infant mortality to be 123 per 1000 live births and child mortality at 274 per 1000 live births. Access to and coverage by Ministry of Health (MSP) provided services (both preventive and curative) is low. Only 42% of the population lives within 5 km of a fixed health facility. The Expanded Program for Immunization (PEV) coverage rates for children 12-23 months of age completely vaccinated are approximately 18 percent overall and only 10 percent in rural areas.

The region can be characterized by large expanses of extremely rugged terrain (mostly desert broken periodically by rugged, inaccessible mountainous areas) which are sparsely populated by mostly nomadic and less frequently agricultural communities. The geographic dispersion of fixed agricultural communities and the nomadic, herding culture practiced by large portions of the population create a particular challenge for the delivery of modern health services. Little is known of the travels and whereabouts of many of these communities for much of the year, with some ranging as far as neighboring Tchad, Nigeria, Mali and Cameroon. For these people, access to MSP services is limited to those periods when their movements bring them into proximity of the limited fixed facilities located in the region's towns. Organization of services is further complicated by the ethnic (and linguistic) diversity of populations in the area. Tamchek, Arab, Toubou, Peuhl and Kanouri communities can be found in the area.

The limited network of roads is extremely poor and suffers from an obvious lack of maintenance. For the vast majority of the area there are no roads at all, and transportation is mainly carried out on foot following tracks or "pistes" through the expanses of rock and sand. Travel in the region is especially difficult during the rainy season (August - October), when many areas are cut off completely. Sedentary/agricultural communities atop Mont Bagazane, deep in the Aér Mountains, for example, are accessible only by foot or donkey.

Under the best of circumstances the delivery of health services in these areas may be considered spotty and inconsistent. Fixed health facilities are few and only able to serve the small communities residing within a reasonable distance<sup>2</sup>. The success of the MSP strategy developed and implemented in the 1980s to extend basic services beyond fixed facilities to many rural communities through a network of "secouristes" or village health workers is undocumented but generally considered to be poor. The secouristes have suffered from a lack of support and supervision and their ability to provide simple/limited services and drugs to their communities has proven to be largely unsustainable.

Many of these fixed facilities ceased to function (or functioned sporadically depending upon local security conditions and/or the availability of appropriate staff) as a result of the armed conflict that took place in the region between 1990 and the signature of a peace accord between the Government of Niger and representatives of the armed resistance groups in April 1995. Despite the signing of that accord, insecurity has persisted in many areas until recently. This has most certainly affected the ability of the MSP to reestablish the delivery of many of the services that had been abandoned.

## **Description of the Project:**

In order to address this remarkable and compelling situation, CARE Project PN - 40 was developed and submitted for funding to USAID. The project agreement was finalized and signed in October 1996. Funding

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<sup>2</sup> The MSP generally considers a fixed health facility to have a catchment area comprised of those communities living within a 5km radius. In the case of these rural areas, this theoretical catchment area is often for planning purposes considered to be as large as 15 km.

was initially obtained to support six months of project activities. The project area was defined as the rural areas of the Arrondissements of Arlit and Tchirozerne in the Department of Agadez. This original funding can be seen, to some extent, as a trial or pilot period to assess the feasibility of operating in the region so shortly after the termination of the armed conflict and associated security problems. Activities supported by the original project funding continued through until the end of June 1997.

In June 1997, a second emergency vaccination project was funded for CARE to support the continuation of activities in the rural areas of the Arrondissements of Arlit and Tchirozirene as well as to extend the PN - 40 service delivery model to other areas, including the Arrondissements of Bilma (Department of Agadez), N'Guigmi (in the Department of Diffa), Tchir Tabaraden (Department of Tahoua). Subsequent un-funded extensions of the project agreement extended its activities until September 1999.

### ➤ GOALS AND OBJECTIVES

**The original target population for the project was defined as women of reproductive age (15-49 years) and children under the age of five years (0-59 months) living in the rural areas of the Arrondissements of Arlit and Tchirozerine** (the original goals and objectives for the project are attached to this report).

Operationally, the target population was translated to represent the entire population of the two arrondissements, excluding the city of Agadez and the towns of Arlit, Akokan and Tchirozirene. This definition was further refined to exclude those persons living within 5 km of a fixed health facility which delivered vaccination services (Aderbissanat, Arlit Ville, Agadez Ville, Elmiki, Ifreouane, Ingall, Tabelot, Tchirozerine, Timia and Tchintaborak). These communities were excluded based upon the assumption that they would/could receive vaccination and other services as provided by those fixed facilities and that the project should not be construed or interpreted as a replacement for routine MSP services but rather as a complement in those areas which the MSP could not reach.

The estimation of the project target population and the setting of numeric project objectives proved to be problematic due to the absence of reliable or up-to-date census data (the last national census was performed in 1988). Both project agreements (October 1996 and June 1997) set objectives for rates of coverage (60%), as well as numeric targets in terms of numbers of women and children to be vaccinated. Due to the unreliability of census/population figures and the operational refinement of the target population discussed above, it was difficult to reconcile the target rates set by the project agreement with the target numbers set in the same objectives. As a result of the lack of congruence in the objectives, the PN-40 team spent considerable effort to develop better, more reliable population estimates for the project area(s). The team correctly used these target numbers to monitor and manage project activities while coverage rates were used as an evaluation tool.

At the time of the extension in June 1997, project objectives were modified/expanded to reflect the greater geographic scope of the new project as well. The modified objectives for Project PN – 40 were:

#### **Project PN - 40 Goal:**

*to reduce mortality and morbidity of children under five and women of reproductive age in the described project zone of the arrondissements of Arlit, Tchirozerine, Bilma, Tchir Tabaraden and N'Guigmi*

#### **Project PN - 40 Objectives:**

- Ö *vaccination of 34,621 children under five years of age (60% of the target group for the complete series recommended for this age group: BCG, oral polio, measles, DPT, yellow fever, meningitis, to the extent that these vaccines are available through the Government of Niger or through contributions in kind)*
- Ö *vaccination of 60% of pregnant women against tetanus*
- Ö *vaccination of 35,556 women of childbearing age against tetanus (60% of the target group)*
- Ö *distribution of Vitamin A capsules to 70,177 women and children (60% of the target group)*
- Ö *to the extent possible, on site treatment of emergency health conditions present at the time of the vaccination campaigns (burns, malaria, infections)*
- Ö *define and implement health education programs in rural communities<sup>3</sup>*

<sup>3</sup> Project health education activities were limited to dissemination of certain key lessons associated with PEV activities (importance of vaccination, retention of the vaccination card, etc.) and treatment-specific counseling of individuals receiving curative drugs and services from the teams.

Ö identify new program interventions which improve the health status of the target groups

In terms of either target numbers or coverage rates this is a tall order when one considers the challenge of reaching the target communities and the fact that the effective rate of coverage in these areas at the time was probably zero.

#### ➤ TARGET POPULATION

Using village level population figures from the 1988 census and population growth rate estimates for the chosen departments and arrondissements furnished by the Ministry of Social Development, Population, Women's Development and Protection of Children, the project finally estimated the original target population of Agadez Department (1998) to be 120,471 (of which 28,311 were women of reproductive age and 24,588 were children under the age of five years). Similar analysis for the Department of Tahoua yielded an estimated total population of 100,409 with a target population of 23,596 woman of reproductive age and 20,793 children aged 0-59 months. The estimated total and target populations for the Arrondissement of N'Guigmi were calculated as 14,247 total of which 3,348 were women of reproductive age and 2,908 children aged 0-59 months. It should be noted that these are the "official" population estimates used the MOH and almost all over organizations working in the health sector for planning and evaluation purposes. These estimates may be summarized as:

**Table 1:** Revised target Population Estimates for Project Zones, All Departments, Project PN-40, July 1996- Spetmeber 1999

Departement	Arrondissement(s)	Women 15-49 Years	Children 0-59 Months
Agadez	Arlit, Tchirozerine, Bilma	28,311	24,588
Tahoua	Tchintabarden, Abalak, Nord Tahoua <sup>4</sup>	23,596	20,493
Diffa	N'Guigmi	3,348	2,908
<b>Total</b>		<b>55,255</b>	<b>47,989</b>
<b>Target Population (60% of Total)</b>		<b>33,153</b>	<b>28,793</b>

The differences in the population estimates found in the project paper and those subsequently calculated represent a refinement of the targets by the project of its objectives. Again, it must be noted that in all cases, these estimates are based upon census information that is more than 10 years out of date. These differences also serve to underscore the fact that the PN-40 target populations are highly mobile and both difficult to count and often to locate. The populations in many of the project areas appear to fluctuate significantly from season to season. The effect of the rebellion on the population and its size and location is also unknown. Clearly any of these figures must be considered as "best guess" estimates. Given the difficulties the project encountered in simply estimating the target population's size and location, it is easy to understand many of the problems encountered in actually finding and vaccinating them.

The population estimates for the Arrondissement of N'Guigmi appear to be particularly erroneous. Using 1988 census figures and the estimated population growth rate furnished by SNIS, a total population of approximately 14,000 can be estimated. Other sources indicate that the true population may be significantly larger. Lists used for tax collection purposes and emergency food distribution (1998) suggest that the true population of N'Guigmi may be greater than 40,000.

There was considerable controversy and discussion between the project, the MOH and the national PEV program over the project objectives as well. The national PEV program defines its target population as women of reproductive age and children aged 0-11 months. The PEV calendar calls for children to have received all vaccinations before the age of 12 months (BCG, Polio 3 doses, DTP 3 doses, measles). While the MOH agreed to the 0-59 month target group, the national PEV program did not endorse this strategy and criticized the project for not adhering to national policy. This created difficulty for the project in that PEV was, therefore, reluctant to provide vaccines to the project (as agreed upon in the project agreement) for use

<sup>4</sup> The June 1997 project agreement called for activities to take place in the Arrondissement of Tchintabarden. After that time a new Arrondissement was created from this area, Abalak, which was included in the project zone. The project also vaccinated some communities in the northern reaches of the Arrondissement of Tahoua. These were communities which had originally been contacted and vaccinated while they were residing in other (Tchintabarden and Abalak) project areas. They moved before they could be visited four times as planned and the project followed them to their new locations in order to insure that they received the full calendar of vaccinations as defined by the national PEV program and were fully vaccinated and protected.

in vaccinating children it considered "out of target age". This is a danger when projects are developed between implementing organizations and donors without sufficient involvement of all local/national partner institutions.

