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Amélie Cardon Date

Evaluation of the Integrated Management of Childhood Illness Strategy in the Menoua Department – Cameroon

By

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Master of Public Heath

Hubert Department of Global Health

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Committee Chair

Evaluation of the Integrated Management of Childhood Illness Strategy in the Menoua Department – Cameroon

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Bachelor of Arts

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2008

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An abstract of

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ABSTRACT

Evaluation of the Integrated Management of Childhood Illness Strategy in the Menoua Department – Cameroon

By Amélie Cardon

Background: Between 1991 and 2011, the under-five mortality rate in Cameroon has made very little progress, slightly dropping from 126 to 122 deaths per 1,000 live births. As developing countries around the world renew their efforts to reach Millennium Development Goal 4 – Reduce under-five mortality by two thirds from 2000 to 2015 – Cameroon recently adopted the Integrated Management of Childhood Illness as a strategy to accelerate the reduction of under-five mortality.

Objective: This paper examines the effect of the Integrated Management of Childhood Illness (IMCI) program implemented by local organization Tockem, in the Menoua Department, to reduce under-five mortality in the department and provide a model to be replicated in other provinces of the country in an effort to achieve Millennium Development Goal 4.

Methods: Data on the knowledge and practices of mothers of children under the age of two were gathered in three IMCI intervention groups to determine the impact of the IMCI strategy on the health of children, and health behaviors of caretakers. A Knowledge, Practice and Coverage survey was performed using a 30x10 complex sampling method in each IMCI group to measure coverage of thirteen key health practices.

Results: There is no evidence that the IMCI strategy procured an advantage to the population served compared to the population living in non IMCI areas. In fact, coverage of child illness home-based management was found to be significantly lower in the IMCI area than in the two other areas. Overall, coverage of births assisted by a qualified attendant and of mothers who received at least two tetanus toxoid shots during their last pregnancy reached program goals.

Discussion: The full potential of the IMCI strategy implemented in the Menoua Department is not being met. Areas of weakness identified as priority areas are for the most part dependent on the work and performance of Community Health Workers acting as health messages relays for the community. Improved health behaviors and practices will necessitate continued supervision and evaluation of community health workers' performance by Tockem, along with supervision of health facility personnel by local health districts through a more efficient health system.

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LIST OF ACRONYMS

ACSD	Association Camerounaise pour la Santé et le Développement
ACT	Artemisinin based Combination Therapy
ARI	Acute Respiratory Infection
ARV	Anti-Retro Viral
ASDC	Association pour la Santé et le Développement des Campagnes
CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
C-IMCI	Community-Integrated Management of Childhood Illness
COGE	Comité de Gestion
COSA	Comité de Santé
DHS	Demographic Health Survey
ELANS	Ensemble pour L'Action Nord Sud
EPI	Expanded Program on Immunization
EPIDRI	Echanges et Partages Internationaux pour le Développement Régional Intégré
GAM	Groupement des Agriculteurs Modernes
HAZ	Height for Age Z score
IMCI	Integrated Management of Childhood Illness
IRB	Institutional Review Board
ITN	Insecticide Treated Net
KPC	Knowledge, Practices and Coverage
LLTN	Long Lasting Treated Nets
LQAS	Lot Quality Assurance
MCE-IMCI	Multi Country Evaluation of Integrated Management of Childhood Illness
MDG	Millennium Development Goals
MOH	Ministry Of Health
ORS	Oral Rehydration Solution
NGO	Non-Governmental Organization
PMTCT	Prevention of Mother To Child Transmission
SZ	Supervision Zone
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WHZ	Weight for Height Z score

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INTRODUCTION

In the past few decades, under-five mortality rates have steadily decreased in all regions of the world. In 2010, the number of deaths among children aged 0 to 59 months dropped to 7.6 million from a striking 12 million in 1990 [1]. Despite encouraging reductions, some developing countries will not be able to reach Millennium Development Goal 4 – to reduce under-five mortality by two-thirds by the year 2015. Only three years away from this deadline, many developing countries are evaluating progress made thus far and considering new, innovative and evidence based strategies to accelerate mortality reduction rates, and stay or get on the path to achieving MDG 4 in time. In Cameroon, strategies adopted to reduce under-five mortality have had very limited success as mortality rates stagnated over the past two decades and remain above 120 deaths per 1,000 live births [2-5]. Most deaths in the age group 0 to 5 years old are caused by preventable or treatable diseases including neonatal conditions (e.g., sepsis, asphyxia, tetanus), diarrhea, malaria, and measles, all exacerbated by under-nutrition [6]. Following demonstrated effectiveness of the Integrated Management of Childhood Illness (IMCI) in increasing coverage of key child health practices in the East Province, the government of Cameroon included the WHO recommended strategy in its 2001 Health Sector Strategy paper, and committed to the implementation of the strategy in 80% of all health districts by the year 2010 in an effort to finally reduce stubbornly high under-five mortality rates. The IMCI strategy is a three pronged childhood illness case management approach centered on the idea of “the whole child”, a concept that encourages health workers to

look for and address all symptoms presenting in a sick child, improves the health system's efficiency, and uses communities and families to promote healthy growth and development of the child. As of 2009, only 10% of all health districts in Cameroon had initiated IMCI implementation [7].

This study examines the effect of IMCI implementation in the Menoua Department – West Province of Cameroon – by Tockem, a local community-based organization that has catalyzed development in the region since the late 1970s under the initiative of Dr. Pierre-Marie Metangmo, traditional chief of the small village of Ntsingbeu, through the Integrated Development Model. Several key indicators of knowledge and practices of the caretakers were measured through a Knowledge, Practices and Coverage survey using a systematic cluster sampling methodology across three distinct intervention groups in order to determine whether IMCI implementation in the Menoua Department resulted in better health behaviors and awareness among caretakers living in IMCI areas compared to those living in non-IMCI areas. Results of this study primarily serve information needs of the multiple stakeholders involved in the implementation of the IMCI strategy in the Menoua Department and help them identify areas of strengths and weaknesses that should be addressed or built upon in the future of the project to continue moving towards reduced morbidity and mortality among children under five in the department. Thus, the study not only provides evidence regarding the current level of effectiveness of the IMCI strategy in part of Cameroon, but perhaps even more importantly could serve to equip provincial, national and international actors with new evidence regarding key issues that need to be addressed to increase the effectiveness of IMCI in a high mortality and

resource poor context when planning expansion of the strategy to health districts across Cameroon.

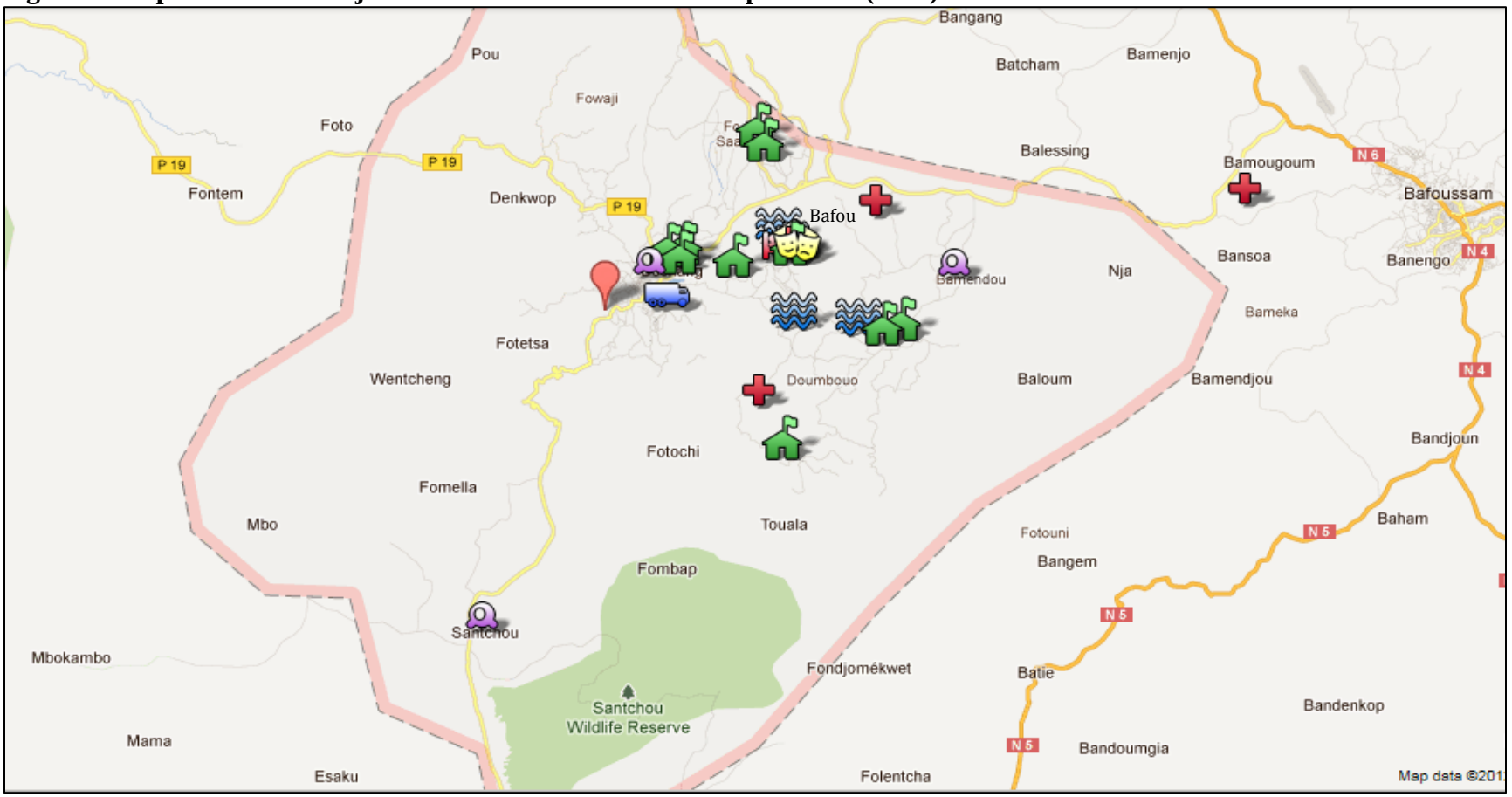
So far, studies have shown mixed results in evaluating the impact of IMCI on under-five morbidity and mortality across regions. As expected, the context, effort and investment made by all stakeholders, as well as compliance with guidelines of all three IMCI components, all play a role in changes observed in the health and behaviors of a population following implementation of IMCI in a country or region. With this study, we hope to provide further evidence on how this process may result in observed health and behavior changes, and to identify specific key community knowledge and practices which may be more resistant to change and require more attention from local and international players.

THE INTEGRATED DEVELOPMENT MODEL IN THE MENOUA DEPARTMENT – CAMEROON

In 1978, Pierre-Marie Metangmo, a student at l'Université Catholique Medical School – Lille, France – founded the Integrated Development Project in his native village of Ntsingbeu located in the Bafou subdivision of the Menoua Department. The goal of this venture was to promote development through a range of initiatives integrating basic economic and social programs selected by the community [8]. Throughout the 35 years since the start of this unique development initiative, community associations were created to manage and oversee each project – including farming and agroforestry, building of schools, and building, equipment, and management of health centers – in an effort to facilitate the translation of community needs into impactful activities. Some of these associations no longer exist but the "Integrated Development Movement" remains and new organizations are taking the lead.

In 2001, Tockem was launched to act as the sustainable tourism arm of the Integrated Development Project [9]. In partnership with ELANS (Ensemble pour L'Action Nord Sud), a French NGO dedicated to promote community driven, participative and sustainable development, Tockem grew from being a tourism platform to one that jointly oversees initiatives promoting the environment, education, health, and institutional support in the region [10, 11]. Today, Tockem continues to follow the integrated framework developed by the Integrated Development Project in an effort to achieve sustainable development for the communities of the Menoua Department.

Figure 1. Map of Tockem Projects and Activities – Menoua Department (2011)



THE INTEGRATED DEVELOPMENT PROJECT

Agriculture

Farming and husbandry are the principal economic activities in Bafou. As early as 1978, the Groupement des Agriculteurs Modernes (GAM) – Modern Farmers Group – was founded in Ntsingbeu, a small village of Bafou [12]. The group gathered local farmers in a cooperative pooling individual resources together and using modern farming and husbandry techniques to increase production and accelerate economic development of the community.

In the late 1980s, a new community driven group called the Association pour la Santé et le Développement des Campagnes (ASDC) – Cameroonian Association for Health and Countryside Development – was charged with overseeing activities of GAM, offering training in modern and environment friendly techniques. ASDC also managed the Rural Development Council (BCDR) and partnered with French NGO EPIDRI (Echanges et Partages Internationaux pour le Développement Régional Intégré) for funding and development of future activities.

Throughout the course of its existence, GAM has taken on a series of initiatives including agroforestry, gardening, pork sausage production, and poultry and eggs production. The latter perpetuated and stays the principal activity of GAM to this day, providing local farmers with a platform through which they obtain necessary training and get access to local markets. Products are sold at low prices in an effort to increase access and intake of

proteins within the community for improved nutrition. The reach of the activities extends as far as Bafoussam, capital of the Western Province of Cameroon. Beyond agricultural activities, GAM contributed to the community's development in its early years through the construction of a community center, two roads and a bridge, and a kindergarten [12].

In 1994, GAM's activities management, once more, changed hands and was transferred to the Association Camerounaise pour la Santé et le Développement (ACSD) – Cameroonian Association for Health and Development – a new community organization that introduced the first health projects in the area, a priority need identified by the communities as farmers and their families suffered from productivity loss caused by endemic malaria [12].

Youth Empowerment

Training Center for Young Girls

As early as 1994, communities in the Menoua Department, more specifically in Ntsingbeu, identified an increase in teen pregnancy among girls who dropped out of school or whose parents could not afford to pay for school fees. The young mothers did not have the skills or knowledge necessary to manage their lives and take on wage earning activities while caring for their children. Those who went off in early marriage similarly had not acquired the skills to manage a home.

In an effort to reduce teenage pregnancy and provide young girls with a set of skills that would allow them to successfully manage and provide for their households, a training

center for young girls was erected under the initiative of ACSD in partnership with EPIDRI [12]. Each year, the center welcomes a class of approximately 15 girls who are offered courses in French, accounting, cooking, gardening, sowing, knitting, braiding, and textile dyeing in a two year program [12]. Girls who have graduated the school put their skills to use working in local restaurants, and setting up their own tailor shop or hair salon. These young women have also become more marriageable as they have acquired skills that will enable them to manage a household. Most importantly, the community has since then seen teen pregnancy rates decrease [12].