There is, however, a technical justification for the PN-40 target group definition (one which PEV leadership appeared unwilling to accept even to the end). The targeting of children 0-11 months is justified in a situation where services are delivered routinely at high rates of coverage and therefore the only children unprotected are those being born into the population. This would be considered as a "maintenance situation". The situation in the project area in July 1997 was very different. In most of the project defined zone(s) there had been no services available for years and it is safe to assume that the entire cohort of 0-59 month aged children was unprotected. In such a "catch-up situation", the expansion of the target ages in order to insure protection on all under fives is required/justified. Despite lack of agreement from PEV/Niger officials this was the correct (in the opinion of the evaluators), decision of the project.

#### ➤ IMPLEMENTATION

In October 1996 the project initiated activities against a backdrop of significant insecurity and a virtual absence of infrastructure and health services in the region dating back over several years. An ex-patriot project manager was hired by CARE and an office established and staffed in Agadez. The project manager was a former Peace Corps Volunteer who knew Niger and the context within which the project was to take place. He had little or no experience in the design, implementation, management or evaluation of health (or specifically vaccination) projects. This lack of experience is evident. But he was successful in establishing the project presence and the start of operations in Agadez during a period of considerable tension and insecurity.

Two large-scale vaccination campaigns were planned and carried out by the original project. The first took place between January and March 1997. Four mobile teams took part and visited sites in the general areas of: Iferouane, Arlit, Ingall and Timia. The second campaign took place between May and July 1997. This time five teams were fielded and visited the areas of: Ingall, Tabelot, El Mecki, Aderbissnat and Tchintaborak. Each campaign was organized so that sites would be visited three times on successive months to allow children to receive all three doses of DTP and oral polio vaccine.

At the completion of the second campaign (five teams, four teams for the first) a new project manager was hired and arrived in Agadez in July 1997. During the search the position of manager, CARE was unable to identify acceptable candidates with specific experience in health and vaccination program planning and management. The new manager, however, was a former Peace Corps/Niger Volunteer with several years of project management experience and a Master's degree in Development Studies (including coursework in health program planning).

A mid-term evaluation of the project was conducted in July-August 1997 by a team of consultants. The team reviewed project documentation in order to assess the number of doses of vaccines that the project reported administering during the three campaigns organized to that date. The results are summarized in tables attached to this report.

These results as reported by the project information and reporting systems demonstrated an impressive accomplishment and significant improvement over the existing vaccination service delivery efforts in the region (essentially zero). However, the project had not yet met its original objectives set for the number of persons vaccinated in the specified areas of Agadez. The search for the reasons and eventual remedies was complicated by the lack of adequate and consistent project records and documentation. The project appeared to have been managed without regard to the impact of activities and their eventual contribution to attainment of the project's objectives. Site selection appeared haphazard and follow-up and planning inconsistent (i.e. teams running out of vaccine while in the field, teams not making the requisite three visits to a site as planned/promised; see mid-term evaluation report for details).

In addition to vaccination services the project teams carried limited stocks of essential drugs with them in order to provide curative services to the populations they visited. At the time of the mid-term evaluation, the teams reported having delivered a total of 4,559 "services". The project reports did not indicate how many persons this actually represented (one person could have received more than one "service"). The mid-term evaluation concluded that it was impossible to determine the impact of these curative services on the health of the population in the project area. The demand for these services among the populations was high, and the teams were under pressure to distribute drugs to people with dubious complaints; they wished to keep the drugs in the event of subsequent illness). There are few, if any, alternative sources of medical assistance for many of the communities visited by the project teams. There was a high expressed demand for these services

by the populations and several communities expressed frustration at their lack of any other available medical services.

In order to assess the impact of these efforts on actual vaccination coverage rates in the project area it was necessary to conduct a population-based survey as part of the mid-term evaluation. The survey did not assess where (or by whom) an individual respondent had been vaccinated. However, it can be assumed that project PN-40 was responsible for virtually all of the vaccinations delivered in the region and the estimated coverage rates.

While still far from its original objectives as suggested by the project MIS (e.g. *vaccination of 18,000 children under five years of age or 60% of the target group for the complete series recommended for this age group: BCG, oral polio, measles, DPT, yellow fever, meningitis*), the results were both impressive and encouraging. Vaccination coverage rates as estimated by the July 1997 survey as summarized in Tables 3 and 4 below.

**Table 2:** Vaccination Coverage Rates Among 217 Children 0-60 Months by Antigen - North Agadez Project PN-40 Region - August 1997

<b>Antigen</b>	<b>% (n)</b>
BCG Scar	71.3% (144)
BCG Recorded on Vaccination Card	55.8% (121)
DPT Dose 1	57.1% (124)
DPT Dose 2	34.1% (74)
DPT Dose 3	17.1% (37)
DPT Booster Dose	4.6% (10)
DPT Complete Series	16.7% (36)
Polio Dose 0	10.1% (22)
Polio Dose 1	47% (102)
Polio Dose 2	31.3% (68)
Polio Dose 3	15.2% (33)
Polio Booster Dose	4.6% (10)
Polio Complete Series	14.7% (32)
Measles	58.5% (127)
Yellow Fever	7.8% (17)
Meningitis	16.1% (35)
Vitamin A (1 Dose or more)	34.6% (75)
<b>Completely Vaccinated</b>	<b>12.9% (28)</b>
<b>Children Aged &gt; 12 months Completely Vaccinated</b>	<b>15.4% (25)</b>

N.B.: the definition of completed series for both DPT and Polio antigens does not require the booster dose.

N.B. the definition for completely vaccinated includes one dose of BCG, three doses of DPT, three doses of Oral Polio and one dose of measles antigen.

**Table 3:** Vaccination Coverage Rates Among 210 Women 15-49 Years by Antigen - North Agadez Project PN-40 Region - August 1997

<b>Antigen</b>	<b>% (n)</b>
BCG Scar	62.8% (130)
BCG Recorded on Vaccination Card	1.9% (4)
Measles	8.1% (17)
TT Dose 1	54.3% (114)
TT Dose 2	40.5% (85)
TT Dose 3	12.9% (27)
TT Dose 4	7.1% (15)

TT Dose 5	2.4% (5)
Vitamin A (1 Dose or more)	17.1% (36)

The coverage survey results confirmed those suggested by project records. While making progress, the project was still far from meeting its coverage objectives as set forth by the project agreement. Only 15% of the target population of children 12-59 months were completely vaccinated in accordance with the PEV schedule/calendar. However, **the project had demonstrated that it was feasible to deliver services in the area based upon the mobile team model.** With improved planning and management, improved coverage rates could be achieved and a greater percentage of the women called for a significant and children in the region protected.

At the same time, the new project agreement (June 1997) expansion of the project area. The new project manager and her team had their work cut out for them!

Based upon the survey results and its work with the project team and key collaborators, the mid-term evaluation made a number of important recommendations to the project in order to improve performance and meet its ambitious and important objectives (a summary of the key evaluation recommendations is attached to this report). The project team, under the strong leadership of the new project manager, immediately and aggressively undertook the implementation of the mid-term recommendations in order to quickly strengthen and improve project management and performance. A plan to respond to the evaluation recommendations was developed by the project manager and her team. A major effort was made to review and revise the project information and reporting systems. Training needs were reviewed at this time as well.

The Project organized a fourth *tourné* in the Agadez region in November 1997. The security situation in the Department at this time was extremely dangerous. Roads were mined as a result of the conflict and one PN-40 team was caught in a cross-fire situation. The project and CARE were obliged to repeatedly and publicly announce that if the safety and security of the teams and project staff could not be insured that it would be forced to terminate activities and withdraw from the region. Eight teams were fielded to carry out "sensibilisation" activities but only six of the eight planned teams were fielded. For vaccinations due to security concerns. The purpose of this operation was to "mop up" the apparently large number of women and children who had been partially vaccinated by the project but had not received all the required doses in order to be considered fully vaccinated. This was in keeping with the recommendations of the mid-term evaluation. Project teams also assisted the Agadez DDS to vaccinate women and children attending the annual Cure Salee festival.

The planning of this "mop up" campaign was based upon the available village level population estimates in order to maximize the impact of the teams travel by going to those villages and sites which had the largest populations. The new strategy quickly paid off. As the teams began to manage "by the numbers" their work became more productive and effective in terms of reaching the greatest number of women and children. Based upon an analysis of information generated by the new reporting and management systems in place, the project manager reported that:

*"In the month of November, after putting into practice the evaluation recommendations, the teams were vaccinating about twice as many children as they were before. This was accomplished under the extremely difficult conditions created by the renewal of conflict in the project zone."*

It should also be remembered that these results were realized during a "mop up" operation where many of the children had already been completely vaccinated.

The renewal of armed conflict in Agadez in the fall of 1997 had major implications for PN-40. Plans at that time, based upon the new project agreement, called for the project to extend operations from its base in Agadez to designated areas of Tahoua Department and to the Arrondissement of Bilma. In December 1997 during a site visit to the project by the CARE country Director and the Health Program Coordinator, armed bandits attacked and robbed the home of the project manager in Agadez. CARE was forced to make good its threats to pull out of the department and announced that the project would suspend operations in Agadez indefinitely (until the security of its personnel and operations could be insured), and the project office was ordered to move immediately to Tahoua. At the same time the project administrator left the project.

The unforeseen timing of the move to Tahoua and departure of the administrator created a number of administrative and logistical obstacles (nightmares?) for the project. The new Tahoua project office was established in January 1998, and preparations were made to begin vaccinating in the project designated areas of Tchintabaraden, Abalak and Nord Tahoua. New vaccinators were hired and trained in collaboration with

the Departmental Medical Director (DDS). The project sought to develop a good working relationship with the DDS from the start and included MSP personnel in many activities including vaccination visits, site selection, training and supervision. As in Agadez, the project depended upon collaboration with PEV and the DDS to insure vaccine supplies and maintenance of the cold chain by the teams in the field. Fixed MSP health facilities were used as central supply and restocking points for vaccine and cold chain equipment and supplies for the teams operating in the remote rural areas). Again, the project sought to maintain good relations with the both government forces and the resistance groups operating in the area. An initial *tourné* to assess the security situation in the far reaches of the Tahoua Department was organized and target areas adjusted to try and insure the safety of the teams which were soon to head to the field.

By March 1998, the project was ready to field nine teams to begin the process of social mobilization and then vaccination. Considerable time and effort went into generating population estimates for the target zones and using them to choose sites to be visited. Teams went out with the estimated numbers of women and children to be found at each site. Radios were installed in the vehicles so that the office could maintain contact with the teams and monitor their progress and address needs. Debriefings were held when they returned in order to verify the estimates, the number of vaccinations actually administered, and to re-visit (and if need be modify) the strategic choice of sites. The management of the teams in the field had become a far more dynamic and information-driven process. The reported results reflected these improvements.

Logistical problems plagued the project's efforts in Tahoua. Shortages of gasoline, vaccine and syringes were all beyond the control of the project, but complicated its efforts to keep teams in the field vaccinating. National stocks of several antigens were found to be dangerously low. In some cases, PN-40 teams were forced to sit and wait in the field as small amounts of vaccine were found to keep them moving. In other cases, the project borrowed syringes from MSP sources to be repaid when ordered supplies arrived.

Despite these difficulties, four rounds of vaccinations by the nine teams were completed by July 1998. As in Agadez, an impressive number of doses of vaccine were reported as administered. Difficulties in establishing reliable estimates of the true target population make the interpretation of these reported figures tricky (see discussion in Results section below).

With the termination of the fourth round of vaccination by the nine teams in Tahoua and the return (again!) of calm and stability in the Agadez region, the project began to prepare to return to Agadez and extend its reach to N'Guigmi. The Tahoua office was closed and the Agadez office re-opened to support nine vaccination teams and their activities in the Arrondissements of Bilma, Arlit and Tchirozerene.

In addition to their planned itineraries in the Agadez, departement eight teams vaccinated within a large (100km radius) catchment area around the site of the annual Cure Salé festival near In Gall. Despite the cancellation of the official festival, large groups of herders still gathered at the site, providing another opportunity for the project to catch-up with unvaccinated women and children. This opportunity allowed the teams to vaccinate 1910 women, 2900 children and to distribute 2783 capsules of Vitamin A.

The work of the teams in Agadez proceeded without incident. The difficulty and risks involved with traveling across such distance in the deep desert must be noted. Again, radio contact with the teams as they traveled helped track their progress and insure their well-being.

The project opened a second office in N'Guigmi in late 1998 in order to prepare for vaccination activities to begin in 1999. Five teams were composed (as before) of MSP employees and CARE vaccinators hired under contract for the project. The teams began their work early in 1999. Project operations were suspended (according to plan) in April-May during the hot season and were still underway at the time of the final evaluation in July 1999. A sixth round of fieldwork by the teams is planned in order to continue to try and vaccinate nomadic populations as they migrate back into Niger following the rains and the return of grass and water with which they can feed their livestock.

The project will finance and carry out a Household Livelihood Security (HHLS) Survey in Agadez in September 1999 as its last activity. CARE has already conducted HHLS survey in almost every other department of the country. This survey will allow CARE to develop an information base necessary to propose future projects and interventions aimed at reducing the vulnerability of households in the department. Providing insight into "next steps" for the region is an important aspect of the project. The HHLS and the PN-40 experience will allow CARE to "show the way" to other organizations contemplating activities in this vastly underserved area. Despite calm in the region, development organizations and donors have been cautious and slow to propose projects in Agadez and return to the department.

## ➤ PLANNING AND MANAGEMENT

It is clear that after the midterm evaluation the project sought to improve its performance by much better planning and management of its activities. It sought to "manage by the numbers". Several planning and management issues deserve mention/discussion.

The criteria for choosing villages/sites to be visited during the two initial Agadez campaigns were not well documented and appear unclear and perhaps contradictory when considered in light of the project's ambitious original numeric objectives. Vaccination team supervisors indicated that they chose those sites which were both remote and represented the greatest population concentrations. The PN - 40 quarterly report for January-March 1997 indicates that "the four zones were selected because they were the most difficult to reach and had not had a vaccination campaign for many years" (of course no areas of Agadez had had a vaccination campaign for many years). There is no documentation of attempts to estimate the percentage of the total target population residing in the areas chosen for the project campaigns. It would seem that such a "first and farthest" strategy of making key management decisions without an idea of their potential contribution to meeting project objectives can be considered risky, at best, if the project were to meet its objectives.

The reaching of the established numeric objectives, however, was not necessarily the only priority for the project during this initial phase. There was considerable uncertainty at that time as to whether CARE or anyone could safely and successfully field and operate mobile teams in such an unsettled environment.

After the mid-term evaluation the project modified its site selection strategy to attempt to target the largest communities. Available population lists were used to develop itineraries for the teams which would maximize their time in the field in terms of the numbers of women and children they would come into contact with. Each site had an estimated target number, and teams kept careful records of the number of vaccines administered in each site. Upon their return from the field, the records and the estimates were compared and changes made in order to increase coverage.

The project obtained two-way radios for use by the teams in the field. This allowed the office to follow their progress and insure that they had sufficient supplies of vaccine to stay busy and productive while in the field. It also allowed for greater accountability by the teams for their performance and created a real spirit of problem solving on the run by both teams and office staff.

Teams were visited and supervised while in the field by project office staff. Supervisory checklists and criteria for performance evaluation were developed and the teams were aware of their contents. The visits and checklists also contributed to the aggressive problem solving and performance improvement ethos which the project developed. This was also due in part to the effective participatory and team oriented management approach of the project manager. The project developed a true esprit de corps and worked together well.

The initial project strategy also called for each site chosen to be visited three times during consecutive months. This was to allow the populations in those sites to receive up to three doses of those antigens which must be administered in a series to be effective (DPT, polio, tetanus toxoid). There were a number of instances where individual sites were not visited the requisite three times. The project did not appear to review the causes for this break from strategy, or make plans to revisit those sites in order to achieve the three visits and the coverage planned for. This left large numbers of individuals in those sites incompletely protected. The rigorous implementation of the mid-term evaluation recommendations by the project team attempted to address this situation. A management information system was put in place that allowed the project to track "coverage" based upon number of DTC third doses administered by site. Sites where less than 60% of target age children (or more than 20 children) had received this third dose were identified and visited again. By the end of the project, teams were visiting many sites up to five and six times to insure complete coverage of those communities and to vaccinate others who might have arrived at the site since the previous visit of the team. This is a strategy which is only necessary in areas where populations are highly mobile and appears to have been instrumental in achieving significant improvements in the percentage of children completely vaccinated as were seen between the mid-term and final evaluations.

Data on the number and types of services delivered during visits to the designated village/sites were recorded on forms ("fiche de seance") used nationally by the MSP/ SNIS and PEV. Data were tabulated and reported using modified versions of SNIS and PEV report forms. Data were entered into project micro-computers using spreadsheet software. From the beginning the project made every effort to improve its collection, analysis and use of monitoring data.

In addition to vaccines, the project teams carried stocks of basic medical supplies and drugs with them when visiting the designated vaccination villages/sites. The teams dispensed these medicines to those in the villages/sites who required them. In many cases individuals with illnesses which could not be treated by the

teams were referred to health facilities or evacuated immediately by the teams. Records were kept as to the numbers of persons suffering from various complaints and symptoms that were treated and these records were shared with local and departmental MOH officials. The teams also made reports of communicable diseases that they encountered in keeping with national epidemiologic surveillance protocols. The lists of medicines carried by the teams was based upon the level of the personnel in the team and the most frequently sited causes of morbidity. All drugs were dispensed by the vaccination team members who were all nurses with state certification (Infirmier Diplôme d'Etat). The project kept records of these activities but did not use them as a management tool as it did with the vaccination data to calculate coverage or targets for these services. They were however, used as quality control and inventory control tools to supervise the team's activities.

### ➤ LOGISTICS

A number of issues with regard to logistics are important to note.

Due to security problems, the project initially made a strategic decision to rent vehicles for use by the vaccination teams rather than buy its own project vehicles. Because of the unmaintained condition of the roads (or the lack of roads all together!), all vehicles leaving the city of Agadez to visit any of the region's rural areas must have four-wheel drive. During the armed conflict in the region, and for the remainder of the project, such vehicles were susceptible to theft either by members of the armed resistance or uncontrolled bandits taking advantage of the unstable situation. By renting locally, the project hoped to lower the chance of vehicle theft/loss and apparently even benefited from the protection of members of the armed resistance groups operating in the region. The project continued to rent vehicles even after leaving Agadez and moving on to Tahoua and Diffa. Vehicle theft by armed bandits continued to be a significant risk for the entire duration of the project.

The decision to rent vehicles rather than to purchase them also meant that the project was able to field a greater number of teams at any one time. This obviously allowed the project to vaccinate a greater number of children in the shortest amount of time. This approach is consistent with the "emergency" nature of the project.

The negative side to this strategic decision was/is that the project had little or no control over vehicle maintenance or upkeep. In several instances, breakdowns in the field have resulted in delays and missed opportunities for the teams in the field. Apparently the original project manager also decided that the project would never rent the same vehicle more than once. This eliminated any incentives on the part of owners and drivers to do a good job and retain an important source of income (especially in light of the decline in the tourist industry in the region during the armed conflict). It also meant that vehicles in good mechanical condition were sometimes replaced by others with problems during subsequent trips to the field.

Vaccines used by the project were made available by the national PEV program as dictated by the project agreement. The project also established a working relationship with the departmental PEV officers and the DDS. In several instances the DDS lent the project vaccine and syringes in order to keep project teams working effectively in the field. Stocks were replaced when vaccine arrived from Niamey. Low stocks at the national level were a concern at times. The project was obliged to go to Niamey to pick up vaccine rather than rely on the PEV delivery/commodities supply system and often transported vaccines for the DDS at the same time in order to insure their supply as well.

While in the field, the project teams collaborate with the fixed health facilities in the area to maintain the cold chain necessary to support the work of the teams in the field. In many cases this has taken the form of providing gas or gasoline-powered generators to the facility to insure the functioning of the PEV furnished refrigerator unit. In several cases CARE installed the refrigerator or freezer at the facility to support its operations in the area. PEV and CARE vaccines were stored together in these refrigerators (in many cases, however it had been years since PEV had stocked vaccine at some facilities) and the CARE teams use the fixed centers (where possible) as resupply centers (vaccine and cold-packs to maintain vaccine while in the field) from which they headed into the more remote areas. This arrangement seems to have worked positively in most cases. However, the refrigerators at the facilities are often small and require a great deal of time to freeze the cold-packs required by the teams as they move out into the field. Initially there were reports that the teams in the field occasionally experienced stock-outs of vaccine. The project's improved planning and management systems implemented after the midterm evaluation were able to improve this situation considerably. Strict attention was paid to estimated vaccine needs before leaving town and was monitored via radio while teams worked in the field. This strategy of working with and out of the fixed health facilities in the area has been maintained throughout the project. In some cases, the project actually was responsible for reopening several dispensaries which had been closed for several years. The DDS has

requested that at the end of the project that the cold chain equipment installed by CARE (freezers, refrigerators, generators, etc.) be turned over to the MSP.

#### ➤ PERSONNEL AND TRAINING

The project suffered in some cases due to turnover of key personnel. Two project managers and three project administrators worked for PN-40 over the two-and-a-half-year life of the project.

The vaccination teams were staffed by a combination of MSP civil servants assigned to the project (“mise en disposition”) and other individuals who had signed contracts directly with CARE for the duration of the campaigns. This strategy was derived, at least in part, to increase the participation of persons from the MSP and to establish a sense of collaboration and buy-in from the MSP perspective. This was important in order to keep the project from being seen as a purely outside enterprise and a reason for the MSP to reduce its effort and commitment to service delivery in these underserved areas.