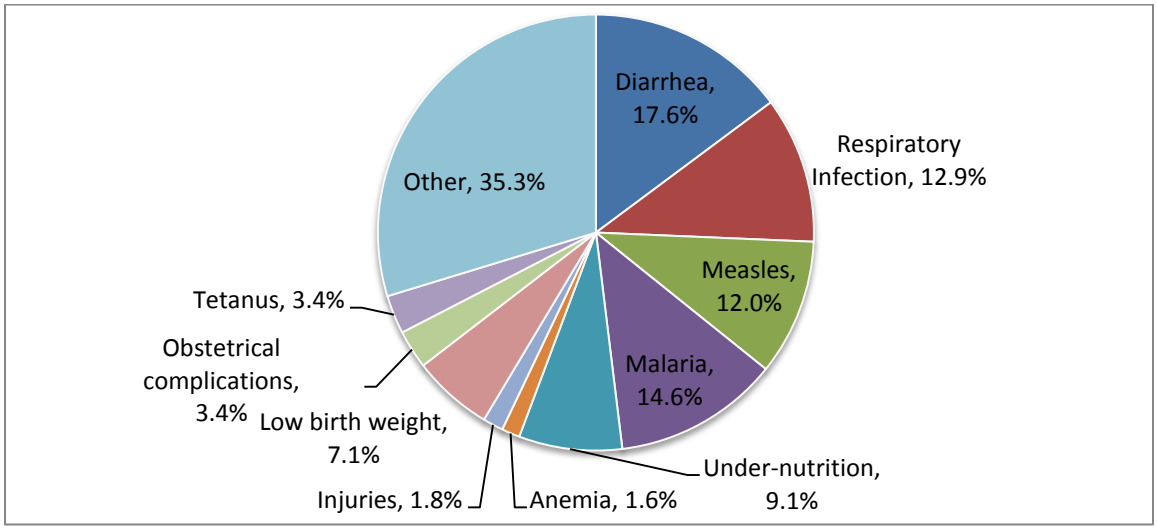
Center for the Youth and Culture

The future of any community lies in its youth [8]. Yet, in the rural area of the Menoua Department, there exists virtually no structure to foster the energy and drive of young generations and direct them towards positive behaviors and practices for a more vibrant and engaging community. In the late 1990s, the Center for the Youth and Culture (MJC) was built to serve the children and young adults of Bafou. There, young people aged 5 to 25 years old are invited to gather and participate in a wide variety of activities including, computer science classes, trivia and other games, theater, book clubs, and soccer tournaments. At the Center, youth are also introduced to local and world issues including waste management and hygiene issues in their village, and also broader issues of education or politics at a national or global scale. The Center is open to all youth with a negligible membership fee to help the staff continue to provide optimal activities and services for the youth in the area.

Health Centers

The health of the populations has always been a critical component of the development strategy proposed by the Integrated Development Project. In 1991, the Demographic Health Survey (DHS) reported an under-five mortality rate of 109.3 per 1,000 live births in the Western and Littoral region [2]. Further exploration of causes of death through verbal autopsies, identified neonatal conditions, malaria, pneumonia, measles, diarrhea and under-nutrition as the major causes of mortality in Cameroon (see Figure 2) [13].

Figure 2. Causes of under-five Mortality in Cameroon (1991)



Source: Direction Nationale du Deuxième Recensement Général de la Population et de l'Habitat and Macro International Inc., *DHS Final Report: Causes de décès des enfants*, 1991

Similar patterns could be observed in the Menoua Department where utilization of health services was a real challenge for isolated communities without proper roads or transport to reach the nearest health center. In response to the obvious lack of access to appropriate health services, ACSD built or renovated, equipped and supervised health centers around the commune of Bafou in the villages of Ntsingbeu, Fonakeukeu, Nkah, Baneghang, Sa'a, and Njieubou increasing access to health facilities for all within the area [12].

TOCKEM

In 2001, Tockem was launched to act as the sustainable tourism association of the Integrated Development Project adding to the existing agricultural, educational, and health activities in Ntsingbeu and the Menoua Department.

Tourism

Economic stimulation of the area is indispensable for development of any community. Though economic stimulus was initiated in 1978 with the creation of GAM, potential for the development of touristic activities around Ntsingbeu soon became evident as French volunteers poured in to participate in development activities celebrating the region's culture and people. In 2001, Tockem became the tourism arm of the Integrated Development scheme and is registered as a local NGO [9]. The goal of Tockem-Tourisme (Tockem-Tourism) was to use tourism as a tool for development through the creation of jobs to provide local alternatives to migration of the population, especially the youth, towatds the city in search of employment [14].

A tourism structure was opened in Ntsingbeu offering tourists a chance to live within and learn from Western Cameroonian individuals, families, and communities. Excursions and activities included participation in the cultural events and ceremonies of the village, and dinner with local families. Hikes in the tea plantations of Bafou, visits to a volcanic lake, natural waterfalls, local chiefdoms and museums, and the famous Sultan's palace in Foumban were also added to the program. To this day, over 1,000 tourists have stayed at

Tockem-Tourisme [14]. Over time, the profile of the tourists has shifted from a clientele predominantly coming from France to a clientele increasingly coming from other regions of Cameroon.

The project has successfully stimulated the economy of the small village by hiring a team of 8 staff members including young women who graduated from the Training Center for Young Girls, and by opening a small ethical gallery where residents of the village can sell hand made products such as marmalade, crafts, and clothes. Overall, 15% of the benefits from the tourism activities are reinvested into other development projects such as water access, building of new classrooms, and wages of school teachers. Through these investments, Tockem has become the new lead organization in the continuance of the Integrated Development Project of 1978.

Education

Improving access to quality education for all children has long been a concern for communities and parents in the Menoua Department. Most schools are deprived of the necessary teaching staff and material to manage very large classes sometimes counting up to 100 students. In addition, failing and drop-out rates are high. In light of this issue, Tockem is working hard to improve access to education but also to improve the quality of education and material conditions in schools for a more stimulating environment and increased primary and high school graduation rates in the department.

Building new classrooms

Tockem recognizes the role and importance of a proper education for the growth and development of communities around the world. In the Menoua Department, existing schools struggle with poor infrastructures and crowded classes where six students often squeeze on one bench designed for two; and where one room contains several grade levels making the teaching process extremely challenging and depriving students of an adequate learning environment.

Through the past few years, Tockem has built more classrooms in schools around the department. This effort led to the construction of two classrooms in the community of Aghang with funding from partner organization ELANS, a French non-profit. In addition, four classrooms were erected in the village of Ntsingbeu all equipped with benches, blackboards and other essential classroom supplies [15]. In high schools, Tockem works alongside the Menoua Department administration to provide informatics equipment and training, and to introduce students to computer technology and internet databases.

Empower the Youth

Tockem also supports both the Training Center for Young Girls and the Center for the Youth and Culture in their mission to provide young generations with the tools and skills that will help them take their future in hands and continue to strive for a sustainable development of the communities in the Menoua Department, the Western Province and the rest of Cameroon.

Environment

In its integrated approach to sustainable development one of the key values promoted by Tockem is environment protection. In fact, the health of the environment and its impact on neighboring communities is an integral part of Tockem's strategy. A few years after its creation and with the participation of communities, authorities and funding partners, Tockem identified waste management and water access as two of the most pressing issues in the area.

Waste Management

In Cameroon, lack of appropriate household waste collection practices, proper disposal sites, waste management regulations, and public awareness have led to the flourishing of uncontrolled dumps especially in cities where they have become a real public health concern [16].

The city of Dschang – the administrative center of the Menoua Department – is no stranger to the problem and faces even greater challenges as the local waste collection trucks are for the most part inoperative [17]. To solve the problem, Tockem partnered with the municipality of Dschang to launch a large waste management initiative in 2005 with the ambitious goal of raising the household waste collection rate from 30% to 80% [18]. To achieve this objective Tockem works to establish collaboration and partnerships with the provincial and national authorities for logistical and material support [17, 19]. Along with increased waste collection rates, Tockem-Environnement (Tockem-Environment) aims to reduce the number of illegal dumping sites in the city from 40 to

25 by identifying and regulating appropriate dumps that will be managed by staff trained in landfilling and composting techniques [18]. Most importantly, Tockem prioritizes community approaches to the issue and seeks to encourage community behavior change through outreach activities, and radio programs inviting listeners to call in for information on waste management, recycling and composting [19]. In schools, Tockem organizes a contest called "My clean school" where pupils are instructed on waste management and recycling issues and run for the title of "Cleanest School in Town" awarded each year during National Youth day.

Agents of Change

True to its vision of a community development coming from within, Tockem recently started a microfinance initiative through which a select number of individuals receive loans to start a small business of their choice. Beneficiaries are selected on the quality and feasibility of their business plan, but also in consideration of their role within the community and their will to work towards a healthier and wealthier community. Along with seed funding, the group of "agents of change" receives training on key health behaviors including waste management practices, safe water consumption, and Insecticide Treated Nets (ITNs) use. By changing the behaviors of these individuals well connected to the rest of the community, Tockem hopes that their progress in development will serve as an example and spread to their neighbors for a cleaner, healthier community [20]. Currently, the project is in pilot phase in Ntsingbeu where a dozen Agents of Change are working to expand their business activities and reimburse their loans.

Water access and sanitation

Access to improved water systems in Cameroon is very limited. According to UNICEF reports, 26% of the total population of Cameroon does not have access to improved drinking-water sources, half of which live in rural areas [21]. In the Menoua Department, Tockem oversees several water access and sanitation projects including the construction of wells and installation of latrines in schools. With increased access to clean water and proper sanitation systems, young pupils are introduced to the benefits and importance of hand washing with soap and consumption of safe water. They will then serve as agents of change themselves sharing hygiene messages with their families.

The organization also drilled boreholes and wells in several villages of the Nkongzem commune where each project is accompanied by the creation of a water board committee [22]. These committees are trained on water system maintenance and outreach strategies to encourage the community to use and store the water in hygienic conditions so as to prevent incidence of waterborne diseases such as diarrhea – a disease that claims a very high portion of under-five deaths.

Finally, agents of change also contribute to increased access to clean drinking water by building, using, and promoting low cost bio sand filters that are locally manufactured and can produce up to 24 liters of purified water per hour. Similar systems have been seen in Eastern Cameroon where UNICEF works to provide families with simple water treatment techniques [23].

UNICEF Biosand filters used in Cameroon

Biosand filters built by agents of change with support from Tockem – Ntsingbeu (2012)

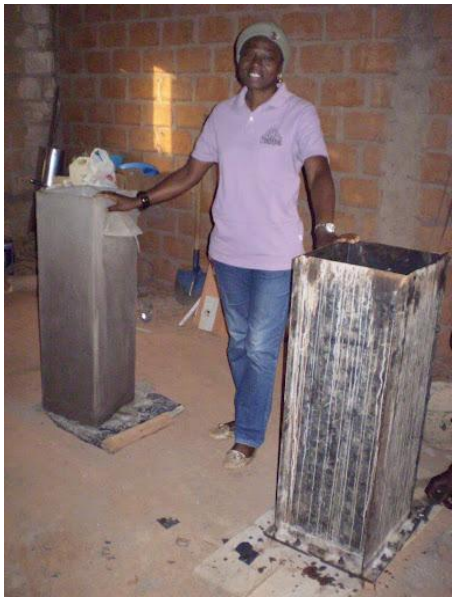


Photo: Ghislain Berlan, ELANS Executive Board Member

Health

Upon the creation of Tockem, ACSD's activities slowed down and the association was ultimately dissolved. However, main stakeholders and actors in the development efforts continued to recognize the importance of health interventions as the area still crippled under disabling disease prevalence primarily affecting young children. The 2004 DHS survey revealed that under-five mortality was not decreasing in Cameroon. At the time,

the under-five mortality had actually risen from 109 per 1,000 in 1991 to 126 per 1,000 in the Western region while causes of deaths remained unchanged [2, 4]. Despite efforts made to improve access to health services in the Menoua Department, local health authorities agreed that mortality reduction in the region demanded greater input, and more structural and capacity support than what had been done in the past.

In January of 2006, Tockem created its Health Branch in partnership with ELANS for the implementation of new health activities in the region [9]. Tockem-Santé (Tockem-Health) immediately recognized the need for a strategy centered on the community to improve health outcomes for all, but most specifically for children under the age of five in the Menoua Department. With the community as the main stakeholder, Tockem also recognized the role of the health system and its impact on the health of populations. As such, the organization encourages the establishment of strong and sustainable relationships between communities and primary health care structures so as to create a channel of information from the community to health structures and authorities and vice versa in order to foster improved services and outreach.

Tockem-Santé also believes that improved health within the communities of the Menoua Department will require increased awareness of key behaviors to prevent and treat diseases at the community level, and contribute to the growth and development of healthy individuals. In an effort to connect health system capacity building and community behavior change, Tockem launched the Integrated Management of Childhood Illness

(IMCI) program throughout the Menoua Department in 2007, in collaboration with the three local health districts [24]. Details of the IMCI strategy are discussed below.

Institutional Support

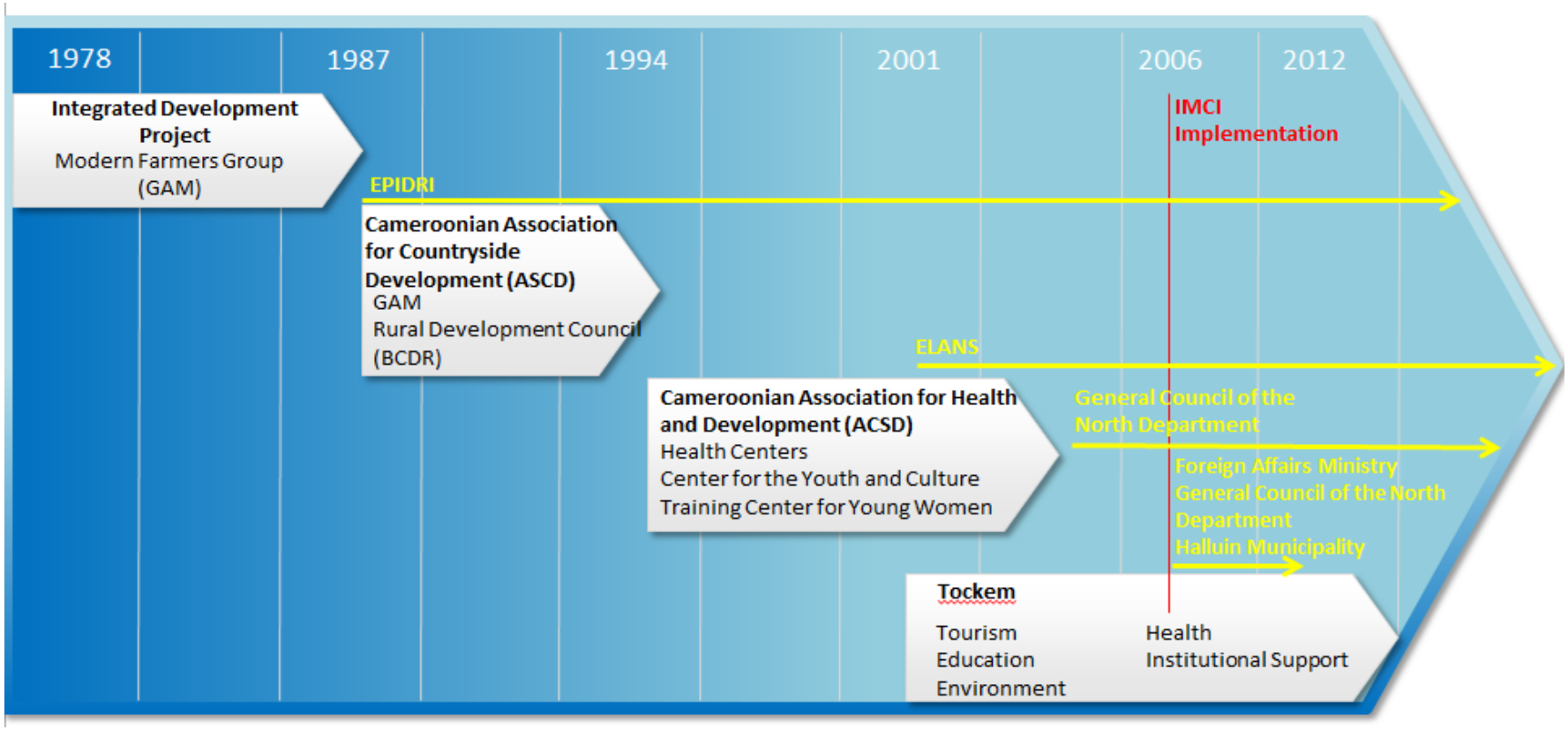
The establishment of strong and well-staffed institutions and administrations is critical for the provision of essential public services and fair governance. As part of their partnership with the General Council of the North Department of France through ELANS, Tockem has undertaken an institutional capacity building program to support the municipalities of the Menoua Department. Through the program, Tockem offers a variety of training opportunities for the representatives and administrative staff to provide them with additional skills to better manage local affairs and fulfill their respective duties [25]. In addition to the professional trainings, Tockem equips each municipality with electronic appliances as needed to upgrade the archives and other documenting systems of each administration.