It must be noted that in a few instances, the MSP agents assigned to the PN-40 teams created conflict and posed a challenge to project managers. Their lack of accountability to the project and lack of motivation was in direct contrast to the other team members who were under contract to CARE. In the long run, these occasional problems were deemed much less important to the project than the need to collaborate and include MSP personnel in project activities whenever possible<sup>5</sup>. In general, MOH personnel assigned to work as part of the project performed duties and tasks as assigned.

The project correctly saw training and personnel management as the key to improved performance, coverage and quality. A number of training sessions were conducted for project personnel. Often, these sessions included MSP personnel and officials. This was important in order to insure consistency of methods between the project and the MSP and also to build cooperation and collaboration. Training sessions in cold chain, vaccination techniques, conflict resolution, standardized curative treatment algorithms, IEC materials development were all developed and organized by the project. Project personnel thought these training activities were beneficial and important (see results section below).

#### ➤ ADMINISTRATION

The project faced a number of administrative burdens in carrying out its job. CARE administrative and financial procedures tended to be cumbersome and time consuming despite authorization to open local accounts. The project lost its field office administrator twice (once at the moment of the move to Tahoua) which required identification of new personnel and training. The project moved its field office several times (from Agadez to Tahoua, From Tahoua to Agadez and N'Guigmi) which also incurred a great deal of administrative time and effort. To the credit of the project team, these obstacles did not appear to have seriously impeded the project's efforts to field as many vaccination teams necessary to vaccinate as many woman and children as possible.

#### ➤ SUPPORT

The project did not receive consistent technical support from either the CARE offices in Niamey or Atlanta. The project manager of the Zinder Child Survival Support Project conducted a trouble-shooting visit to Agadez during the initial phase of the project and the CARE/Niamey Health Program Coordinator conducted a seminar on IEC materials development for the project, during which materials were developed for use by the PN-40 teams in their health education activities. No technical support appears to have been provided by CARE/Atlanta. It does not appear that the Health Program Coordinator was a consistent or effective spokesperson/advocate for the project at the level of the national PEV or MSP offices.

### **Methods:**

An evaluation team was assembled by CARE to conduct a review of the Agadez Emergency Health Project and produce a final evaluation report. The team's scope of work (SOW) is attached. James C. Setzer, MPH, Senior Associate, Rollins School of Public Health, Emory University was designated team leader. Other evaluation team members were Shannon M. Mason, MPH, independent consultant, Mr. Seydou Abdou, Director of Cold Chain, Programme Enlargi de la Vaccination (PEV), and Mr. Issoufou Matou, the Ministry of Health's Assistant Departemental Director for the Department of Diffa.

The team reviewed project documents and reports. Contacts were also made with the central offices of the PEV Program in Niamey and the Ministry of Public Health's SNIS (Systeme Nationale d'Information Sanitaire) to collect relevant data. Interviews were conducted with district level health officials in N'Guigmi

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<sup>5</sup> It should be remembered that USAID had, for political reasons placed restrictions on CARE's level of collaboration with official Government of Niger institutions and their personnel. The transfer of resources to government institutions was not permitted.

and the departmental director and maternal and child health coordinator in Diffa. While conducting the coverage survey (see below), the team also visited and observed the immunization teams who were in the field vaccinating at the time of the survey.

A survey was conducted to estimate current levels of vaccination coverage among the target populations in the project zone in the Arrondissement of N'Guigmi. The survey was based upon the standard WHO cluster sample methodology for vaccination coverage assessment. A single stage cluster sampling methodology was used to select a list of 30 villages/sites in the defined project zone (defined as the rural populations of the Arrondissement of N'Guigmi). N'Guigmi was selected as it was the place where the project was still currently vaccinating. In other regions, coverage has already begun to fall as vaccinated children leave the 0-59 month age cohort and new, presumably unvaccinated, children enter. N'Guigmi offers, therefore, the most feasible site to measure the ability of the project to achieve coverage of the target population. Clearly, the sustainability of whatever rates of coverage are achieved is another question.

The development of an adequate sampling frame listing villages/sites (clusters) and their populations from which to draw a sample was particularly challenging. The project had already attempted to find such a list to use in the planning of the activities and itineraries of the vaccination teams. The teams quickly found that the list of villages and their populations from the 1988 national census were badly out of date. As many as a quarter of the villages on that list either could not be found after intensive searches or were found and no one lived there any longer. This is indicative of the mobile and nomadic population of N'Guigmi. Many of the sites on the census list were actually wells which are inhabited only seasonally and often for only 2 or 3 years at a time.

In order to develop a more comprehensive list of villages/sites, PN-40 undertook an aggressive strategy of locating and listing all inhabited sites found by the teams while they were in the field. Villages not found on the census list were added to it. The project therefore kept a running list of population sites which was more up to date than the census-based list. As each village was identified or found, the teams vaccinated the women and children living there. They used the number of vaccines administered to calculate a crude estimate of its population (the teams assumed 80% coverage at that time and used SNIS estimates that women and children represent 43.3% of the total population). These estimates also allowed the teams to check the original census figures as well.

The total population estimated for the project zone using this "running" list was approximately 57,000. This is far more than the 14,000 estimated using census/SNIS data. While certainly more complete than the census list, there was no guarantee that this list presented all of the population sites in the project zone either. In reality, any such list for the arrondissement would probably change significantly from season to season due to the migratory patterns of the populations in the area. An accurate and up-to-date census performed in November, for example might be woefully inaccurate in May.

An administrative listing of populations used for tax collection purposes was also consulted. This list estimated the total population of the arrondissement as approximately 40,000 and served as a rough check for the project's "running" list described above. While probably close to complete, this list did not allow the teams to determine the actual location of the families listed so was useless as a sampling frame.

The final sampling frame, then, was developed by fusing the census and the project listing of villages. All villages/sites from the census listing, whether they could be located or not or had been vacant when previously listed, were joined to the list developed by the teams during their visits to the field. This resulted in a list of more than 360 villages/sites. It is unclear how complete this listing is but appears to be more exhaustive than other list available. For this list, then, 30 clusters/sites were drawn based upon probability proportional to their estimated size. There was concern that the survey teams might not be able to find some of these sites despite aggressive and intensive searches. Ten "extra" cluster/sites were drawn as "extras" and the teams were instructed to conduct the surveys in those clusters if any of the clusters on their original list could not be located or was no longer inhabited. Such is the life of an epidemiologist trying to count and find nomads in the desert!

Of the forty clusters chosen, the survey teams were able to locate and survey 34. It was found that one village had been selected twice owing to it having multiple names. Three villages were either abandoned or no longer existed. Two villages could not be found.

In each cluster selected, ten women of reproductive age (15-49 years) and the mothers of ten children aged 12-59 months were interviewed. Survey participants were chosen at random from among the target population of the village/cluster. The survey teams chose a central point in each village/cluster. A direction was chosen at random ("spin the bottle" technique) and one interviewer proceeded in that direction and the

other in the exact opposite. Interviewers passed from household to household until the requisite ten interviews had been completed.

Due to the nomadic nature of the population, the teams had to deviate from the classic methodology for the selection of survey respondents. A cluster was, in some cases, defined as an encampment or tribe attached to a single leader (rather than a fixed, recognized geographic location). The survey teams made every effort to locate the population of the selected cluster(s) despite their dislocation. In instances where the requisite number of interviews could not be completed in a given site, households from the nearest neighboring village or encampment were used to complete the cluster.

The survey instruments developed and used were simple and intended to obtain information on the vaccination status of the interviewee. Both questionnaires are attached as Appendices to this report. Data regarding vaccination status were extracted from the interviewees "carte de vaccination" when available. In addition, a limited number of questions were asked regarding the availability of and demand for vaccination services and other curative services delivered by the teams. Simple questions were also included in order to see whether women and mothers had understood the simple educational lessons that the teams transmitted as part of their community mobilization activities and during their visits to vaccinate.

Survey data were entered using Epi-Info version 6.04b software developed by the Centers for Disease Control and Prevention, Atlanta, Georgia. Each questionnaire was evaluated as to whether the timing and sequence of vaccinations received was consistent with PEV Niger policy and vaccination coverage rates were estimated using COSAS (Coverage Survey Analysis System) software developed by the WHO for analysis of vaccination coverage surveys. Simple descriptive statistics were calculated using Epi-Info's ANALYSIS and CSAMPLE routines which are specifically for the analysis of cluster sample surveys such as the one reported here. This routine accounts for the effect of cluster sample methodologies on the estimated rates of coverage.

Project field personnel (vaccinators and supervisors) were interviewed. An open-ended structured interview guide was developed in French by the evaluation team with input from the project manager and field supervisors. The interviews sought team members feedback and insights regarding the project, its objectives and issues of its implementation. Interviews were conducted in French by the three survey team supervisors with all seventeen members of the five vaccination teams. A meeting was held with all of the team members and the field supervisors to explain the purpose of the interviews and to reiterate the confidential nature of the interviews.

The interviews were analyzed for common themes and the frequency of common responses.

The project manager and CARE country director were debriefed prior to the consultant's departure from Niger. A draft report was produced by the team and presented to relevant parties in both Niamey and Ziguinchor. Based upon their input, a final report was produced and submitted to CARE.

## **Results:**

### **► Services Delivered:**

In the discussions of project activities below, estimates of coverage of the stated target populations as expressed in the project objectives are given. These should not be confused with estimates of rates of vaccination coverage that may only be derived from a population-based sample survey (see results presented below). The discussions here present the potential contribution of project activities to the rates of vaccination that will be estimated using the survey data collected. In fact, the project represents the major source of vaccination services for the rural populations for most of the target populations. Other sources of vaccination services were the National Immunization Days (JNV) organized by PEV. The relative contributions of PN-40 and the JNV to the rates of vaccination coverage estimated by the evaluation survey cannot be determined.

It should be noted that the project objectives call for 60% of the target children to be "completely vaccinated". Project records only track the number of doses of individual vaccines administered or distributed. **They do not allow for the determination of the number or percentage of children who have received their full coverage** according to the established PEV calendar. The rate of coverage for complete vaccination can be no higher (and will almost certainly be lower) than that of the lowest individual antigen. Only through the population-based survey is it possible to estimate the number or percentage of children completely vaccinated.

A review of project records of the numbers of doses delivered by department is summarized in Tables 4 and 5 below.

**Table 4:** Reported Number of Doses Delivered by Antigen, Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	<b>Agadez (Oct 96-Jan 99)</b>	<b>Tahoua (Jan 98-July 98)</b>	<b>N'Guigmi (Jan 99 – Present)</b>	<b>Total</b>
<b>BCG</b>	16,221	24,380	10,925	51,526
<b>3 Doses Polio*</b>	14,164	21,454	6,684	42,302
<b>3 Doses DTP*</b>	13,286	21,187	6,689	41,162
<b>Measles</b>	18,421	58,695	10,961	88,077

\* : These figures are totals for DTP and Polio “third dose” as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

**Table 5:** Estimation of “Coverage”<sup>6</sup> by Antigen, Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	<b>Percent of Project Objective<sup>o</sup></b>	<b>Percent of Estimated Target Population</b>
<b>BCG</b>	179%	107%
<b>3 Doses Polio*</b>	147%	88%
<b>3 Doses DTP*</b>	143%	86%
<b>Measles</b>	306%	184%

<sup>o</sup> : Calculations based on revised estimations of target population by project as discussed above.

It is clear from the information presented that the project vaccinated a large number of children aged 0-59 months with each of the selected antigens in all three of the departments targeted. **PN-40 reported delivering more doses of all antigens than the estimated (revised) project objectives.** It also exceeded the original (unrevised) numeric objective of 34,621 children vaccinated (albeit not necessarily completely). The project reported delivering more doses of both BCG and measles vaccine than the total estimated child target population.

It is important to note that the **project objectives only represent 60% of the total estimated child population.** Therefore, for example, it is also important to look at the reported doses administered as a percentage of the total estimated target population as well. Again the reported results suggest **that the project was able to administer vaccine to a high percentage of all children 0-59 months in the target zones.** In fact, the records indicate that for two antigens, BCG and measles, it administered more doses to children than were estimated to be living in the project areas. Two explanations for this phenomenon seem most plausible:

- the population estimates were inaccurate and in fact too low; and/or
- the population estimates are correct and the PN-40 teams vaccinated children outside of the target age range.

An examination of the results by department suggest that a combination of these two explanations may be at work:

**Table 6:** Reported Number of Doses Delivered by Antigen, Children 0-59 Months, Agadez Department, Project PN-40, October 1996-January 1999

	<b>Agadez (Oct 96-Jan 99)</b>	<b>Percent of Project Objective<sup>o</sup></b>	<b>Percent of Estimated Target Population</b>
<b>BCG</b>	16,221	110%	66%
<b>3 Doses Polio*</b>	14,164	96%	58%
<b>3 Doses DTP*</b>	13,286	90%	54%
<b>Measles</b>	18,421	125%	75%

\* : These figures are totals for DTP and Polio “third dose” as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

<sup>o</sup> : Calculations based on revised estimations of target population by project as discussed above.

<sup>6</sup> The term “coverage” is used loosely here for the purposes of the Table title. It actually refers to the comparison of doses reported delivered against the project objectives. True coverage estimates can only be established based upon a population survey.

These results suggest that the **revised population estimates used by the project for Agadez may have been reasonably accurate and that the project was successful in meeting its objectives for the department.** It is worth noting that at the time of the mid-term evaluation in Agadez the project had met only 77% of its objective for BCG, 138% of objective for measles and 30% of objective for DTP/Polio dose 3 (recorded together at the time). The sharp rise in DTP/Polio dose 3 by the final evaluation may be attributed, at least in part, to the project's improved management and supervision systems implemented post-evaluation and the strategic decision to visit sites four rather than three times in order to increase the chances of children receiving all three doses.

**Table 7:** Reported Number of Doses Delivered by Antigen, Children 0-59 Months, Tahoua Department, Project PN-40, January 1998-July 1998

	<b>Tahoua (Jan 98-July 98)</b>	<b>Percent of Project Objective<sup>o</sup></b>	<b>Percent of Estimated Target Population</b>
<b>BCG</b>	24,380	198%	119%
<b>3 Doses Polio*</b>	21,454	175%	105%
<b>3 Doses DTP*</b>	21,187	172%	104%
<b>Measles</b>	58,695	477%	286%

\* : These figures are totals for DTP and Polio "third dose" as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

<sup>o</sup> : Calculations based on revised estimations of target population by project as discussed above.

It appears that while **the project successfully delivered an impressive number of vaccinations in Tahoua**, it should be noted that the census/SNIS based revised population estimates for the target areas in Tahoua are probably significantly lower than the actual population. Population estimates made by the teams of sites visited while they were in the field suggest that actual populations may be twice as high as those estimated using census/SNIS data. Therefore, the "true" level of coverage for the antigens does not exceed 100% as indicated above.

In addition to the doses of vaccine delivered by the project during its regular operations, PN-40 also participated in the MSP Journées Nationale de Vaccinations (JNV). The first round of JNV fell while PN-40 teams were in the field and results are therefore included in the regular project reports. This was not true for the second round of JNV (20-26 December 1998).

**Table 8:** Reported Number of Doses Delivered by During JNV Round Two, Children 0-59 Months, Agadez Department, Project PN-40, December 1998

	<b>Tahoua (Jan 98-July 98)</b>
<b>Doses of Oral Polio</b>	7,317
<b>Doses Vitamin A</b>	520

The number of measles vaccine doses delivered in Tahoua, however, appears to be out of line with the results for the other antigens even if population estimates are adjusted upwards. It is curious that the recorded doses for one particular antigen would be so different from the others. The results show that more than twice as many doses of measles vaccine were administered than any other antigen. It would appear that **in the case of Tahoua, the teams did not respect the target group ages for measles and apparently vaccinated a large number of children who should not have been included in the target group.** This represents a breakdown in the project's management and supervision systems. It appears that this problem was corrected by the time teams returned to Agadez and were sent to N'Guigmi.

It is interesting to note that a large percentage of the measles cases reported by the DDS in Agadez for 1998 and the first half of 1999 apparently occurred in individuals over the age of five years. This may be the result of two factors. Thanks to project efforts children under five years of age were protected and therefore the only population at risk were those under fives who were not vaccinated or those over fives who were not vaccinated due to the lack of services previously or had not developed immunity through contracting the disease. The percentage of persons in this second group may be particularly high among nomadic population such as those found in Agadez. Due to their dispersed and isolated lifestyle, individuals may not come in contact with the disease and develop natural immunity, leaving them vulnerable to periodic epidemics. This example underscores the need to develop special strategies and approaches to the delivery of health services to these populations.

**Table 9:** Reported Number of Doses Delivered by Antigen, Children 0-59 Months, N'Guigmi Arrondissement, Project PN-40, January 1999-Present

	N'Guigmi (Jan 99 – Present)	Percent of Project Objective <sup>o</sup>	Percent of Estimated Target Population
<b>BCG</b>	10,925	626%	367%
<b>3 Doses Polio*</b>	6,684	383%	230%
<b>3 Doses DTP*</b>	6,689	383%	230%
<b>Measles</b>	10,961	628%	377%

\* : These figures are totals for DTP and Polio “third dose” as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

<sup>o</sup> : Calculations based on revised estimations of target population by project as discussed above.

It seems clear from these results that the population estimates obtained for N'Guigmi obtained by applying SNIS estimated growth rates (in the case of N'Guigmi, SNIS has suggested an estimated annual growth rate of –1.1%) seem to be gross underestimates of the population of the arrondissement at this time. Other sources of population data suggest that the actual population of N'Guigmi may be as high as 44,000 (the running list of village populations developed by the project teams suggests it may be as high as 57,000) or as much as three times higher than census/SNIS based estimates. Dividing Table 10 results by three then, may be a more accurate reflection of the status of project activities in N'Guigmi at the time of the evaluation.

**Table 10:** Reported Number of Doses Tetanus Toxoid Delivered, Women 15-49 Years, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N'Guigmi (Jan 99 – Present)	Total
<b>2 Doses TT**</b>	16,984	26,754	6,010	49,784

\*\* : These figures are totals for TT “second dose” as reported on project activity reports. It is assumed that women recorded as having received the second dose actually received the first.

**Table 11:** Estimated “Coverage”<sup>2</sup> Tetanus Toxoid, Women 15-49 Years, All Departments, Project PN-40, October 1996-June 1999

	Percent of Project Objective <sup>o</sup>	Percent of Estimated Target Population
<b>2 Doses TT**</b>	150%	90%

<sup>o</sup> : Calculations based on revised estimations of target population by project as discussed above.

As with the child vaccines, Table 11 indicates that the project exceeded objectives for vaccinating women of reproductive age against tetanus. Population estimates for women used by the project may be lower than the actual populations as they appear to be for children (especially in N'Guigmi). More accurate estimates may serve to lower the percentage of the total population vaccinated somewhat. The same may be said with regard to project efforts to protect women and children through Vitamin A capsule distribution as seen in Table 12. None the less, these data indicate that the **project vaccinated an impressive number of women in N'Guigmi and may have significantly exceeded targets for these services** (see coverage survey below).

**Table 12:** Reported Number of Doses Vitamin A Delivered, Women 15-49 Years and Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N'Guigmi (Jan 99 – Present)	Total
<b>Capsules Vitamin A</b>	29,777	32,312	9,291	71,380

\* : Based on numeric objective of 70,177 capsules distributed as found in project agreement.

**Table 13:** Estimated “Coverage”<sup>2</sup> Vitamin A Delivered, Women 15-49 Years and Children 0-59 Months, All Departments, Project PN-40, October 1996-June 1999

	Percent of Project	Percent of Estimated
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	Objective <sup>o</sup>	Target Population
<b>Capsules Vitamin A</b>	114%	100%

Based upon consultation with experts from Helen Keller International, the project decided only to provide Vitamin capsules to women who had recently delivered a baby. This was done to avoid the possibility of giving Vitamin A to a pregnant woman and an potentially damaging the fetus.

Vaccination against meningitis is not part of the national PEV vaccination schedule for either women 15-49 years or children 0-59 months. Niger is part of the Sahelian “meningitis belt” and is at risk of periodic epidemics of the disease. The MSP does authorize vaccination of at risk populations in the case of an epidemic. In such a case, the PN-40 vaccination teams also vaccinated individuals against meningitis while they were in the field.

**Table 14:** Reported Number Doses of Anti-Meningitis Vaccine Delivered, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N’Guigmi (Jan 99 – Present)	Total
<b>Anti-Meningitis</b>	498	0	13,541	11,894

Teams in the field carried limited stocks of essential drugs in order to treat illness in the communities they visited. The teams also aided in the evacuation of certain individuals who required transportation to fixed medical facilities. Communities and district level medical teams were very appreciative of these services rendered by the PN-40 teams.