Thanks to these activities, Tockem was able to build strong relationships with the population's legal representatives and successfully implement strategic projects which necessitate support from the local authorities such as the household waste management initiative described earlier.

In conclusion, Tockem is a very unique organization that seeks to promote development of communities around the Menoua Department by tackling a variety of different social

and economic issues following an integrated model close to the one presented by the Millennium Villages. The organization emanates from, and follows principles introduced in the region over thirty years ago through Dr. Metangmo's Integrated Development Project (See Figure 3). Through the decades, the movement has challenged the pessimists and demonstrated that it is possible to implement successful projects by involving both the community and the local authorities [8]. Still, Tockem's integrated scheme has yet to produce optimal results and pass the test of time proving that it is in fact a sustainable one.

Figure 3. INTEGRATED DEVELOPMENT PROJECT TIMELINE



Legend:

Funding Partners
IMCI Implementation

THE MENOUA DEPARTMENT

Background

The Menoua Department is one of 8 departments of the West Province of Cameroon (see Appendix A). Located South of the West Province, the department counts a total of about 320,000 residents most of whom live in rural areas (other sources have estimated up to 500,000 residents in the area. See Table 2) [26]. The population density of the area is well above that of the country as a whole with 230 inhabitants per km^2 (vs. 42 per km^2 for Cameroon) and its area is 1380km^2 [26].

The temperate weather in the Menoua Department with average temperatures around 69°F, precipitations between 1800mm and 2000mm over the span of 9 months between March and November, high altitude, and rich soil make the region highly favorable for agriculture, the principal economic activity of the department [27]. Common crops in the region include corn, cassava, potatoes, bananas, plantains, peanuts, tea and coffee which make the West Province, the leading agricultural province of Cameroon.

Beyond the advantageous environment, it is thought that the social structures of chiefdoms in the Menoua Department also played a part in acquiring the role of a leader within the West Province and the rest of Cameroon. A number of produce are crops regularly used in traditional ceremonies and events including weddings and funerals [27].

Mastery of agrarian techniques to provide these essential goods for the community has allowed the region to acquire a large portion of the local and national market.

Despite its dynamism, lack of educational and sanitary structures, and the low rates of employment in non-agricultural sectors have led to massive exodus of young generations to the cities in other departments depriving the Menoua Department of its development force [28].

Socio-demographic characteristics

The socio-demographic data collected by the national bureau of statistics of Cameroon during censuses is generally reported at the larger provincial level as opposed to the more disaggregated departmental level. As a consequence, a complete socio-demographic profile of the Menoua Department could not be developed. Nevertheless, it is worth noting that in 2010, the West Province had one of the highest employment rates among heads of households across the country with 75.5% of these individuals holding a job, mostly in the informal sector [29]. Furthermore, women constitute over one third of all heads of household in the West Province (35.2%); making the province rank first in proportion of female headed households in the country [29]. Most heads of households are married in a monogamous union and almost one third have received no education at all (See Table 1) [29].

Table 1. Heads of Households Socio-Demographic Characteristics – West Province (2010)

Characteristics	Proportion of heads of household (%)
Marital Status	
Single	12.8
Monogamous union	45.3
Polygamous union	11.1
Cohabitation	1.5
Separated	1.2
Divorced	1.4
Widowed	19.7
Education	
None	30.7
Primary	37.6
Secondary	25.2
Higher	6.5
Religion	
Catholic	34.0
Orthodox	0.3
Protestant	20.5
Other Christian	2.0
Moslem	20.9
Animist	9.1
Other religion	0.7
Free Thinker	11.6

Source: Takwa T. J., *Socio-Demographic Situation of Ordinary Households*, 2010

Administrative System

The Menoua Department is under the administration of a prefecture based in the city of Dschang, its administrative center. It has five divisions; each administered by a sub-prefect, and all further divided into local subdivisions as shown in Table 2.

Table 2. Menoua Department Administrative Organization (2010)

Divisions and Subdivisions	Population
Dschang	**175,594**
Foto	38,362
Fongo-Tongo	23,432
Foréké-Dschang	21,438
Fongo-Ndeng	7,427
Fossong-Wentcheng	7,427
Fotetsa	5,121
Fossong Ellelem	3,140
Dschang ville	75,478
Fokoué	**16,420**
Fomopea	4,574
Fontsa-Toula	3,293
Fotomena	2,671
Fokoué Village	2,403
Fokoué Ville	2,353
Bamengwou	1,126
Nkong-Ni	**99,341**
Bafou	72,232
Baleveng	27,109
Penka Michel	**118,829**
Bamendou	42,315
Bansoa	37,202
Balessing	18,544
Baloum	10,352
Penka Michel Ville	10,416
Santchou	**36,772**
Sanzo	12,348
Fombap	3,188
Fondonera	12,510
Santchou Ville	8,726
Total	**446,956**

Source: Fleury C., *Etude de cas dans le département de la Menoua au Cameroun: Quelles solutions pour une amélioration de la santé infantile dans les pays en développement?* 2010

Health System

The Menoua Department is divided into 3 health districts (public sector): Dschang (consists of the administrative divisions of Dschang, Fokoué and Nkong-Ni), Penka Michel, and Santchou; each managed by a physician chief of the health district who reports to the provincial health administration in Bafoussam, capital of the West province. Each district hosts various types of public and private health providers. However, in 2010, the ratio of health professionals to population was extremely low (See Tables 3 and 4). Evidently, lack of health personnel is a great barrier to the provision of optimal health care. Access to proper health services is further inhibited by the fact that services can be costly especially for the very poor who may resort to using the informal health sector including traditional healers or street vendors when seeking care. In 2009; the annual expenditure on health per capita in Cameroon was found to be around $26, while the annual GDP per capita reached $1136 [30, 31].

According to calculations made by the three local health districts in 2011, children under one represented 4% of the total population or about 12,800 infants in the Menoua Department. Overall, there were over 57,600 children under the age of five (18%) and 16,000 pregnant women (5%) [32, 33].

Table 3. Number of Health Facilities and Specialized Health Personnel by Health District – Menoua Department (2010)

District	Pop size	Public hospitals	Private hospitals	Sub divisional health centers and district hospitals	Health centers	Specialists	Health technicians	Dentists
Dschang	268,000	1	4	3	35	0	2	1
Penka Michel	111,808	1	3	1	13	0	1	0
Santchou	27,811	1	3	0	3	0	0	0

Source: Fleury C., *Etude de cas dans le département de la Menoua au Cameroun: Quelles solutions pour une amélioration de la santé infantile dans les pays en développement?* 2010

Table 4. Ratio of Health Workers to Population – Menoua Department (2010)

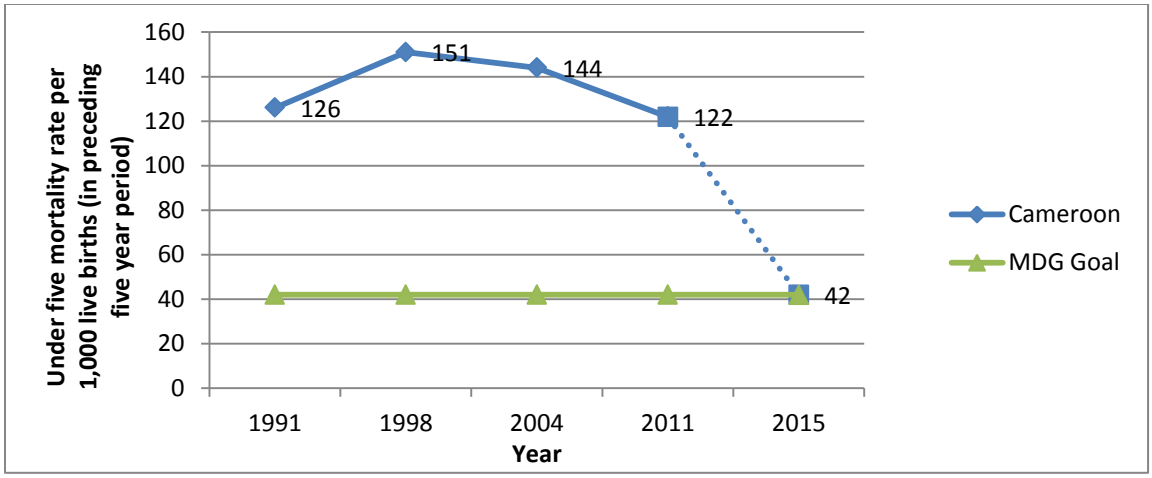
District	Pop size	Doctor	Ratio of Doctors to population	Registered nurse (RN)	Ratio of RNs to population	Certified nurse	Ratio of Certified nurses to population	Total Ratio of nurses to population
Dschang	268,000	14	**1/19,143**	61	1/4,393	79	1/3,392	**1/3,350**
Penka Michel	111,808	3	**1/37,269**	4	1/27,952	10	1/11,181	**1/7,986**
Santchou	27,811	1	**1/27,811**	2	1/13,905	12	1/2,317	**1/1,987**

Source: Fleury C., *Etude de cas dans le département de la Menoua au Cameroun: Quelles solutions pour une amélioration de la santé infantile dans les pays en développement?* 2010

LITERATURE REVIEW

As countries move towards their Millennium Development Goals' 2015 deadline, questions are being raised on the progress achieved so far. Of the eight ambitious goals set out in 2000, the child mortality goal by country – goal number 4 – has dramatically progressed across all regions of the world [34]. Yet, many countries will not achieve the ultimate target – a two thirds reduction in under-five mortality – on time without additional funding and continued innovation in technology, treatment and service delivery to improve the health of children under the age of five [35]. Cameroon stands as a classic example where ineffective interventions and lack of investments have led to poor results, and where failure to significantly improve child health is of concern. As shown in Figure 4, Cameroon at its current rate of progress, will not reach Millennium Development Goal 4 by 2015. In fact, at the current rate of decline MDG 4 will not be achieved before the year 2040 [35].

Figure 4. Under five mortality rate in Cameroon and MDG 4

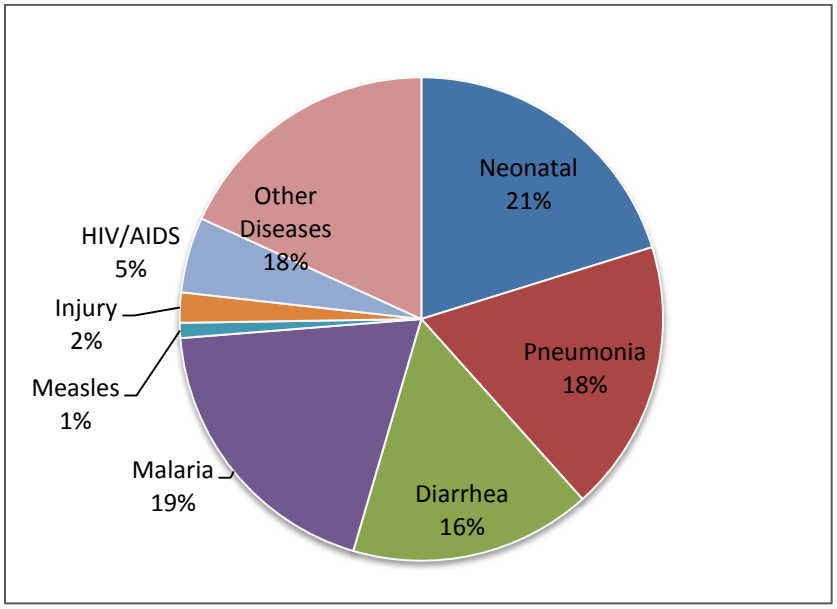


Source: Cameroon Demographic Health Survey Final Reports: 1991; 1998; 2004; 2011

Health Profile

In Cameroon, as in most other developing countries, causes of death among children under five are mostly preventable or treatable. Neonatal deaths including preterm births, asphyxia, sepsis, congenital abnormalities and tetanus are most common. Among post neonates, pneumonia, malaria and diarrhea, together are responsible for over half of all under-five deaths (See Figure 5) [6].

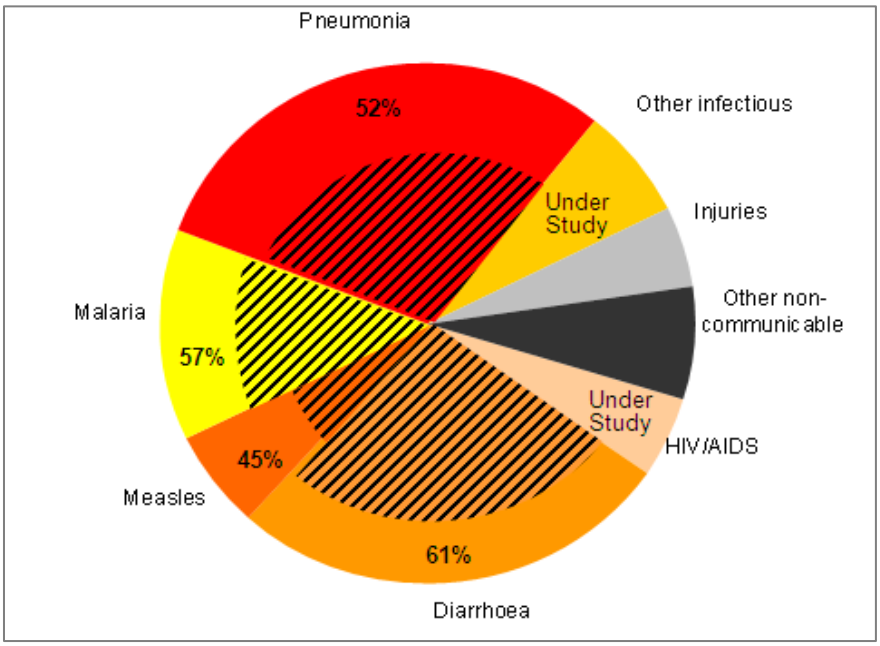
Figure 5. Causes of under-five Mortality in Cameroon (2008)



Source: WHO, *World Health Statistics 2011*. 2011

Although, under-nutrition is rarely a direct cause of mortality, it is a major contributor to many infectious diseases deaths as shown in Figure 6 [36].