**Table 15:** Reported Number Curative “Services”, All Departments, Project PN-40, October 1996-June 1999

	Agadez (Oct 96-Jan 99)	Tahoua (Jan 98-July 98)	N’Guigmi (Jan 99 – Present)	Total
<b>“Services”</b>	6,642	3,005	3,609	13,256

There were no objectives (numeric or coverage) set for the delivery of these “services”. The original project paper called for their delivery “to the extent possible”. Clearly they only barely begin to address the health and medical needs of the populations in the project zones. There was a period when delivery of these “services” was suspended due to a lack of essential drugs for the teams to take with them to the field.

The 1998 Niger Demographic and Health Survey (DHS) (Enquete Démographique et de la Santé, EDS) provides a point of reference when analyzing project coverage results. According to the DHS the national coverage rates for children 12-23 completely vaccinated (BCG, DTP 3 doses, oral polio 3 doses, measles) is 17.9% (when verified by the presence of a vaccination card). DHS 1998 estimates the national rate for complete vaccination for children 12-23 months among rural populations to be 10.5%.(verified by card or mother’s recall) Zinder/Diffa (sampled and reported together by DHS) coverage rates were 10.1% (verified by card or mother’s recall).

**Table 16:** Comparison of Reported Rates of “Coverage” Project PN-40 and DHS 1999 Results for Individual Antigen Coverage

	Project PN-40 (Agadez, Tahoua, N’Guigmi)	DHS Reported National Coverage
<b>BCG</b>	104%	47.3%
<b>3 Doses Polio*</b>	84%	25.0%
<b>3 Doses DTP*</b>	82%	24.0%
<b>Measles</b>	182%	43.9%

\* : These figures are totals for DTP and Polio “third dose” as reported on project activity reports. It is assumed that children recorded as having received the third dose actually received the first and second.

#### ► Coverage Survey Results:

Table 17 suggests that the population surveyed is representative of and similar in demographic make-up to the general population of the N’Guigmi region. The sex ratio of the children surveyed and the age distribution of the women is reflective of the general demographic profile of the region as well.

**Table 17:** Demographic Characteristics of the Population Surveyed: N'Guigmi, Niger, August 1999

	Percent of the Population Surveyed
<b>Average age of children:</b>	33 months
<b>12 - 23 months</b>	22.4%
<b>24 - 59 months</b>	77.6%
<b>Gender of children:</b>	
<b>Male</b>	48.5%
<b>Female</b>	51.5%
<b>Average age of women interviewed:</b>	27 years
<b>Women's age:</b>	
<b>&lt;20 years</b>	18.0%
<b>20-34 years</b>	57.1%
<b>35+ years</b>	24.9%

As seen in Table 18, 91.2% of the children surveyed reported having been vaccinated at least once, although only 81.4% of the children had vaccination cards available at the time of the survey to verify the mother's account. The vast majority of mothers reported having benefited from CARE's immunization services. Less than six percent reported having benefited from other MSP immunization services. This is consistent with the notion that **Project PN-40 successfully targeted communities that had little or no access to routine vaccination services** (and probably no health services of any kind). Approximately three percent reported possessing a card, but that the card was inaccessible at the time of the interview. Four percent of mother's reported having lost their child's vaccination card, while an additional 2.7% reported that the child had been immunized but that he/she had not received an immunization card.

Of those who reported never having been immunized the primary reasons cited included:

- Absence;
- Failure to be informed;
- The team never passed; and
- Child was not ill.

**Table 18:** Vaccine Coverage of Children 12 - 59 Months, N'Guigmi, Niger, August 1999

	Percent of Estimated Population
<b>Child vaccinated at least once according mother's report</b>	91.2%
<b>Child vaccinated by CARE according to mother's report</b>	90.4%
<b>Child vaccinated at health center or clinic according to mother's report</b>	5.9%
<b>Vaccination card available</b>	81.4%
<b>Lost card</b>	4.1%
<b>Card inaccessible</b>	2.9%
<b>Immunized, but never had a card</b>	2.7%
<b>Never immunized</b>	8.8%

The project achieved a complete coverage rate of 45.1% of children 12 to 59 months of age. Table 19 presents the coverage rates for the various antigens administered to children under the age of five in accordance with PEV policy. The project successfully reached the majority of the identified population at least twice as seen by the high rates of coverage with BCG, measles antigens and doses one and two of DPT and polio antigens. Reaching a child the third time for the requisite three doses of polio and DPT antigens appears to have posed the project the greatest difficulty. This may be attributable in part to the time frame in which the project was implemented. The first two vaccination visits were made during a time when the majority of the nomads were relatively stable and clustered around water sources. The later three follow-up visits came during a period a high mobility and much greater population dispersal. Furthermore approximately 8.3% of children immunized by the project were not vaccinated/contacted for the first time until the fourth or fifth tour, making complete immunization impossible by the time of the survey. The project plans to continue to vaccinate after the survey in order to reach as many of these children as possible. It is likely that these children represent populations entering Niger from Tchad and Nigeria following seasonal patterns of migration.

**Table 19:** Coverage Of Children 12 - 59 Months By Antigen (verified by vaccination card only), N'Guigmi, Niger, August 1999

	Percent Of Estimated Population
<b>Verifiably immunized at least once</b>	87.6%
<b>BCG scar</b>	85.3%
<b>BCG</b>	79.1%
<b>DPT 1</b>	79.6%
<b>DPT 2</b>	69.3%
<b>DPT 3</b>	52.8%
<b>Polio 1</b>	77.9%
<b>Polio 2</b>	68.7%
<b>Polio 3</b>	53.7%
<b>Measles</b>	71.4%
<b>Completely Vaccinated</b>	45.1%
<b>Vitamin A</b>	70.2%
<b>VAM</b>	37.2%

Missed opportunities may also account for the slightly lower than anticipated complete vaccination coverage. A missed opportunity was defined as a child's encounters with the immunization team in which he/she failed to receive all of the age-appropriate immunizations. Missed opportunities pose significant threat to programs such as CARE PN40 in which the population is highly mobile and the chance of repeated contact with a child is relatively low. Analysis of immunization records available through vaccination cards indicated 30.8% of the children surveyed failed to receive at least one age-appropriate vaccination during an encounter with the vaccination team or received the vaccine and did not have their card correctly filled out. Eleven percent of children (30) failed to receive measles immunization or have their card correctly up-dated despite being 9 months or older at the time of an encounter with the team. Approximately 12% of children did not receive BCG immunization on their first encounter with the team. Of the 33 cases in which BCG immunization was delayed, 31 occurred during the first tour of the vaccination teams and may be attributed to the underestimation of the target population that resulted in a rupture of BCG antigen stock. Eight percent of children did not receive both DTP and Polio antigens during an encounter. Project managers suggested that this might be attributable to incorrectly completed vaccination cards, as this has been an issue identified during supervision of the field agents.

Despite the lower than anticipated vaccination coverage, the project achieved coverage rates using the mobile strategy that are far superior to the fixed/advanced strategy currently employed by the Ministry of Health. Table 6 compares the vaccination coverage found by the evaluation team in N'guigmi with the figures reported by the 1998 Demographic Health survey for all of Niger, rural Niger and the departments of Zinder and Diffa combined.

**Table 20:** Vaccine Coverage By Antigen Of Children 12-23 Months (verified by vaccination card only), N'Guigmi, Niger, August 1999

	% Estimated Population in N'guigmi*	% Niger Population** <sup>a</sup>	% Rural Population in Niger*** <sup>a</sup>	% Population in Departments of Zinder/Diffa*** <sup>a</sup>
<b>BCG</b>	71.1%	32.7%	38.0%	38.8%
<b>DPT 1</b>	71.1%	32.8%	36.2%	37.4%
<b>DPT 2</b>	59.2%	27.6%	25.1%	25.8%
<b>DPT 3</b>	47.4%	23.2%	14.6%	12.7%
<b>Polio 1</b>	71.1%	32.2%	44.3%	47.0%
<b>Polio 2</b>	57.9%	27.5%	30.0%	30.4%
<b>Polio 3</b>	46.1%	22.8%	14.6%	13.4%
<b>Measles</b>	53.9%	23.7%	27.85	22.4%
<b>Completely Vaccinated</b>	34.2%	17.9%	10.5%	10.1%
<b>Vitamin A</b>	55.3%	7.1%	5.0%	3.9%
<b>Never vaccinated</b>	9.2%**	40.0%**	47.3%	46.4%

\*According to vaccination cards

\*\* According to vaccination cards and the reports of the mother

<sup>a</sup> 1998 Demographic Health Survey of Niger

According to the project proposal, limited health education would be conducted to raise awareness about the project services and increase the population's understanding of the importance of immunizations. Messages included the importance of immunizations, the age at which a child could begin receiving immunizations, the immunizations the child was to receive, the importance of retaining the child's vaccination card in good shape, and the possible side effects of immunization. The majority of mothers interviewed reported the prevention of disease as the primary reason for immunizing a child, although 4.1% of mothers believed that immunization would cure illness (Table 21). Only 10.9% of mothers knew when a child could begin receiving immunizations. Almost three-quarters of mothers could cite at least one of the antigens their child had received, though many also cited antigens not received as well as protection against diseases not covered under PEV (diarrhea, fever, yellow fever, cholera, leprosy, stomach pain, myopia, varicella, and colds). Less than thirty percent of the mothers interviewed knew where their child could receive immunization if CARE's mobile team had not passed.

**Table 21:** Knowledge Of The Mother Regarding Childhood Immunizations, N'Guigmi, Niger, August 1999

	Percent of Population Surveyed
<b>Reason for immunization:</b>	
Prevention of diseases	64.9%
Cure illness	4.1%
Do not know	13.0%
<b>Age to begin child immunizations:</b>	
From birth	10.9%
1 month	11.5%
Do not know	59.6%
<b>Able to cite at least one of the immunizations the child had received</b>	72.1%

As seen in Table 22, 93.0% of the women surveyed reported having been vaccinated at least once, although only 77.8% possessed vaccination cards to verify immunization history. A high percentage of the women reported having received either two or three vaccinations. Seven percent of women reported having received immunizations, but reported that their vaccination cards were either lost or inaccessible. Approximately 8% of women reported having received immunizations, but never having received a vaccination card. Of those who reported never having been immunized, the primary reason(s) cited for not having received immunization was that the team had not passed through their village or encampment or that they had not been informed of the team's passage. Two women did however, report that they were refused immunizations.

**Table 22:** Availability Of Vaccination Cards Among Women 15 - 49 Years, N'Guigmi, Niger, August 1999

	Percent of Estimated Population
<b>Reported having been vaccinated</b>	93.0%
<b>Vaccination Card available</b>	77.8%
Lost card	5.0%
Never received a card	7.9%
Card inaccessible	2.1%
Never vaccinated	7.0%

All vaccination coverage rates estimated for the women are based on the documentation provided by vaccination cards only. Table 23 presents the findings of the cluster survey. According to the survey, **the project successfully achieved a complete vaccination coverage rate of 64.5% for women 15 to 49 years, as defined by the Ministry of Health as two tetanus toxoid immunizations four weeks apart.** The complete coverage rates are reduced by difficulties reaching women twice. As seen with the children, follow up of many of the women was lost during the third or later tour when the population became more mobile and disperse. An additional 34.3% received immunization against meningitis.

**Table 23:** Vaccination Coverage of Women 15 - 49 years, N'Guigmi, Niger, August 1999

	Percent of Estimated Population
<b>TT 1</b>	77.1%
<b>TT 2</b>	64.5%

<b>TT 3</b>	3.5%
<b>TT 4</b>	2.1%
<b>TT 5</b>	1.2%
<b>Meningitis</b>	33.4%

Table 24 depicts the results of the cluster survey as compared with the national results as reported in the 1998 Demographic Health survey by age group. As seen among the children, it is evident that **the mobile strategy employed by the project achieved coverage nearly three times that of the Ministry of Health's current fixed/advanced strategy.** The difference between PN-40 results and national results are even greater if urban areas were removed from the national rates.

**Table 124:** Vaccination Coverage of Women by Age Group, N'Guigmi, Niger, August 1999

	<b>% Estimated Population in N'guigmi receiving TT 1</b>	<b>% Niger Population receiving TT 1<sup>a</sup></b>	<b>% Estimated Population in N'guigmi receiving TT 2 or more</b>	<b>% Estimated Population in N'guigmi receiving TT 2 or more<sup>a</sup></b>
<b>Women &lt;20 years</b>	83.6%	34.5%	60.7%	19.2%
<b>Women 20 - 34 years</b>	76.2%	35.3%	66.8%	18.9%
<b>Women &gt;35 years</b>	76.2%	30.3%	63.1%	16.5%

<sup>a</sup> 1998 Demographic Health Survey of Niger

In the absence of CARE's mobile strategy, almost 40% of women indicated that they knew where they could go to receive immunizations, though the average distance required for her to travel was reported to be 41 km, several women citing distances exceeding 100km. Distances such as these mean that services delivered at fixed facilities are not accessible to these populations.

**Table 25:** Knowledge of the Woman Respondents Regarding Her Immunizations, N'Guigmi, Niger, August 1999

	<b>Percent of Population Surveyed</b>
<b>Reason for immunization:</b>	
<b>Prevention of diseases</b>	58.7%
<b>Cure illness</b>	5.7%
<b>Do not know</b>	22.9%
<b>Able to cite at least one of the immunizations they had received</b>	42.0%

As seen in table 25, a majority of the women surveyed knew that the immunization helped to prevent disease, though almost 6% falsely believed that immunizations cured disease. Only 42.0% of the women were able to accurately cite at least one of the immunizations they had received.

Although the focus of the project was not curative service, the vaccination teams did offer emergency basic treatment and evacuation services to individuals presenting at the time of a vaccination session. Approximately 40.4% of the respondents for the children's survey and 33.2% of the respondents from the women's survey reported that a member of their family had received curative services of some type from the project teams during their visits. An overwhelming 96.6% of the women reported being very satisfied with the services, both curative and preventive, that the project had delivered. Complaints focused primarily on the project's refusal to vaccinate adults and its inability to provide treatment to everyone who requested or needed it.

The vaccination teams discussed the issue of offering curative services at great length. Several team members expressed being caught between an ethical dilemma and a logistical nightmare. One vaccinator explained that they could not categorically refuse all curative care, given the population's difficulty accessing adequate medical services, but once they treat one truly ill person, many others create ailments to stock up on medicines, in turn depleting the team's supply. Should the team attempt to be more selective in

their treatment of the population, they were then accused of refusing treatment. The teams nor the evaluators were able to find a simple solution to this complex problem. **The provision of health services to these populations will continue to be a challenge to MSP resources and capacities for the foreseeable future.**

➤ **Results of Team Member Interviews:**

☒ **Team composition and relationships:**

The project has been operating in the N'Guigmi region using five teams of vaccinators. Each team included one MSP civil servant and 2-3 CARE-hired contractors as decided by project policy. The average length of service with the project was 14 months, although this ranged from 2 to 33 months. MSP civil servants had spent less time with the project, on average 4 months, while the CARE hired contractors averaged 20 months with the project (this is consistent with the project policy to rotate and change MSP personnel working with the vaccination teams more frequently). Most members of the team were satisfied with this arrangement and felt that it helped to improve relations with the CSI (15/17).

Team members suggested that the relationship between fixed health facility staff and CARE could be further improved by continuing to incorporate the MSP civil servants in all aspects of the project's implementation, within the teams as well as the supervisors. In this way communication between CARE and the MSP and the sharing of information at all levels would be strengthened and a climate of confidence and mutual respect fostered. The transportation of vaccines and staffing health dispensaries were often issues of conflict between the facility staff and CARE.

All vaccinators found their relationship with the other members of the team to be positive, though many proposed suggestions on how to improve relations even further. They underlined the need to divide tasks equally and assure that all members of the team understand their role(s). Mutual respect and dialogue between members of the team were seen as essential. The vaccinators reiterated the need for the team leaders to share information, to remain impartial, and to avoid being too authoritarian. Several vaccinators suggested exchanges of members between the teams to learn from one another and to get to know better the other members of the project.

☒ **Project objectives:**

The majority of the respondents (14/17) correctly described the project's objective to completely vaccinate 60% of women ages 15-49 and children ages 0-59 months. Others emphasized the project role in providing curative services.

All of the respondents felt that the objectives were both realistic and attainable, particularly given their experiences in Agadez and Tahoua. Several expressed their impression that project resources were sufficient to achieve and perhaps even surpass the objectives. The project time frame was perhaps too ambitious, given the difficult terrain and the mobility of the target population. Others expressed concerns related to the influx of people from Nigeria and Chad, as well as the birth of new cohorts that they felt would not be vaccinated by sustainable/routine MSP services. One respondent suggested that intensified health education efforts through opinion leaders and the heads of household would increase their likelihood of achieving the project's objectives

☒ **Training and Supervision**

All of the respondents were satisfied with the training they had received through the project. They did, however, suggest several areas where they would appreciate further instruction. These include:

- Vaccine related issues (conservation of the vaccines, the interval between doses, treatment of post-vaccination complications, vaccine administration errors and over dosage, etc.);
- Quality assurance;
- Conflict resolution;
- Information, education and communications strategies (IEC); and
- Curative treatment strategies.

These areas are, of course, the same areas in which they did receive training by the project. Training sessions for each of these topics were of several days duration and often used outside/non-project technical resources.

All of the respondents felt that the supervision they had received was positive and helped them to successfully carry out their work. The majority of the vaccinators (15/17) were very satisfied with their rapport with the supervisors. Most vaccinators (11/17) felt that they needed to be supervised at least once per field tour—or once per month. Four people preferred to have more frequent supervision, at least twice per tour—or per month. Only one person felt capable of performing with supervision on only a quarterly basis. Many vaccinators suggested extending the length of time the supervisors spend with the teams to 2-3 days, so that they can better observe and understand their work, the circumstances and team relations.

Other suggestions for improving supervision included conducting individual interviews with each of the team members, unscheduled visits, and practical demonstrations by the supervisors of correct/preferred techniques and method. Respondents emphasized the need to avoid contradiction between supervisors, to respond clearly to all questions and to assure all members of the team are informed of the results of the supervision. One respondent suggested that the supervisors leave the team with written documentation of the findings during the supervision to help them to recall the areas they need to improve. This was in fact the case. Each team did carry a notebook with them where the supervisor would write his/her comments at the time of the visit.

#### ☒ Knowledge and Practices

All of the vaccinators demonstrated a clear understanding of the key concepts relating to cold chain conservation and vaccination safety. Observations conducted in the field with three of the teams confirmed that the teams were following protocol relative to vaccine conservation and the disposal of used needles, syringes and vials.

#### ☒ Rapport with the Population

The majority of the respondents (15/17) felt that they had a good rapport with the populations that they served, yet they recognized that efforts must constantly be made to improve this relationship. One of the primary difficulties cited related to language barriers that necessitated the use of an intermediary. Several respondents suggested basic language training to allow the vaccinators to assure that messages are accurately transmitted. This likely relates to the need for increased health education that was expressed by half of the respondents. Many of the respondents emphasized their need to listen, remain open and sympathetic to the problems the population faces, to remain patient, friendly and welcoming and to have confidence in the population. One respondent suggested the need for more time to relax and speak with the population.

#### ☒ Difficulties Encountered

The principle difficulties encountered by the vaccinators revolved around maintaining the cold chain, difficulties accessing/finding the target population and communities, health education, and curative services.

Two teams expressed having encountered some difficulties relative to the maintenance of the cold chain. There was an apparent mechanical problem with two of the cold boxes that forced the teams to replenish their stocks in N'guigmi, therefore limiting their ability to reach certain populations until the problem was regulated. Other vaccinators also pointed to the reduced effectiveness of the refrigerators and cold boxes during the hot season.

Difficulties cited in accessing the population were related to the increased mobility of the population with the onset of the rainy season and the difficult terrain. Suggestions to overcome these complications included conducting a mobility study of the populations in the region, taking time prior to the initiation of activities to contact the tribal and camp leaders for information about the movement of their populations, and always using local guides. Others suggested conducting activities primarily during the cold season when the populations are less mobile and more stable. One vaccinator felt additional time was necessary to access the new populations that have begun to enter Niger from Chad and Nigeria with the onset of the rainy season.

Language barriers created difficulties communicating schedules, etc. to the population and transmitting health messages. Furthermore, respondents reported several instances where community leaders refused to allow the team to immunize their population. Vaccinators felt that with support from authorities and more appropriate health education methods and messages, some of these challenges could be overcome.

Curative care posed many problems for the vaccinators. One vaccinator explained that they could not categorically refuse all curative care given the population's difficulty accessing adequate medical services, but once they treat one truly ill person, many others create ailments to stock up on medicines, in turn depleting the team's supply. Furthermore the demand for curative services on occasion impeded immunization services.

### **Key Findings:**

The key findings of the evaluation team are listed below:

© **Project PN-40 vaccinated a significant proportion of the population of its target areas under insecure, physically hostile and extremely difficult conditions and deserves to be congratulated! This**

was accomplished in areas that have had no health services at all for a number of years. There still exists an obvious and significant demand for health services of all types in these areas.

© Project PN-40 has demonstrated the feasibility of operating in these underserved areas. CARE does not currently have resources to neither sustain project activities nor maintain a presence in the area. CARE has learned many lessons that would be of importance to other NGOs who wish to strengthen the delivery of health services in the area(s). CARE is in a position to provide important insight and/or technical leadership to groups wishing to support the development and improvement of services in these areas.