Figure 6. Deaths among children aged 28 days to five years and importance of under-nutrition (2000-03)



% of deaths from this condition that due is to the presence of under-nutrition

Source: Caulfield, L.E., et al., *Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles.* 2004.

Studies have demonstrated the existence of a variety of appropriate, feasible and sustainable technologies and interventions to tackle the root causes of under-five mortality in developing countries with epidemiologic profiles similar to Cameroon [37]. These include preventive measures such as clean deliveries assisted by a qualified attendant, immunizations, promotion of exclusive breastfeeding, complementary feeding, water, sanitation and hygiene interventions, insecticide treated bed net use, and curative measures such as use of oral rehydration solutions, antimalarials, and antibiotics for diarrheal dehydration, malaria, pneumonia, and sepsis [37]. However, coverage of these interventions remain suboptimal in most developing countries leading to slow and

underperforming reductions in under-five mortality rates as observed in Cameroon [38, 39]. Increased investment and commitment from the Cameroonian government and support from the international community are necessary to accelerate progress towards lower morbidity and mortality rates among children in the country.

Following global efforts to accelerate the move towards healthier, wealthier and more educated populations, the government of Cameroon outlined a number of interventions to be implemented throughout its 2001-2015 Health Sector Strategy. To reach MDG 4 by 2015 and reduce stubbornly high under-five mortality rates, the government chose to focus on evidence based interventions recommended by the international public health community, through three health axes outlined in Table 5; (only interventions directly related to under-five morbidity and mortality are shown here) [40].

Table 5. Health Sector Strategy Interventions and Services – Cameroon (2009)

Health Class	**Health Intervention**	**Health Intervention Services**
Health Axis 1: Maternal, child and adolescent health		
Maternal Health	Antenatal Care	Malaria screening and prevention
		Tetanus toxoid vaccination
		Micronutrients supplementation
	Delivery and Obstetric Care	Clean delivery attended by qualified personnel and umbilical cord care
		Obstetrical emergency care
		Neonatal emergency care
		Post-partum care
	Family Planning	Counseling
		Side effects case management
		Post-partum, post-abortum, and adolescent family planning
Child Health	Immunization	Immunization against vaccine preventable diseases
	Prevention of Mother to Child Transmission of HIV (PMCT)	Early diagnosis of HIV/AIDS
		Early case management and support
	Integrated Management of Childhood Illness (IMCI)	Clinical IMCI
		Community IMCI

Health Class	Health Intervention	Health Intervention Services
Health Axis 1: Maternal, child and adolescent health		
	Preschool Consultation	Growth monitoring
		ITNs and LLTNs distribution
		De-worming
		Micronutrients supplementation
	Malnutrition case management	Community case management of acute malnutrition
		Fortification of food with micronutrients
		Community child growth monitoring
		Promotion of dietary demonstrations in health facilities
Adolescent Health		
Health Axis 2: Fight against disease		
HIV/AIDS case management		
Malaria and TB case management		
Fight against non-communicable diseases		
Fight against neglected tropical diseases		
Integrated disease surveillance and response		
Disaster management		
Geriatric Health		
Mental Health		
Health Axis 3: Health Promotion		
Integrated communication for health program promotion		
Health, nutrition and environment		
Primary prevention of malnutrition and non-communicable diseases		

Source: Fouda A., et al., *Stratégie Sectorielle de Santé 2001-2015,* 2009

Along with the commitment to work towards the implementation of these health interventions, decentralization of service provision from the national and provincial levels to the health district level was deemed crucial to reinforce the health system overall and improve its effectiveness [40]. The Integrated Management of Childhood

Illness is an example of under-five mortality reduction strategies set out to be implemented at the health district level.

Despite commitments made through the Health Sector Strategy, in 2009 Cameroon remained one of the 30 countries in Sub Saharan Africa with under-five mortality rates above 100 per 1,000 live births [41]. Between 1991 and 2011 the under-five mortality rate stalled at 126 and 122 deaths per 1,000 live births; even rising up to 151 deaths per 1,000 live births in the late 1990s as shown in Figure 1 [2-5]. In twenty years, the country has failed to start the journey towards the goal of an under-five mortality rate of 46 deaths per 1,000 live births. In fact, if current trends are sustained, Cameroon will be one of 23 countries of Sub-Saharan Africa that will not reach Millennium Development Goal 4 before the year 2040 [35]. Drawing on the situation depicted through the 2011 DHS survey and World Health Statistics in Figures 1 and 2, developing a strategy for accelerated rates of child and infant mortality reduction in Cameroon will necessitate focus on the commitment and capacity of the health system to address the wide range of health issues faced by young children. Increased and sustained coverage of key interventions cited above, and strong community based involvement must be achieved for long term positive health outcomes of the population.

THE INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS STRATEGY (IMCI)

History of the Integrated Management of Childhood Illness

In 1996, the WHO and UNICEF developed the Integrated Management of Childhood Illness (IMCI) in a joint effort to accelerate progress towards MDG 4. Recognizing the need for increased coverage of key interventions to mitigate morbidity and mortality among children in the developing world, the consortium developed an integrated approach through which all aspects of a child's wellbeing are addressed. As such, IMCI includes both preventive and curative elements that are implemented by families, communities and health workers with a focus on diarrhea, pneumonia, malaria, measles and under-nutrition, the five main causes of under-five mortality in the world [42, 43].

WHO and UNICEF identified a number of barriers to positive health outcomes in children. Such barriers include:

- Poor feeding and hygiene practices
- Poor parental recognition of danger signs in sick children
- Poor health seeking behaviors
- Poor access to health care
- Poor training of health workers
- Poor communication with the care taker on appropriate treatment
- Poor access to appropriate drugs

The IMCI strategy addresses the aforementioned issues by promoting prompt assessment, classification of co-existing conditions, rapid and effective treatment through standard case management, and prevention of illness through improved nutrition and immunization status [44].

In all, the integrated strategy breaks down into three main components:

1. *Improving case management skills of health care staff*

IMCI provides training for health workers who assess sick children using a set of integrated guidelines. Eleven day long training courses provide health workers with the competencies necessary to examine, recognize, and treat multiple conditions in children. Furthermore, essential communication skills are acquired in an effort to better provide care givers with information and knowledge on disease prevention, the treatment of the child, and follow up instructions [45]. Guidelines have been developed as a series of wall charts and are also distributed as desk reference tools for health providers and community health workers (CHWs) to follow during consultations [44]. Care of the sick child is composed of four steps. These steps are Assessment, Classification, Treatment and Follow up. For each category, the health provider is taken step by step through a process that looks at the child as whole encouraging dialog, counseling and recording [46].

2. *Improving overall health systems*

IMCI promotes changes in the health system to support the needs of health workers and families to prevent sickness and treat sick children. Such changes include making drugs

available for free or at low cost and in formulations for children, and ensuring availability of appropriate equipment for care in health facilities. IMCI encourages decentralization of health services to the district level allowing for the development of context specific strategies accompanied with necessary technical support and training for adequate supervision of the CHWs. Furthermore, IMCI integrates health packages and services often offered separately using each community outreach program and health facility visits as an opportunity to assess, counsel and treat the "whole child" improving quality of care and cost-effectiveness [43, 44]. On a broader scale, an integrated approach to child health and development must be adopted in the national policy for effective support of the IMCI strategy throughout developing countries [42].

3. Improving Family and Community Health Practices

As families have the major responsibility for promoting growth and development of their children, the IMCI strategy promotes actions within the community to support key family practices [43]. Such actions include teaching care takers how to recognize danger signs of sickness and seek care from the appropriate provider at the community or health facility level [44]. Following recognition of danger signs in a child, a number of scenarios can ensue; some are potentially harmful to the child. First, caretakers may decide to do nothing for lack of resources or in accordance to personal beliefs. Others may decide to take action and seek help with a local traditional healer, or self-diagnose the child and purchase fake or expired medication on the street for home-based treatment. Such behaviors are inadequate and are unlikely to cure the child; on the contrary they may contribute to building drug resistance in the child, and in some cases lead to death.

Alternatively, parents can take their sick child to a health worker or health facility for assessment, appropriate treatment and counseling. Through the IMCI strategy, families are introduced to the importance of proper care seeking for the survival of their children through community outreach and during medical visits [44].

Finally, the strategy works with communities to improve hygiene and nutrition practices to promote child development using opportunities such as community events to meet with families and reach sick children. Community health workers may also be trained to reach out to families and provide care takers with the latest information on key issues such as breastfeeding, insecticide treated bed net use and immunization days [47]. In some settings, community health workers are trained to provide IMCI services administering treatments for malaria and diarrhea.

The IMCI guidelines and strategy were recommended for all countries with infant mortality rates above 40 per 1,000 live births, and where there is transmission of *Plasmodium falciparum* malaria [48]. As of this day, over 100 countries have initiated IMCI activities [49].

IMCI in Practice and Effectiveness

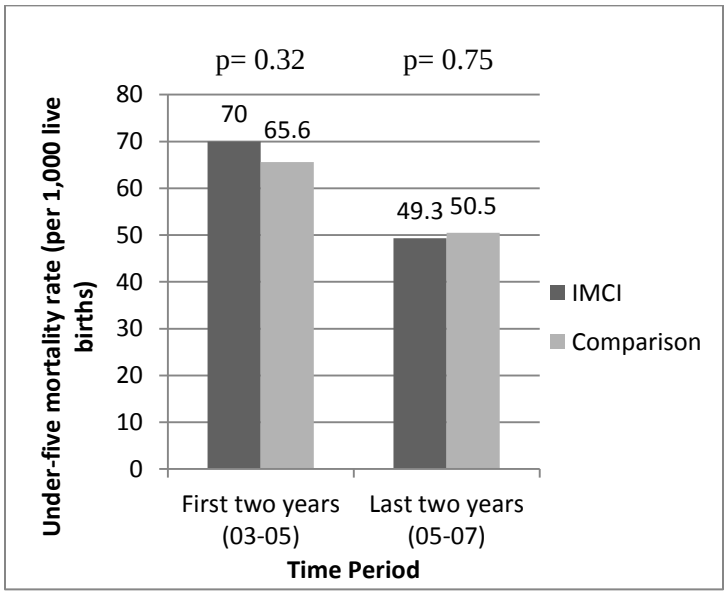
In 1998, the Multi Country Evaluation of Integrated Management of Childhood Illness (MCE-IMCI) was launched in an effort to measure effectiveness, cost, and impact on health facilities, communities, and lives saved; and to provide information to Ministries of Health and partners about the barriers to IMCI implementation on the ground [50, 51].

Upon completion of the study, effectiveness of the IMCI strategy remained elusive as most studies showed some improvement in health worker performance, health outcomes among children, and cost of care; yet, observed reductions of under-five mortality rates between intervention and control groups were not significant [50, 52-55]. Mixed results have been reported in other countries since, illustrating the difficulties of implementation of the strategy in real life environments [56, 57].

Under-five Mortality

In Bangladesh the MCE-IMCI group partnered with the government to establish an efficacy randomized cluster trial in which efforts were made to achieve optimum delivery of IMCI in the intervention groups [52]. As expected, evaluation results showed lower under-five mortality rates in IMCI areas compared to baseline levels dropping from 70.0 deaths per 1,000 live births during the first 2 years to 49.3 deaths per 1,000 live births in the last two years. However, similar trends were observed in non IMCI areas as the under-five mortality rate dropped from 65.6 deaths per 1,000 live births to 50.5 deaths per 1,000 live births in the last 2 years as shown in Figure 7. There was no statistically significant difference between mortality rates in IMCI and comparison areas at baseline and at the time of the evaluation.

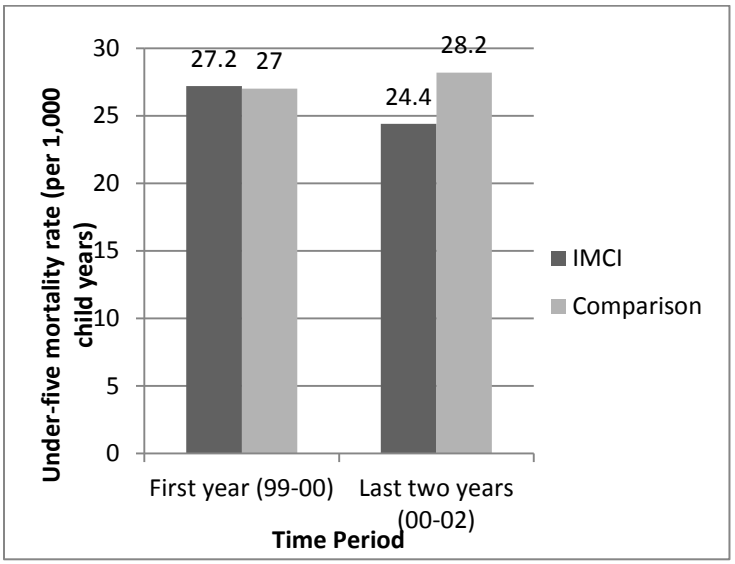
Figure 7. Under-five Mortality Rate Reduction in IMCI and Comparison Areas – Bangladesh (2003-07)



Source: Arifeen Shams E., et al., *Effect of the Integrated Management of Childhood Illness strategy on childhood mortality and nutrition in a rural area in Bangladesh: a cluster randomised trial.* The Lancet, 2009

In Tanzania, where the under-five mortality rate approached 150 per 1,000 live births at the time of the MCE-IMCI evaluation, and where malaria is endemic, results also showed the positive effects of IMCI as the under-five mortality rate in IMCI areas was 13% lower than in non IMCI areas (p=0.004 only when in between district variation were ignored; adjusted p=0.28). In fact, under-five mortality rate in IMCI areas dropped from 27.2 to 24.4 deaths per 1,000 child years while mortality rose from 27.0 to 28.2 deaths per 1,000 child years in non IMCI areas over the same period of time (see Figure 8) [58].

Figure 8. Under-five Mortality Rate Reduction in IMCI and Comparison Areas – Tanzania (1999-2002)



Source: Schellenberg J. R. M. A., et al., *Effectiveness and cost of facility-based Integrated Management of Childhood Illness (IMCI) in Tanzania.* The Lancet, 2004.

Studies in Peru and Brazil showed no impact on under-five mortality [53, 54]. While the Bangladesh and Tanzania IMCI strategies and implementation were closer to being optimal and took place in an environment with high infant and child mortality rates, strategies in Peru and Brazil suffered from poor implementation and coverage in environments with low malaria transmission and considerably lower child mortality rates at baseline [50, 52-54, 58].

Caregivers' knowledge, practices and health seeking behaviors

In Bangladesh, implementation of the IMCI strategy also led to improved family health behaviors. This translated into an increase in exclusive breastfeeding, as well as a significantly lower prevalence of stunting in IMCI areas compared to non IMCI areas (see Figures 9 &10) [52].