© Based upon project data for numbers of doses administered Project Pn-40 appears to have exceeded targets for individual antigen vaccination coverage.

© Coverage survey results indicate that despite its efforts, the project did not meet project objectives for percentage of children 0-59 months of age completely vaccinated (60%). None the less, the results achieved by the project are many times greater than estimates of national (especially rural) vaccination coverage rates. PN-40 represents a successful model for the delivery of vaccination services in these areas. This model will require modification and adaptation if it is to be expanded to include other curative or preventive services.

© The project made every effort to implement the recommendations of the mid-term evaluation report. Its efforts are evident in the improvement of coverage rates seen between the mid-term and final evaluations. The monitoring and supervisory systems were well conceived and implemented and had a direct effect on the project's ability to achieve high levels of coverage. These systems should be shared with the national PEV program should it undertake efforts to improve services in these or similar areas.

© The difficulties in carrying out field operations in the project areas and with the project target populations cannot be underestimated. The evaluators know of no existing models or examples of projects in similar circumstances which have shown greater levels of coverage or achievement.

© The national PEV program now realizes that it is not possible to achieve high levels of vaccination coverage in populations and areas such as those targeted by Project PN-40 through its current strategy(s) "fixte" and "avancé". The contribution of project PN-40's experience and results to this realization is not clear.

© The project made every effort to improve its performance and coverage through management "by the numbers", training and rigorous and frequent supervision. The failure to meet project numeric objectives as measured by the coverage survey is due, in the opinion of the evaluators, more to the difficulty of reaching the target population than a lack of effort or adequate management and supervision on the part of the project.

© Logistical arrangements made by the project appear to have been adequate. Occasional shortages of vaccine and other supplies and commodities were troublesome but often out of the control of the project. Project management procedures were implemented in order to limit logistics problems encountered by teams in the field and to keep them vaccinating.

© The project sought to establish appropriate levels of contact and collaboration with local administrative and MSP officials. These relationships proved highly beneficial to the project. The project also sought the support and assistance of armed rebel groups. The project effectively "walked the line" between these groups and was seen (correctly) as an independent and neutral body seeking to improve the lives and well-being of communities in the area and without political ties or agenda.

© The project did not receive substantial technical support from CARE/Niamey or CARE/Atlanta.

© CARE/Niamey did not maintain strong links to MSP and PEV officials at the central level. Opportunities for technical leveraging and/or linkages may have been missed as a result. In some instances field office staff were required to travel to Niamey to address problems and or pick up vaccine orders.

© The rates of coverage attained by the project are not (currently) sustainable by the MSP and PEV mechanisms in place. The PN-40 project was designed to address an acute shortage of services not to

**build the capacity to maintain acceptable levels of coverage in the project areas. Project implementation was consistent with this "emergency" or "catch-up" approach. Had sustained coverage been an objective, implementation would have been very different and emphasized systems and capacity building of public and other permanent structures and institutions more than it did.**

**© There are few things more sustainable than the immunity developed by a child who has been correctly and completely vaccinated and immunized. For all of the many women and children who were immunized by Project PN-40 the impact is 100% sustainable!**

### **Recommendations:**

The lack of available funding to continue project activities limits the scope of recommendations that this report may make. CARE/Niger has acquired a wealth of information about the communities living in the project area through its experience vaccinating their women and children and the House Hold Livelihood Security (HCLS) surveys that it has conducted throughout Niger (and specifically Agadez using PN-40 resources). The only role left for CARE/Niger to play is to provide technical insight and support to other donors, PVOs or government institutions attempting to assist in the re-establishment of health services in these areas. It might also act as an advocate and attempt to convince these institutions as to the importance in re-establishing a viable health service delivery system that includes all Nigerians no matter where they live.

CARE/Niger should seek appropriate for a in which it can present the results of the project to MOH and PEV officials. CARE/Niger should transmit the important conclusion of the PN-40 effort that: high levels of vaccination coverage cannot be achieved for populations living in the project areas (and others in Niger) through implementation of the existing "fixte" and "advancee" strategies. Additionally, the delivery of other curative health services through fixed centers alone, will never reach a large percentage of the population and will have limited impact (at best) on the high levels of morbidity and mortality seen in these communities. The usual and difficult environment and circumstances in which these communities live require different and creative approaches to delivery of health services. It must also be clearly understood that the cost per beneficiary of delivering services to these communities is necessarily much higher than in other areas of the country. Equity concerns of the MOH require that services to these communities will require greater subsidies and support from donors sources AND the MOH in order to achieve national standards and goals for health indicators. These communities cannot be ignored nor neglected even if national, aggregate health indicators appear acceptable.

CARE should be ready to play an important role, then, in discussion around the development of appropriate service delivery models capable of meeting the needs of these communities. These models will require a greater understanding of the seasonal movements of many of the communities and factors influencing their health care seeking behavior. The models will require operational testing in order to evaluate their effectiveness. The PN-40 model for the aggressive delivery of vaccination services through the use of mobile teams would appear to be ready for implementation and/or replication as documented in this evaluation report. CARE should attempt to identify donor support to continue PN-40 activities.

The delivery of other services is less clear. With funding, CARE/Niger should experiment with the use of semi-permanent health facilities. Using field tents, such facilities could "follow" communities in their movement by moving perhaps every three to four months. In this way a wider area could be covered (at a far lower cost!) than through building and staffing the many many fixed facilities that would be necessary to adequately "cover" and serve these communities as they trek across such huge expanses of territory.

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ATTACHMENT 1:

**Project PN-40 Goal and Objectives (October 1996 - June 1997)**

**Project PN - 40 Goal:**

- Ö *to reduce mortality and morbidity of children under five and women of reproductive age in the described zone of Arlit and Tchirozerine*

**Project PN - 40 Objectives:**

- Ö *vaccination of 18,000 children under five years of age (60% of the target group for the complete series recommended for this age group: BCG, oral polio, measles, DPT, yellow fever, meningitis)*
- Ö *vaccination of 4,500 pregnant women against tetanus (60% of the target group)*
- Ö *vaccination of 14,700 women of childbearing age against tetanus (60% of the target group)*
- Ö *distribution of Vitamin A capsules to 37,200 women and children (60% of the target group)*
- Ö *to the extent possible, on site treatment of emergency health conditions present at the time of the vaccination campaigns (burns, malaria, infections)*

ATTACHMENT 2:

**Summary of results PN-40 Mid-term Evaluation; August 1977**

**Table A:** Doses of Vaccine Administered by Project PN-40 to Children Aged 0-59 Months, Department of Agadez, October 1996-July 1997

<b>Antigen</b>	<b>Doses Administered</b>	<b>Percent Original Objective</b>
BCG	13,833	77%
Polio Dose-0	556	
Measles	24,780	138%
Polio-DTP Dose 1	16,112	
Polio-DTP Dose 2	9,613	
Polio-DTP Dose 3	5,443	30%

**Table B:** Number of Doses of Anti-Tetanus (TT) Antigen Administered Women 15-49 Years - Project PN-40, October 1996-July 1997

<b>Antigen</b>	<b>Doses Administered</b>	<b>Percent Original Objective*</b>
TT Dose 1	12,920	
TT Dose 2	8,128	42%
TT Dose 3	354	
TT Dose 4	202	

\* : Project records do not distinguish between pregnant and non-pregnant women. The numeric objectives for these two groups were added together to produce a single numeric objective for TT vaccination.

**Table C:** Number of Vitamin A Capsules Distributed - Project PN-40, October 1996-July 1997

<b>Antigen</b>	<b>Doses Administered</b>	<b>Percent Original Objective*</b>
Vitamin A	24,271	65%

**Table D:** Vaccination Coverage Rates Among 217 Children 0-60 Months by Antigen - North Agadez Project PN-40 Region - August 1997

<b>Antigen</b>	<b>% (n)</b>
BCG Scar	71.3% (144)
BCG Recorded on Vaccination Card	55.8% (121)
DPT Dose 1	57.1% (124)
DPT Dose 2	34.1% (74)
DPT Dose 3	17.1% (37)
DPT Booster Dose	4.6% (10)
DPT Complete Series	16.7% (36)
Polio Dose 0	10.1% (22)
Polio Dose 1	47% (102)
Polio Dose 2	31.3% (68)
Polio Dose 3	15.2% (33)
Polio Booster Dose	4.6% (10)
Polio Complete Series	14.7% (32)
Measles	58.5% (127)
Yellow Fever	7.8% (17)
Meningitis	16.1% (35)
Vitamin A (1 Dose or more)	34.6% (75)
<b>Completely Vaccinated</b>	<b>12.9% (28)</b>
<b>Children Aged &gt; 12 months</b>	<b>15.4% (25)</b>
<b>Completely Vaccinated</b>	

N.B.: the definition of completed series for both DPT and Polio antigens does not require the booster dose.

N.B. the definition for completely vaccinated includes one dose of BCG, three doses of DPT, three doses of Oral Polio and one dose of measles antigen.

**Table E:** Vaccination Coverage Rates Among 210 Women 15-49 Years by Antigen - North Agadez Project PN-40 Region - August 1997

<b>Antigen</b>	<b>% (n)</b>
BCG Scar	62.8% (130)
BCG Recorded on Vaccination Card	1.9% (4)
Measles	8.1% (17)
TT Dose 1	54.3% (114)
TT Dose 2	40.5% (85)
TT Dose 3	12.9% (27)
TT Dose 4	7.1% (15)
TT Dose 5	2.4% (5)
Yellow Fever	2.9% (6)
Meningitis (1 Dose or more)	16.7% (35)
Vitamin A (1 Dose or more)	17.1% (36)

N.B. The project only vaccinated women of child bearing age with (TT , three doses) and distributed Vitamin A capsules to these same women. Rates of other antigens are included only for the sake of completeness and comparison.

### ATTACHMENT 3:

#### **Summary of Recommendations,PN-40 Mid-term Evaluation; August 1997**

The mid-term evaluation recommendations to the project may be summarized as:

*“The project should:*

- Ö seek technical assistance as required to improve project monitoring and supervision systems including adoption of a quality assurance approach and techniques*
- Ö improve data collection, tabulation and analysis systems to provide a more accurate and timely picture of project activities*
- Ö streamline and improve administrative and accounting procedures where ever possible;*
- Ö develop a more strategic approach to the choice of vaccination sites that includes estimates of the potential population to be reached where possible*
- Ö explore possibilities to collaborate with MSP structures and personnel within the context of donor policy and guidelines*
- Ö undertake a third major campaign in the two original target arrondissements prior to expanding the project’s geographic boundaries*
- Ö develop, as part of quality assurance plans, a program for periodic training and retraining of project personnel in all aspects of their jobs*
- Ö reduce missed opportunities and protect every mother and child!”*