Figure 9. Exclusive Breastfeeding Practices in IMCI and Comparison Areas – Bangladesh (2004)

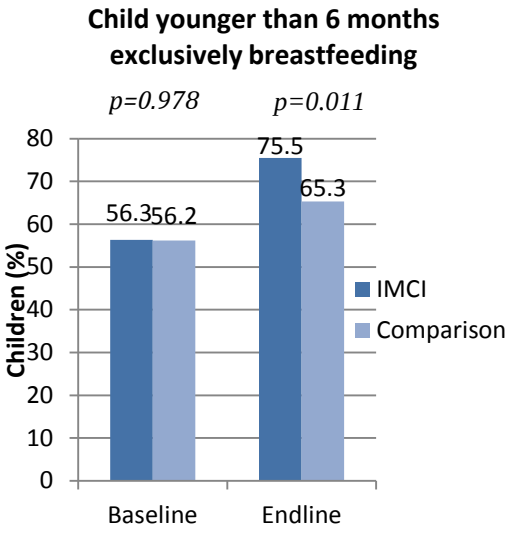
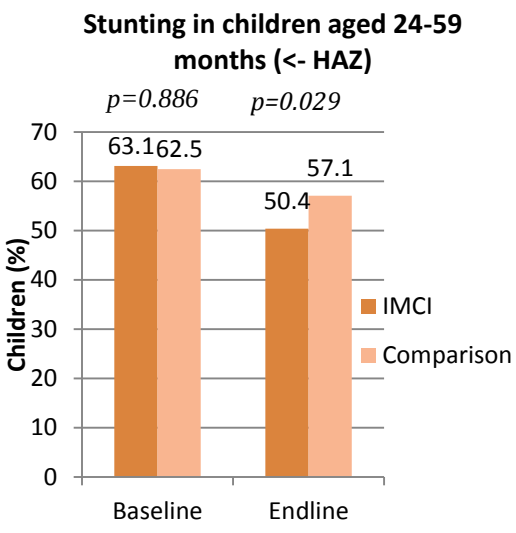


Figure 10. Stunting in Children 24-59 months old in IMCI and Comparison Areas – Bangladesh (2004)



No difference was seen in complementary feeding or wasting (Figures 11 & 12).

Figure 11. Complimentary Feeding Practices in IMCI and Comparison Areas – Bangladesh (2004)

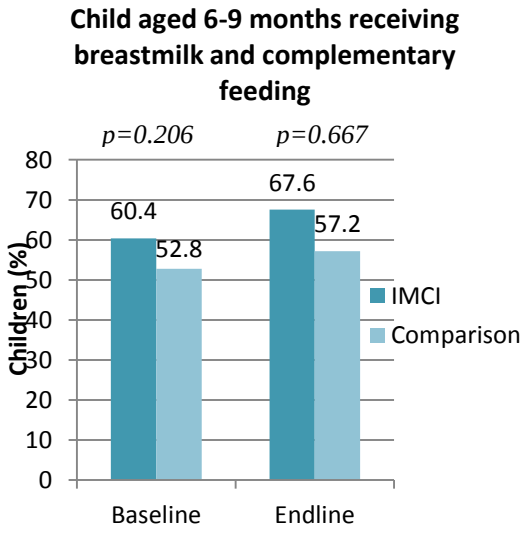
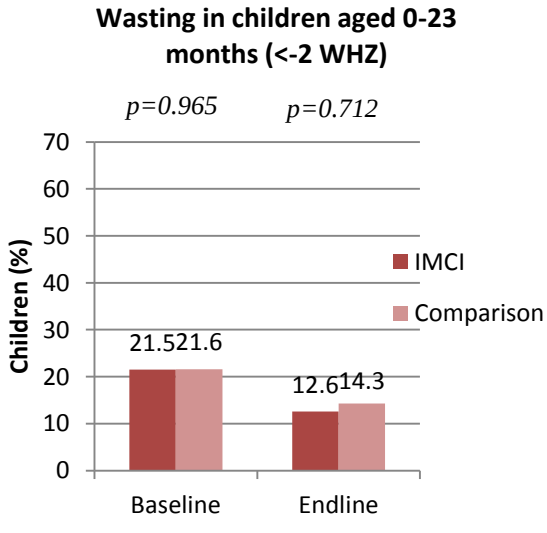


Figure 12. Wasting in Children 0-23 old in IMCI and Comparison Areas – Bangladesh (2004)

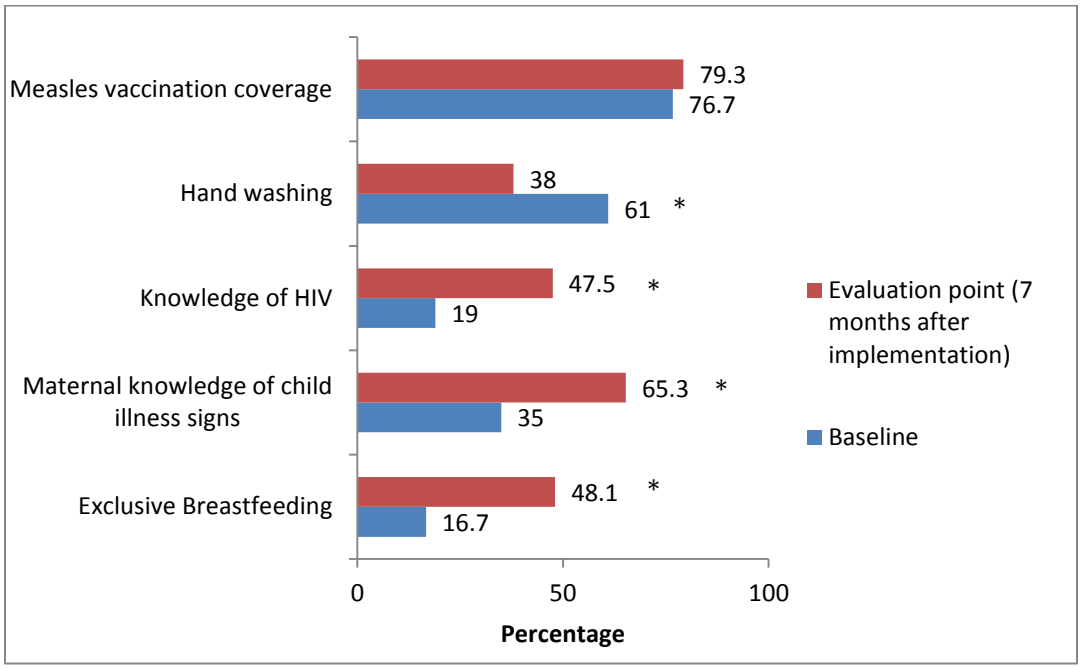


Source: Arifeen et al., *Effect of the Integrated Management of Childhood Illness strategy on childhood mortality and nutrition in a rural area in Bangladesh: a cluster randomized trial*. 2009

One study conducted in Dar es Salaam in Tanzania found that following implementation of IMCI, mothers displayed high knowledge of danger signs as all respondents were aware of at least one sign of disease in children [59]. Furthermore, 98.2% of respondents indicated taking their child to the health facility when sick. However, proper administration of medication regimen appeared to be a challenge as mothers preferred to interrupt the treatment before the dose completion. In Uganda where IMCI was implemented in 1995, a 2003 study revealed low care seeking practices among mothers despite high perceptions of danger signs in children, underlining the existence of challenges with access to care including high costs, bad attitude of health workers, unavailability of transportation, and poor quality of care [60]. Similarly, in Nigeria, where IMCI has been implemented nationally, only 23.2% of mothers in the Lagos Island area took their children for care at a health facility within 24 hours of perceived onset of the illness [61]. Most children were brought to the health facility after an attempt at self-treatment (68.6%), use of traditional medicines (12.5%) and provision of traditional home care (10.7%). However, in South-Western Nigeria, caregivers in IMCI areas were found to practice significantly more of the key health behaviors than in the non IMCI areas including, hand washing and ITN use for children under five; the study did not report baseline coverage levels [62]. In Armenia, a pre-post survey performed to assess the impact of the IMCI strategy implemented in the rural Martuni region of Gegharkunik marz found a significant improvement in some indicators of health knowledge and behaviors including exclusive breastfeeding which increased by 31.4%, maternal knowledge of child illness signs increased by 30%, knowledge of HIV increased by

28.5%; while other indicators such as hand washing practices inexplicably decreased (23.0% reduction) or stayed at baseline levels (see Figure 13) [63].

Figure 13. IMCI Evaluation Results – Armenia (2009)



*p-value <0.05
Source: Thompson M. E. and Harutyunyan T. L., *Impact of a community-based integrated management of childhood illnesses (IMCI) programme in Gegharkunik, Armenia.* Health Policy and Planning, 2009

Health worker care practices

Most studies measuring the impact of the IMCI strategy on health worker performance found significant improvements in health facilities where health personnel had been trained to follow IMCI guidelines. One study conducted in Uganda found that in health facilities, training of at least one health care worker in IMCI increased the integrated child assessment as measured by the WHO by 44% [64]. Similarly, the Brazil MCE-IMCI evaluation showed that IMCI trained health workers performed significantly better

than non-IMCI trained ones in disease classification, provision of treatment at the clinic, and communication with caregivers [65]. In South Africa, IMCI trained health workers were found to perform better assessment of danger signs and rational prescribing [66]. Both IMCI evaluations conducted in China and Morocco also established that IMCI trained health workers performed significantly better in the way they prescribed medication and antibiotics [67, 68].

Supply of medical equipment

The China IMCI evaluation study conducted between 2004 and 2006 demonstrated the positive impact of the IMCI strategy on the supply of medical equipment. In fact, the study found that health facilities in areas covered by the IMCI strategy were significantly more likely to be equipped with children's scales (90.5% vs. 27.8%), timing devices (97.3% vs. 89.3%), and appliances to mix oral rehydration solutions to treat diarrhea (100% vs. 36.5%) [67].

Cost-Effectiveness

Lastly, studies seeking to measure the costs or cost savings related to IMCI implementation established that the cost of IMCI case management was lower or equal to case management in non IMCI areas. The MCE-IMCI Tanzania evaluation found that the annual cost of care per child under the age of five was $11.19 in IMCI districts and $16.09 in comparison districts [58]. In Bangladesh, a study examining the recurrent costs of implementation of the IMCI strategy at first-level health facilities found that introduction of IMCI in the country would save over $4 million dollars [69].

In spite of the number of benefits brought onto populations by improving the performance of the health system and providers, many challenges have impeded the IMCI strategy in producing the desired results of reduced morbidity, mortality, and progress towards Millennium Development Goal 4. Some of these challenges are described below.

High training costs

Attending and providing IMCI training has been reported as a major challenge across countries where IMCI implementation reviews were performed. Health facility managers, who often have a very limited amount of staff members, especially in primary health care facilities, have to face difficult choices in sending their employees out to attend the recommended eleven day training. On the other hand, conducting the trainings can also be a high burden on the government, NGOs, and other entities responsible for these trainings that need to manage the costs of hiring high quality trainers and provide expected transportation, accommodation or stipend for attendees [70]. As a result, many countries have shortened the length of the trainings to reduce the burden on all stakeholders despite evidence demonstrating the higher effectiveness of the longer eleven day training (the magnitude of the difference across countries remained unclear) [71-73].

Low supervision and health care workers compliance

Supervision is a key element of the IMCI strategy to ensure continued compliance of health care workers with the IMCI guidelines, and to address any challenges faced by them. A study conducted in Benin in 2010 found that the frequency of health workers

supervision increased substantially after IMCI trainings, but then deteriorated [74]. Obstacles identified through the study included poor coordination, inadequate management skills, lack of motivation, health workers' resistance towards IMCI implementation, and low priority ranking of IMCI supervision due to lack of incentives for supervision activities. Issues of increased supervision workload, time required for other activities, incomplete project interventions, and loss of effective supervisors were highlighted by the study team as additional barriers [74]. In Tanzania, poor health care worker compliance with the IMCI guidelines was found to be common in four health districts where health providers in primary health facilities failed to adhere to IMCI treatment and referral guidelines for children with severe illness [75].

Weak health systems

Although strengthening of the health care system is one of the three IMCI components, it has often come second to training and capacity building of the health care workers [55]. Yet, it seems evident that lack of proper medical equipment, medication and vaccine supplies, and proper supervision systems, will highly impact the capacity of the two other IMCI components in improving the health of children under five [55, 76]. In addition, high turnover rates, and frequent promotions and staff relocation, common in many developing countries, pose a significant problem by taking away qualified IMCI trained personnel from health facilities, thereby interrupting the IMCI implementation and application of the guidelines in these facilities [77].

Inadequate national strategies

In order for a strategy such as IMCI to be effective and to attain optimal delivery of services, it is essential to have full support and commitment from national authorities through funding and through the establishment of policies institutionalizing IMCI and all its components. Lack of involvement and support from the state was a major barrier to the scaling up of IMCI in Peru resulting in suboptimal coverage of the strategy and limited impact on the population [77]. Similarly, in Kenya and Tanzania, the low priority given to IMCI at the national and international level also limited the expansion of training to other areas of the country [70].

Overall, success of the IMCI strategy can only be achieved through full engagement of all three IMCI components. High quality training and supervision of health workers are necessary to encourage compliance with IMCI guidelines and to enhance case management of childhood illness with the support of the health system and the community in order to reach desired health outcomes [49-51, 71]. The effectiveness of the IMCI strategy also requires focus on local epidemiology, and must target the major causes of death within each region and districts of a specific country [50, 51, 71]. Finally, national support and commitment to the IMCI strategy is critical to conduct and regulate all aforementioned interventions, and to accelerate progress towards MDG 4. Though based on basic principles and guidelines, the proper implementation of the IMCI strategy can prove to be resource intensive, necessitating the commitment a multitude of players at all levels of implementation. As a consequence, expansion of the strategy from pilot areas to other regions of a country has proven challenging, including in Cameroon.

INTRODUCTION OF COMMUNITY-IMCI IN THE EAST PROVINCE OF CAMEROON

In 2001, the first IMCI training program in Cameroon was launched in the East Province – one of the regions with the poorest health indicators in Cameroon – under the leadership of NGO Plan International and funded by USAID [78]. To obtain optimal results, the intervention devoted particular attention to the family and community health practices component of IMCI which proved to be critical in the 1998 Multi-Country Evaluation of IMCI.

The community approach IMCI (C-IMCI) sought to improve child health using a three armed strategy:

1. *Address issues of health facilities utilization*

Low utilization of existing services represents a real obstacle to the reduction of child morbidity and mortality in Cameroon. Reasons for non-use of existing health facilities include distance, poor quality of services, limited clinic hours, and lack of money [78]. To resolve this issue Plan's C-IMCI focused on providing a stronger voice to the community in expressing their needs and establishing positive relationships with local health structures so as to work together towards a common goal in the promotion of a better health for children. As part of their strategy, Plan International engaged existing community led health committees called COSA and COGE (Health Area Committees and Health Area Management Committees) to support a community-health structure partnership [78]. These committees were mandated by the government to serve as tools for coordination between the communities and their corresponding local health structures;

each composed of a few community members nominated by the community. In the absence of more directives regarding the role of COSAs and COGEs, Plan International sought to strengthen the committees by promoting women leadership within the groups, and providing planning and management training while encouraging them to act as the voice of the community during meetings with the local health staff [78]. In turn, health facilities' staff members were trained on being responsive to the community's needs. They became de facto members of the COSA and COGE making them representatives of and answerable to the community [78]. Last but not least, women's groups and other community-based organizations were used to support COSAs and COGEs by mobilizing the communities and providing representatives for the committees [78]. Through this initiative, the committees learned to communicate issues encountered by the community to their local health facility and to coordinate the setup of outreach campaigns targeting children's health.

2. Scale up of IMCI trained community based providers

Better quality services and outreach campaigns may not solve the issue of health structures' utilization especially among communities located far away from the local health facility. To remediate to this access issue, Plan International trained COSA representatives, women's groups, traditional birth attendants, and traditional healers to act as referral agents in their communities [78]. Trainings included modules on promotion of good health behaviors, recognition of danger signs in the child or pregnant mother, adequate referrals, and anthropometry. Along with improving capacity among community based health workers, Plan International supported the organization of Health

and Nutrition Action days to bring primary health services to the communities. These included immunizations, vitamin A supplementation, growth monitoring, and delivery of key health messages [78]. Finally, Plan International supported home-based management of illness through monitoring and nutritional rehabilitation programs led by women's groups trained in anthropometry and referral standards. Success of these activities have pushed the Ministry of Health (MOH) to revise its policies and allow COSA representatives and trained community health workers to provide home based malarial case management. Currently, research is being conducted to establish the impact of community based zinc provision to treat diarrhea in children under five [78].

3. *Improve community knowledge and practices*

With a focus on 21 health indicators specifically related to health behaviors associated with child development, disease prevention and appropriate home treatment practice, Plan International continued to use women's groups as relays of information for the community. The groups used Sunday gatherings and home visits to share their knowledge and promote health prevention and treatment practices such as the use of ITNs or ORS [78]. Plan International also encouraged community discussions through community mapping activities as a means of monitoring targeted health behaviors and understanding trends in the community [78]. Furthermore, a community based health information system was created in an effort to detect and address any health issues within the community, but also to communicate aggregated data information up to the MOH to demonstrate the impact of the program and transfer information on health trends in the region [78].

In parallel, the C-IMCI program also engaged other sectors known to influence health outcomes in a community including schools, local authorities, and local industries [78]. Overall, all community and home health practices indicators showed improvement from baseline (See Table 6) opening a window for expansion of the program. Today, Plan International works in 11 districts in three provinces (East, Center, and North-West provinces) up from three districts in one province [78]. Preliminary results evaluating the impact of C-IMCI in these new areas showed similar upward trends in the coverage of key health practices.

Table 6. C-IMCI Community and Home Health Practices – East Province (2000-04)

Indicator	**Baseline**	**End Point**
Changing Community and Home Health Practices		
Percentage of mothers who knew at least two danger signs that children need to be seen at a health facility	58.5%	65.0%
Percentage of mothers of children 0-6 months of age who exclusively breastfed their child	29%	56.9%
Percentage of children 12-23 months who were fully immunized before their first birthday	24.7%	54.9%
Percentage of children 0-23 months, and their mothers who slept under an ITN	0.4%	33.6%
Percentage of mothers of children 0-23 months who received iron/folic acid supplementation during the last pregnancy	28.4%	51.4%
Hand washing with soap or ash by mothers of children 0-23 months before food preparation for the child	42.2%	49.4%
Hand washing with soap or ash by mothers of children 0-23 months before feeding the child	35.4%	62.5%
Hand washing with soap or ash by mothers of children 0-23 months after cleaning a child who has defecated	18.7%	51.1%
Percentage of children 0-23 months, who attended a growth monitoring session during the last four months and whose weight was recorded on a growth monitoring chart	11%	44.4%

Source: Core Group, *Community Approaches to Child Health in Cameroon - Applying the Community-based Integrated Management of Childhood Illness (C-IMCI) Framework*, 2009

In brief, the case of Plan International's C-IMCI program has provided a successful IMCI strategy model applicable and replicable in communities around Cameroon. Following the success of the program, the government of Cameroon committed to the expansion of IMCI to 80% of all health districts, adapted its IMCI guidelines to include HIV and first week of life interventions, and developed comprehensive national child survival policies, strategies, and plans described earlier [40, 79]. Yet, as of 2009, the WHO estimated that less than 10% of all health districts in Cameroon had initiated IMCI training [7]. Application of child health policies and renewed effort and investment in effective interventions such as IMCI are necessary to bring Cameroon back on track in the race towards Millennium Development Goal 4.

The present study supplements currently available data on the effect of the IMCI strategy implementation in Cameroon, on the knowledge and practices of caretakers using the case of the Menoua Department. By expanding the knowledge base attributed to IMCI, this paper seeks to contribute to recent efforts made to identify viable solutions which will help the IMCI strategy achieve better and more sustainable outcomes for the realization of MDG4.

INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS IN THE MENOUA DEPARTMENT

INTRODUCTION OF THE IMCI STRATEGY IN THE MENOUA DEPARTMENT

Following his work with Plan International's East Province C-IMCI program, Dr. Metangmo, animated by a strong desire to see similar improvements in the health of the people in his native region, proposed implementation of the IMCI strategy in the Menoua Department and its three health districts Dschang, Penka-Michel, and Santchou. With support from the Public Health Ministry, the Western Provincial Authorities, local health districts; but also key IMCI players Plan International and Helen Keller International, along with the French Ministry of Foreign Affairs, the General Council of the North of France and the municipality of Halluin (North Department, France), organizations Tockem and ELANS became the implementation leaders of the Menoua Department IMCI strategy launched in 2007 [24].

IMCI implementation planning in the Menoua Department debuted in 2006 with health personnel practices and health facility capacity assessments. In addition, a quantitative Lot Quality Assurance Sampling (LQAS) baseline evaluation of key health indicators was conducted to determine coverage of key IMCI practices in the population and select goals to be reached by the program. To identify context and cultural specific barriers and assets informing the development of an IMCI strategy that would best address issues specific to the Menoua Department, qualitative research in the form of "doers/non-doers analysis" was also carried out.

Baseline LQAS study

The LQAS method is based on the random selection of small samples of the population – in this case 19 households per Supervision Zone (SZ) – to distinguish zones with high coverage of key indicators from the zones with low coverage; the Menoua Department was divided into 7 SZs. This method must be distinguished from KPC surveys which were developed in the late 1980s and are typically used by NGOs working in the field of maternal and child health to evaluate projects using a concise set of indicators that can be adapted to the specific activities led by the group [80, 81]. KPC surveys use larger sample sizes sometimes allowing researchers to estimate indicators such as under-five mortality rates which require broader sample bases.

Thirteen key indicators were selected by Tockem and its partners based on WHO priority indicators and previous experience with IMCI in Cameroon [82]. Use of small samples reduced the costs of the baseline evaluation while setting a base for continued evaluation, and providing information necessary to set the program objectives. Aggregation of results of all Supervision Zones would also allow Tockem and its partners to determine coverage levels for the Menoua Department as a whole.

A total of 133 mothers of children under the age of two were interviewed in December 2006. Results of the survey were used to define the goals of the IMCI program for each specific indicator as shown in Table 7.

Table 7. Results of LQAS Baseline Evaluation and Goals of the IMCI Strategy – Menoua Department (2006)

Indicator	Description	Coverage (%)	Goal (%)
1. Birth Spacing	At least 24 months between each child	88	95
2. Mothers with TT2	Mother received at least two tetanus toxoid shots during the last pregnancy	57	80
3. Presence of skilled birth attendant at delivery	Mother was assisted by a trained birth attendant at delivery (doctor, nurse or midwife)	88	95
4. Exclusive breastfeeding	Child 0-5 months is exclusively breastfed	41	70
5. Complimentary feeding	Child 6-9 months is breastfed and eats solid or semi-solid foods	89	95
6. Hand washing	Mother knows to wash her hands before cooking, before feeding the child, after defecating and after cleaning a child who has defecated	13	50
7. Wasting	Wasting (weight for age)	13	5
8. Full immunization	Child 12-23 months has received BCG shot, measles shot, and all three polio and DPT shots before age 12 months	63	90
9. Measles vaccination	Child 12-23 months has received measles shot	63	90
10. ITN use	Child slept under ITN the previous night	17	75
11. Recognition of danger signs	Mother knows at least two signs that indicate the child is sick and needs to receive treatment	70	80
12. Provision of more liquids and food to sick child	Mother gives more liquid and more food to the child when s/he is sick	02	50
13. HIV/AIDS knowledge	Mother knows at least two ways of avoiding HIV infection	59	75

Source: Fleury C., *Evaluation du Programme de Coopération dans le Département de la Menoua*. 2010

In reaching these goals, Tockem and its partners sought to realize a specific set of objectives.

General Objectives:

- Contribute to positive growth and physical, mental, and social development of the child
- Contribute to the improvement of under-fives' health by 2010
- Improve the quality of life of children under five in its social, sanitary, environmental, economic, and educational dimensions

Specific Objective:

- ***Reduce by 30% the under-five morbidity and mortality in the Menoua Department***

Doers/non-doers analysis

Following the LQAS survey, a "Doers/non-doers analysis" was performed to complete the overview of the health status of the population. The research tool developed by the FHI 360 Center for Global Health Communication and Marketing, draws on the idea that it is necessary to understand people's motives to establish successful behavior change interventions [83]. Through interviews with caretakers, Tockem staff members were able to identify the key factors influencing the adoption of certain behaviors. Using this approach, Tockem developed and adjusted communication tools for the community component of the IMCI strategy.

IMCI Implementation

All three IMCI components, as defined by the World Health Organization and UNICEF, were implemented in the Menoua Department: Health care staff case management skills, Health System, and Community health practices [24].

Over the span of the next 3 years, the IMCI strategy was to be deployed progressively to each health district of the department, each health zone, and each health structure. There are three health districts in the Menoua Department and 39 health zones. Accordingly, the IMCI strategy was to be implemented in 13 zones each year starting within the district of Dschang, the most populous, and adding zones from the two other districts – Penka Michel and Santchou – in the beginning of the second year [24].

Training of the health care personnel

- *Training*

Each year 24 nurses and 3 doctors were set to be trained in one 11-day training under the supervision of one head lecturer, and eight expert IMCI instructors. The focus of the training was to equip health providers with the competences necessary to recognize the signs of each illness and prescribe the appropriate treatment in the right dosage. This is especially important for the case of malaria as patients may have developed resistance to drugs. Health providers were expected to learn to systematically assess the sick child for all possible conditions without having recourse to costly procedures [24]. A final evaluation was conducted at the end of each training session and synthesis cards were developed for each health structure for case management and follow-up of each child in

an effort to track application of competences acquired through the training. As shown in Table 8, a total of 116 nurses and 18 doctors received the IMCI training.

Table 8. Number of IMCI Trained Health Professionals – Menoua Department (2012)

Year	Health Facilities	Nurses	Doctors
2007	20	21	3
2008	25	28	2
2009	28	22	7
2010	24	22	4
2011	17	23	4
Total	**114**	**116**	**18**

Source: Vanhecke S., Personal communication via e-mail. March 2012.

During each training session, one local health district secretary was invited for training with a secretary from the Health Ministry on standard nomenclature for improved recording systems across the three health districts in alignment with the national authorities in Yaoundé [24].

- *Supportive supervision: Follow-up visit*

Within four weeks following the training, newly IMCI trained health professionals were visited by one of the four local IMCI supervisors trained each year on follow-up techniques for these visits. The chief of the health district and the health bureau chief were automatically enrolled as supervisors as they were also in charge of leading subsequent bi-yearly supervision visits in the health centers where staff had been trained on IMCI [24].

The goal of follow up visits was to reinforce skills acquired by health professionals during the IMCI training. Through these visits, health professionals had the opportunity to discuss their performance post IMCI training and address issues encountered in the process of applying their new skills. Finally, visits were used as an opportunity for supervisors to perform an inventory of available supplies and medication in each of the facilities [24]. This would then be used throughout the health system reinforcement component of the IMCI intervention.

Improving overall health systems

- *Equipment*

In 2006, most of the health structures in the Menoua Department lacked proper medical equipment. Through the IMCI strategy, focus was brought onto health facilities most deprived of material by way of a plan for provision of adequate material at all levels with items including microscopes, lab material, delivery tables, and essential generic medication depending on the needs of each structure [24]. In addition, health districts provided all health structures with integrated supervision targeting issues of under-five health, maternal health, IMCI strategy, vitamin A supplementation, ITN use, and management of malaria.

- *Monitoring and Evaluation*

Beyond supervision efforts, health districts were responsible for conducting evaluations of the infrastructural organization of all health centers with IMCI trained personnel every

trimester. These evaluations served to determine the quality of practices within the health center, helped develop a working referral system for the management of serious cases, ensure appropriate and continued supply of essential medication needed for adequate IMCI strategy delivery, and to integrate IMCI classifications into the health system's information system [24].

At the health district level, bi-yearly supervision conducted by the Health Ministry consisted of reviewing the evolution of the districts' health profiles in an effort to evaluate the integration of the IMCI strategy in the health zones [24]. These sessions enabled chiefs of health districts to express difficulties encountered in their zones and receive support from the Ministry of Health's personnel to improve the impact of IMCI on the health of populations.

Improving family and community health practices

- *Training of the Community Health Workers*

Each year, about 3 community health workers were trained by Tockem staff members for each health facility with IMCI trained health staff. Through a three day training, CHWs developed skills and competences to efficiently lead IMCI activities within the community. These activities were designed to promote child growth and development, prevent disease, ensure home management of child illness, encourage caregivers to seek help at the local facility, and report activities undertaken [24]. To be selected, CHWs must be literate, open to the Community-IMCI approach, and motivated; they must also agree to work on a voluntary basis and live in the community they serve.

Throughout the training, community health workers were taught a variety of different communication techniques to help them spread health messages to the community in understandable and acceptable ways while emphasizing areas which were identified through the "Doers/non-doers analysis" as key barriers to healthy practices. By the year 2012, about160 community health workers had been trained through the IMCI initiative.

- *Supportive Supervision*

Once they completed the Tockem IMCI training, CHWs were sent out to the field under the supervision of the chief of their assigned health center who delineates their geographic zone of action [24]. Support from Tockem continued to be provided a week after the start of their service and every semester thereafter. Following the 2010 evaluation detailed later, Tockem decided to take on full supervision of the CHWs as it became clear that the health center chiefs could not fulfill their roles of supervisors due to the amount of work they had in addressing the health needs of the population they served.

- *Monitoring and Evaluation*

A set of monthly goals were developed to help CHWs keep up with their responsibilities and keep track of the activities organized in the community to raise awareness on child health and care. Each month, CHWs were encouraged to conduct at least three education sessions in groups, four house visits, and to record the number of cases referred to health facilities [24].

- *Capacity strengthening of the COGE and COSA committees*

In an effort to fulfill the integrated approach to child illness management at the community level, Tockem engaged the local health and community management committees, referred to as COSA and COGE respectively, to be active players in the new approach [24]. Capacity strengthening of local COSAs and COGEs was initiated to support a "Health Center – Population" collaboration through which all actors including, communities, CHWs, and health professionals could have a voice. Meetings gathering health center chiefs, representatives of COSA and COGE and community health workers were set up as a model to establish collaboration in planning and problem solving activities.

2010 Mid-point Evaluation

Funding from the French partner authorities for the IMCI program in the Menoua Department was to be renewed every three years. As a consequence, all parties agreed that full evaluations of the program would be conducted at the end of each term. The 2010 evaluation included a number of elements dedicated to the assessment of each component of the IMCI strategy.

Assessment of the health care personnel practices was done through interviews of caregivers exiting health facilities after a consult for their children. The study found that 100% (n=6) of caregivers interviewed knew how to properly administer prescribed drugs to their children, and 79% (n=11) knew at least two aspects of home-based case management including provision of more liquids, and follow up visits; these indicators

increased from 45% and 39% respectively at baseline [84]. Health workers who were interviewed felt strongly about the IMCI strategy and claimed the training had changed their practices. Yet, supervision by health districts was deemed insufficient and superficial.

Performance of the health system was evaluated through interviews with the chiefs of the health districts and their health bureau chiefs who expressed their appreciation for the IMCI training, and observed improvement in case management of children in their districts. Chiefs of the three health districts admitted that supervision of the community health workers was a challenge as noticed through their supervision of local health zones and facilities. They reported that virtually no health worker in charge of the health zones showed evidence of supervision or contact with CHWs assigned to their area [84]. The evaluation also looked at the availability of essential medicines in health facilities. Out of 23 visited health centers, only 5 (22%) had all essential medications in stock. In addition, only 12 of these health centers used the IMCI recording tools despite the fact that they had been distributed to all through the IMCI training [84].

In order to assess progress made on community and health practices, a LQAS study similar to the one conducted in 2006 was performed by Tockem and ELANS. Results showed progress was made in most key health practices though statistical tests to determine significance of the changes observed were not performed (See Table 9).

Table 9. IMCI Mid-point Evaluation Results – Menoua Department (2010)

Indicator	LQAS 2006 Results (%)	LQAS 2010 Results (%)	Goals (%)
Birth spacing	88	77	95
Mothers with TT2	57	77	80
Births assisted by qualified attendant	88	95	95
Exclusive Breastfeeding	41	57	70
Complementary feeding	89	90	95
Hand washing	13	07	50
Wasting	13	02	05
Full immunization	63	89	90
Measles immunization	63	91	90
ITN use	17	29	75
Recognition of danger signs	70	82	80
Provision of more liquids and food to sick child	02	03	50
HIV/AIDS knowledge	59	78	75

Source: Fleury C., *Evaluation du Programme de Coopération dans le Département de la Menoua.* 2010

In parallel, community health workers were asked to participate in a forum where they were invited to share their experiences and to talk of any barriers encountered in the field. Out of 142 trained CHWs at the time, only 44 participated in the forum. Low attendance was thought to be due to a high rate of turnover caused by financial difficulties and lack of time. The forum revealed serious gaps in the supervision of CHWs who often felt abandoned. Contact with health district supervisors and even with health facility personnel was found to be almost non-existent and source of frustration. Issues of

legitimacy were also raised in regards to relations with families and communities in the field who did not recognize the expertise of the community health workers.

Upon review of the results of the study, Tockem in collaboration with the three health districts, identified areas on which to focus to improve the impact of the IMCI strategy. These areas included supervision of all health actors including health personnel and CHWs; other CHW related issues such as remuneration and legitimacy; pharmacy stocks in health facilities; and continued training of health personnel.

METHODS

Objectives of the study

This study focused on the family and community health practices component of the IMCI strategy implemented in the Menoua Department. The main objective of the study was to assess the effect of the IMCI community strategy on caregivers' practices and the health of young children, and to determine whether the program achieved desired coverage of the key practices identified by Tockem and its partners.

Knowledge, Practices, and Coverage (KPC) survey

To measure the effect of the IMCI program on the health of children living in the Menoua Department, we conducted a Knowledge, Practices, and Coverage (KPC) survey across all health districts.

Institutional Review Board (IRB) considerations

Because of the nature of this study involving contact with human subjects and recording of individuals' personal information under the form of first names, date of birth and place of residence, IRB approval was sought early on during the study development process. Upon review of the study protocol, the review board at Emory University determined the program evaluation scope of the study did not necessitate submission of a proposal for IRB consent and the study was therefore exempt from IRB approval.

In the field, participants were provided information on the study and its purpose and were then assured that they had no obligation to participate in the study, and did not have to answer all questions or complete the questionnaire if they so decided, in accordance with research ethics guidelines.

Questionnaire

Development

The questionnaire used in this study was pulled from the baseline evaluation on health status and practices of the population performed in 2006, also used for the 2010 evaluation. At baseline, the questionnaire was developed using the standard Rapid Core Assessment Tool of Child Health (CATCH) created by the CORE group to perform rapid KPC surveys that could inform implementing organizations and their local partners, provide a basis for comparability between projects within and across countries, and serve as a tool for advocacy at both the national and international levels [85]. The standard questionnaire used by the CORE group corresponded to the IMCI indicators presented by the WHO and addressed all 13 indicators selected by Tockem. As a result, the original CORE group questionnaire was adopted as is with the exception of a few changes in the order of questions for a better flow and improved understanding of participants in the context of the Menoua Department.

Performance of the questionnaire throughout the two past evaluations (2006 and 2010) was considered sufficient field testing for this study to continue using the same questionnaire. However, a few additional changes were made following discussions with

program coordinators and past enumerators. These changes were minimal and consisted of rewording of the *fluid and food intake during sickness of a child*, and *hand washing* questions for better comprehension of the participants (see Appendix B. for a copy of the questionnaires).

Key Indicators:

Indicator	**Description**	**Program Objectives (%)**
1. Birth Spacing	At least 24 months between each child	95
2. Mothers with TT2	Mother received at least two tetanus toxoid shots during the last pregnancy	80
3. Presence of skilled birth attendant at delivery	Mother was assisted by a trained birth attendant at delivery (doctor, nurse or midwife)	95
4. Exclusive breastfeeding	Child 0-5 months is exclusively breastfed	70
5. Complimentary feeding	Child 6-9 months is breastfed and eats solid or semi-solid foods	95
6. Hand washing	Mother knows to wash her hands before cooking, before feeding the child, after defecating and after cleaning a child who has defecated	50
7. Wasting	Wasting (weight for age)	5
8. Full immunization	Child 12-23 months has received BCG shot, measles shot, and all three polio and DPT shots before age 12 months	90
9. Measles vaccination	Child 12-23 months has received measles shot	90
10. ITN use	Child slept under ITN the previous night	75
11. Recognition of danger signs	Mother knows at least two signs that indicate the child is sick and needs to receive treatment	80
12. Provision of more liquids and food to sick child	Mother gives more liquid and more food to the child when s/he is sick	50
13. HIV/AIDS knowledge	Mother knows at least two ways of avoiding HIV infection	75

Though most child health interventions, including IMCI, target children under the age of five, KPC surveys collect information on children under the age of 24 months in an effort to make the best of limited resources; but most importantly because children in this age range have the highest health risks [80].

In the absence of past KPC evaluations that could be used as reflective data in this impact assessment, we decided to use counterfactual groups naturally present in the area as a means to determining whether changes observed in the area could be attributed to the IMCI intervention.

Study groups

Although Tockem aimed for full IMCI coverage of the Menoua Department, limited resources, logistical capacity, and high mobility of the health personnel across the country have led to the emergence of three distinct IMCI groups.

1. *IMCI group*

All three health districts of the Menoua Department participate in the IMCI intervention and activities. As a result, most health zones and facilities across the department received the original IMCI training mentioned above including health staff and CHW training, and institutional support. Overall, a total of 292 villages – all located within the Dschang health district – out of a total of 599 villages, or almost 57% of the total Menoua population, were served by health facilities that participated only in the original IMCI training.

2. *IMCI+ group*

Lack of training, incentives, recognition, and high turnover were found to be major barriers to the performance of the CHWs as indicated by the 2010 evaluation led by Tockem. To address the issue, Tockem organized a supplemental training for CHWs in April of 2011. Through this training the volunteers were given a chance to discuss challenges encountered in the field and the opportunity to select a set of issues that needed priority attention. In addition, the CHWs received a refresher training session and learned about new strategies to approach families and monitor their own performance. They were offered a stipend for the training and sent out for a week to practice newly acquired skills in their respective communities. At the end of the week, CHWs were invited to reconvene and debrief. Although no formal evaluation of that training was performed, Tockem's staff reported a very positive and successful training that, they expected, would serve to improve the impact of the IMCI intervention on the health of the population. Yet, limited resources came in the way of the initial plan to offer this supplemental training to all CHWs. As a result, only the two less populated health districts of Penka Michel and Santchou received the new CHW training. Overall, 245 villages or about a third of the total population of the Menoua Department were served by community health workers that participated in the original IMCI training supplemented with CHW refresher training in April of 2011.

3. *Non IMCI group*

A very small proportion of all health facilities in the Menoua Department are staffed with personnel who did not receive the IMCI training for various reasons. Certainly, the most

prominent cause of absence of a trained health staff in these structures is the frequent reassignment of health personnel to different regions of the country. Hence, staff trained early on after the launch of the IMCI intervention may have been transferred to another health center since. In other instances, health staff was simply unable to attend the trainings offered by Tockem. Lastly, a few health facilities are new and have not had a chance to participate in IMCI trainings yet. Overall, 62 villages are served by health facilities where no staff received the IMCI training and where no CHW was trained on community and family behavior change strategies. These villages accounted for about 12% of the total population. Because these areas did not benefit from the IMCI intervention, they were used as controls in our study.

Sampling

Clusters

Cameroon does not yet have a reliable and disaggregated census system including geographic information systems or lists of all households in each town or village of the country, thus preventing the use of random sampling methods to select a sample. As a result, sampling units were selected using the 30 by 10 cluster sampling method commonly used by organizations conducting KPC surveys and by the WHO Expanded Program on Immunization (EPI) in similar environments [80]. Cluster sampling is an efficient way to obtain coverage estimates of the entire program area by allowing the project team to interview a number of individuals located in the same cluster, thereby avoiding long traveling distances to find respondents. Thirty clusters were selected in each IMCI group in order to assess and compare coverage estimates across groups, for a

total of 90 clusters to be visited. Clusters were defined as all villages, sometimes called neighborhoods in areas like the city of Dschang, in the Menoua Department.

The research team obtained a list of all villages and corresponding population sizes from each of the health districts. It is important to note that only the Penka Michel health district had a complete internal list of villages. The records were the most comprehensive and listed all villages, the corresponding health structure, health zone, and number of inhabitants. In the absence of internal information from the two other health districts, we were provided with Mectizan distribution reports, which are filled out every year by health workers who distribute the anti-parasitic drug for free to the entire population through the Onchocerciasis Program. Mectizan distribution reports are thought to be only partially reliable and often an underestimate of the real population numbers as health workers tend to ignore children under five, and those who are not present during the distribution as they do not receive the drug (see Appendix C for a list of the population data sources).

Cluster selection was conducted using systematic random sampling as indicated in the KPC guidelines [80]. The total population of each IMCI group was divided by 30 to determine the sampling interval. Subsequently, a random number between zero and the sampling interval was selected to determine the first cluster/village to be visited. The sampling interval was then added to that random number to find the second village. This step was repeated until 30 clusters were selected. Since cluster sampling is a probability sampling design through which clusters are selected using probability proportional to size, bigger communities are more likely to be represented than smaller communities. In

fact, communities which are significantly bigger than others may be selected several times throughout the sampling process. The total number of villages selected for this study was 87 as three villages were selected twice.

Basic sampling units

Following the KPC basic sampling methodology, ten households were selected in each village visited. As a result, the total sample consisted of 900 mothers of children under the age of two. Due to the absence of maps showing the number and locations of households in each village, and lack of access to mapping devices with satellite capability to create these maps, the team decided to use the "spin the bottle" methodology, used in EPI surveys, to select households in the most random possible way. Upon arrival in a village, enumerators contacted a village chief or elder who would direct them to the center of the village. From there, enumerators spun a pencil on the ground and walked in the direction pointed by the pencil until they hit the first household. Each subsequently selected household was the closest household to the right.

Data Collection Staff

Selection of field staff

Collecting good quality data that appropriately represents a population's health status, knowledge and behaviors requires well trained and unbiased data collectors along with structured supervision. For the purpose of this study, we recruited a team of 14 enumerators. Selection criteria included knowledge of French and Yemba (the local dialect), familiarity with the area, minimum of 10 years of schooling, preferred previous

experience in community outreach activities and surveys, and possession of a driver's license for our four drivers. Limited access to individuals meeting all requirements obliged the team to match enumerators with complementary skills and send them out to the field in teams of two.

Training

Enumerators were all required to participate in a one-day training led by the principal investigator and Tockem staff. The training was divided into two modules including theory and practice. The first module consisted of an introduction to the IMCI strategy, survey techniques, sampling techniques ("spin the bottle"), weight measurements, questionnaire administration, and ethics. In the second module, enumerators were sent out for a series of pilot interviews in the surrounding community and brought back to debrief on the quality of the data collected and challenges encountered. Lack of time to properly instruct guidelines for weighing children forced the team to drop the question from the questionnaire during the data collection period.

Data Collection

Collection of the data

Data collection took place over a two weeks span. Seven teams of two enumerators were sent out every day to visit two villages and complete 20 interviews. In some villages, the data collection staff was unable to find ten households with children under the age of two; in such cases enumerators were instructed to continue walking to the nearest house in the nearest community. Time and funding constraints did not permit follow up visits to

all villages that were not completed (See Annex C). In the case of the villages of Zemlah and Lepoh, poor information on the geographical limits of the villages and poor information coming from community leaders identified by enumerators led two different teams to survey the villages on separate days thinking they were in a different village, resulting in oversampling of the two villages. Other cases of oversampling were caused by miscalculations of the number of questionnaires filled by enumerators.

Supervision

One member of each team was responsible for the supervision of the data collection in the field throughout the study period. The role of the supervisors was to oversee household selection following the "spin the bottle" methodology, ensure completion of questionnaires, and communicate with the team leader to report issues encountered on the ground or in the emergence of questions. At the end of each day, supervisors debriefed with the team leader and expressed any concerns related to the survey methodology, questionnaires or population's attitudes towards the teams, and the questions asked.

Data Quality Assurance

Data quality in the field was ensured by supervisors responsible for the appropriate delivery of questions, the understanding of questions by participants, and the completion of questionnaires. Upon reception of all questionnaires at the end of each day, data were set to be reviewed by the principal investigator by going through a sample of questionnaires to verify completion patterns, and check for trends in responses that may indicate bias coming from the enumerators.

Analysis

Data were entered in EPI Info version 3.5.3. (CDC, Atlanta GA, USA) by teams of two people including one person reading the survey and the other entering the data. Enumerators were consulted when data were not collected properly, could not be read, or reported improbable values, in order to understand what type of error occurred. When issues with the data could not be reconciled, improbable values (such as two live births in the span of 3 months) were set to missing. The dataset was then transferred into statistical analysis software SAS 9.3 (SAS Institute Inc., Cary NC, USA) and cleaning was performed by the principal investigator.

To provide key stakeholders with valuable information which could then be transformed into renewed efforts to improve the health of the population in the Menoua Department, coverage levels of key indicators gathering all three IMCI groups were calculated to determine whether the Menoua Department as a whole had achieved program goals. Subsequently, coverage levels of the same indicators were calculated for each IMCI group separately. Wilson confidence limits taking into account the complex survey design described above were used to determine confidence intervals, and Rao-Scott chi-square tests were performed to assess the presence of any statistical difference between the three IMCI groups. Finally, stratified survey logistic regressions were used to compare mean coverage between each pair separately and assess statistical difference between the groups. ANOVA tests were used to assess statistical significance of the difference observed between groups for continuous variables.

RESULTS

Overall, 931 mothers of children under the age of two answered the questionnaire. A total of twelve questionnaires were deleted from the dataset due to age calculation errors leading to the inclusion of children aged 24 months or over in the sample. As a result, 919 questionnaires were included in the analysis. The mean age of the respondents was found to be 27.7 years old and did not differ significantly across the three IMCI groups. Similarly, the average number of biological children under the age of five was the same in all groups (1.6 children per woman). Mothers in the Menoua Department appeared to all have a pronounced habit of taking their children to a health facility when sick. In fact, almost all respondents declared taking their child to the health clinic when ill; no statistically significant difference was observed across groups (See Table 10).

Table 10. IMCI Evaluation Sample Characteristics – Menoua Department (2011)

	Non IMCI Group	IMCI Group	IMCI+ Group	Total	p-value
Villages visited	28	29	30	87	--
Respondents	305	319	295	919	--
Mothers who take their child to a health facility when sick	97.7%	99.4%	99.0%	98.6%	0.3904
Average age of mother	27.5	27.6	28.0	27.7	0.6137
Average number of biological children under the age of five	1.6	1.6	1.6	1.6	0.4714

Although additional socio-demographic data were not collected through this study, samples in each IMCI group were found to be similar on age of the mother, number of children under the age of five and access to health facilities in the event of illness.

Child Health

Prevalence of disease among children under two in the region was found to be highest for acute respiratory infection symptoms. A total of 41.7% of mothers reported that their child had experienced episodes of coughing during the two weeks preceding the interview. In addition, 13.2% reported their child had difficulty breathing and 4.5% reported fast breathing issues. Fever and malaria symptoms were reported by about a fifth of the respondents (18.5% and 20.0% respectively). And, 16.3% of mothers declared their child had diarrhea within the past two weeks; 4.5% reported their child had bloody diarrhea. Finally, convulsions were found to be very rare as less than one per cent of children were reported to have had convulsions. Overall, no statistically significant difference was found between the three IMCI groups in the distribution of causes of morbidity (See Table 11).

Table 11. IMCI Evaluation Child Health Indicators – Menoua Department (2011)

Indicator	2011 KPC overall results (%)	Non IMCI group (%)	IMCI group (%)	IMCI + group (%)	Rao-Scott overall Chi square P value	Chi square P Value (non IMCI vs. IMCI)	Chi square P Value (non IMCI vs. IMCI +)	Chi square P Value (IMCI vs. IMCI +)
Child had diarrhea in the past two weeks	16.3 (13.9, 19.0)	18.0 (14.1 ; 22.7)	15.2 (10.9 ; 20.7)	15.6 (11.9 ; 20.2)	0.6183	0.3962	0.4096	0.8849
Child had blood in stools in the past two weeks	4.4 (3.1; 6.1)	4.6 (2.5; 8.4)	4.1 (2.4; 6.9)	4.4 (2.4; 7.9)	0.9632	0.7833	0.9321	0.8516
Child coughed in the past two weeks	41.7 (38.1; 45.5)	45.2 (39.6; 51.0)	40.2 (33.7; 47.0)	39.8 (33.8; 46.1)	0.3939	0.2618	0.2042	0.9321
Child had breathing difficulties in the past two weeks	13.2 (10.3; 16.9)	16.4 (11.3 ; 23.2)	10.1 (6.0 ; 16.6)	13.3 (8.7 ; 19.7)	0.2886	0.1317	0.4480	0.4205
Child had episodes of fast breathing or shortness of breath in the past two weeks	4.5 (3.0 ; 6.6)	4.9 (2.4 ; 9.8)	5.1 (3.0 ; 8.3)	3.4 (1.4 ; 8.1)	0.7225	0.9479	0.5299	0.4509
Child had fever in the past two weeks	18.5 (15.6; 21.7)	17.7 (12.7; 24.1)	22.2 (17.4; 27.7)	15.3 (11.3; 20.4)	0.1695	0.2614	0.5133	0.0534
Child had malaria in the past two weeks	20.0 (16.8; 23.7)	20.7 (14.8; 28.1)	19.0 (14.2; 24.9)	20.4 (15.3; 26.6)	0.9116	0.6996	0.9556	0.7191
Child had convulsions in the past two weeks	0.7 (0.3; 1.4)	1.3 (0.5 ; 3.3)	0.0	0.7 (0.2 ; 2.4)	*	*	*	*

Table 12. IMCI Evaluation Practices and Behaviors – Menoua Department (2011)

Indicator	Project Objectives (%)	2011 KPC Overall Results (%)	Non IMCI group (%)	IMCI group (%)	IMCI + group (%)	Rao-Scott overall Chi square P value	P Value (non IMCI vs. IMCI)	P Value (non IMCI vs. IMCI +)	P Value (IMCI vs. IMCI +)
Birth spacing**	95	69.3 (64.0; 74.2)	70.2 (60.5 ; 78.3)	64.5 (55.0 ; 72.9)	73.5 (64.5 ; 80.8)	0.3659	0.3877	0.5990	0.1540
Mother with TT2	80	89.1 (86.5 ; 91.3)	89.2 (84.8 ; 92.5)	89.6 (84.7 ; 93.1)	88.4 (83.0 ; 92.3)	0.9172	0.8846	0.7830	0.7056
Birth assisted by qualified attendant	95	96.5 (94.7 ; 97.7)	94.7 (90.6 ; 97.1)	96.9 (93.6 ; 98.5)	98.0 (95.3 ; 99.1)	0.1700	0.2835	0.0740	0.4629
Exclusive Breastfeeding	70	59.3 (53.0 ; 65.3)	69.1 (54.8 ; 80.5)	53.1 (43.9 ; 62.0)	57.1 (47.1 ; 66.6)	0.1133	0.0585	0.1734	0.5418
Complementary Feeding	95	91.3 (85.4 ; 94.9)	92.4 (83.5 ; 96.7)	86.3 (73.1 ; 93.6)	95.3 (84.5 ; 98.7)	0.2797	0.3066	0.5465	0.1658
Hand washing	50	0.5 (0.2 ; 1.3)	0.7 (0.2 ; 2.6)	0.9 (0.2 ; 3.2)	0.0	*	*	*	*
Hand washing before cooking and before feeding the child		25.8 (21.4 ; 30.6)	26.0 (18.2 ; 35.5)	26.3 (20.1 ; 33.6)	25.1 (18.3 ; 33.3)	0.9750	0.9504	0.8813	0.8127
Wasting	5	X	X	X	X	X	X	X	X
Full immunization (by age 12 months)	90	57.8 (48.7 ; 66.4)	51.4 (35.6 ; 67.0)	70.0 (54.6 ; 81.9)	51.2 (36.5 ; 65.7)	0.1020	0.0678	0.9835	0.0923
Full immunization		64.3 (55.3 ; 72.5)	60.0 (43.6 ; 74.4)	71.8 (56.1 ; 83.5)	61.0 (45.2 ; 74.8)	0.4475	0.2438	0.9244	0.3338
Measles immunization	90	80.9 (72.7 ; 87.0)	80.0 (64.1 ; 90.0)	89.7 (74.7 ; 96.3)	73.2 (58.1 ; 84.3)	0.1664	0.2808	0.4581	0.0875

Indicator	Project Objectives (%)	2011 KPC Overall Results (%)	Non IMCI group (%)	IMCI group (%)	IMCI + group (%)	Rao-Scott overall Chi square P value	P Value (non IMCI vs. IMCI)	P Value (non IMCI vs. IMCI +)	P Value (IMCI vs. IMCI +)
ITN use	75	17.2 (14.1 ; 20.8)	14.0 (8.8 ; 21.7)	21.2 (16.2 ; 27.3)	16.1 (11.6 ; 21.8)	0.2101	0.0979	0.7921	0.0527
Recognition of dangers signs	80	72.1 (68.3;75.7)	73.0 (67.4 ; 78.0)	74.2 (67.8 ; 79.7)	69.0 (61.1 ; 76.0)	0. 4881	0.7653	0.3919	0.2850
Provision of more liquids and food to sick child	50	2.9 (1.8; 4.6)	2.8 (1.2; 6.5)	2.5 (1.1; 5.7)	3.4 (1.6; 7.2)	0.8628	0.8179	0.7639	0.5588
Provision of more liquids to sick child and continue feeding		8.8 (6.6 ; 11.5)	9.4 (5.8 ; 15.1)	7.9 (4.9 ; 12.5)	9.0 (5.6 ; 14.1)	0.8696	0.6139	0.8876	0.7079
Provision of more liquids to sick child		30.7 (26.2; 35.6)	35.2 (27.4 ; 43.9)	21.8 (15.6 ; 29.5)	35.4 (28.1 ; 43.4)	**0.0368**	**0.0109**	0.8361	**0.0071**
HIV/AIDS knowledge (ABC)		39.6 (34.6 ; 44.8)	34.8 (26.7 ; 43.8)	50.5 (41.8 ; 59.1)	32.9 (25.8 ; 40.8)	**0.0047**	**0.0137**	0.7473	**0.0033**
HIV/AIDS knowledge	75	56.3 (51.6 ; 60.8)	53.4 (46.0 ; 60.7)	65.8 (58.7 ; 72.3)	48.8 (40.6 ; 57.0)	**0.0039**	**0.0169**	0.4133	**0.0021**

*Chi-Square test could not be used due to the presence of null cells in the model

**All observations below six months were set to missing

Practices and Behaviors

Coverage of key practices and behaviors in the Menoua Department are presented in Table 12.

Antenatal and delivery care

As the first indicator on the child developmental scale, appropriate **birth spacing** of at least two years between children was found to be practiced by only about two thirds of women interviewed (69.3%; 95% CI: 64.0, 74.2), far below the target rate. No statistically significant difference could be observed between the three IMCI groups. However, when questioned, mothers were often unable to recall the exact date or year of birth of all their children, a limitation that may have significantly biased results in one direction or another.

Of the 13 key indicators identified by Tockem to measure the progress of the IMCI strategy, the proportion of **mothers who received at least two tetanus toxoid** shots before the birth of their child and the proportion of **births assisted by a qualified attendant** are the only two indicators that reached and surpassed their respective targets. Almost 90% of mothers who responded to the survey, and who knew how many shots of tetanus toxoid they had received in the past, declared having received at least two shots before the birth of their last child surpassing the 80% target by about 10 percentage points. Attendance at delivery of qualified health personnel has been reported by almost all mothers (96.5%; 95% CI: 94.7, 97.7) also surpassing the 95% target of the program.

No statistically significant difference between the three groups was observed for either indicator.

Feeding practices

Exclusive breastfeeding coverage was estimated at 59.3% while the target was set at 70%. Although no statistically significant difference was observed across the three IMCI groups, the non IMCI group almost reached the target with a practice rate of 69.1%. Reaching higher coverage levels, appropriate **complementary feeding** was reported by 91.3% of mothers, four percentage points shy of the 95% coverage target. In this case, the IMCI + group was found to have reached the project objective with a practice rate of 95.3%. Nevertheless the IMCI + group was not statistically different from the two other groups.

Immunization

Measles immunization among children 12-23 months old at any time before the interview was found to be at 80.9% while the program objective was set at 90%. Despite the lack of statistical significance between the groups, it is important to note that the IMCI group has almost reached the target with coverage of 89.7%. Results regarding immunization levels should be interpreted carefully as it became evident through the survey that a number of immunization cards were not complete due to loss of the original card, bad storage conditions causing some data to be erased, and possible failure of the health personnel to fill out the cards appropriately. As a result, it is likely that immunization coverage were underestimated. **Full immunization** before a child's first

birthday – defined as the reception of BCG, DTP1, 2, 3; Polio 1, 2, 3 and Measles shots before age one – was confirmed for almost three fifth of children 12-23 months old (57.8%; 95% CI: 48.7, 66.4); while full immunization at any time before the interview reached coverage of 64.3%. No statistically significant difference was found between the three groups. Nonetheless, the IMCI group's coverage surpasses both other groups' by more than 10 percentage points.

Knowledge of danger signs and care practices

The proportion of **mothers who recognize at least two signs of illness that indicate a child needs treatment** reached almost three quarters (72.1%; CI 95%: 68.3, 75.7) about eight percentage points away from the 80% target of the program. Although most mothers were able to list at least two danger signs, less than 3% of all **children who had been sick in the past two weeks received more fluids and food while ill**. Only 8.8% received more liquids and the same amount of food as usual, and almost one third received more liquids (30.7%; 95% CI: 26.2; 35.6). No statistically significant difference was observed between the three groups for the two first levels of feeding. However, the practice of providing more liquids to a child when sick was found to be significantly lower in the IMCI group compared to the two other groups (IMCI vs. non IMCI p value= 0.0109; IMCI vs. IMCI+ p value= 0.0071).

Prevention

ITN use among children sampled in this survey was found to be very low as only 17.2% of children were reported to have slept under an ITN during the night preceding the

interview. There was no statistically significant difference observed between the three groups. Despite guidelines and efforts made to clarify what the survey was about and who was responsible for the study, mothers had a tendency to assume the team would come back with bed nets as may have been done in the past. As a result, there was a clear tendency from the respondents to reporting absence of any type of bed net in the house, in hope of obtaining one later, which may have translated into deflated rates of ITN ownership and use.

Virtually none of the mothers surveyed (0.5%; 95% CI: 0.2, 1.3) was able to list all four key events when **hand washing** must be practiced (before cooking, before feeding the child, after going to the bathroom, and after changing a child who has defecated). Yet, about a quarter (25.8%; 95% CI: 21.4, 30.6) of those who responded listed both cooking and feeding of the child as key events prior to which they need to wash their hands, both events are the final steps of the oral-fecal route and therefore are especially important. During the survey, most mothers responded they washed their hands *all the time*, especially after *any* type of work. When pressed to specify what precise events prompted them to wash their hands, respondents often expressed misunderstanding in regards to the importance of the question insisting that washing hands all the time was their final answer. It is thus possible that hand washing practices coverage was underestimated.

Lastly, only about two fifth of all respondents were able to list two of the ABC guidelines to avoid HIV/AIDS (Abstinence, Be faithful and Be with a faithful partner, and Condom). Including additional possible ways of avoiding HIV/AIDS such as “avoiding

sex with prostitutes" or "avoiding injections", **knowledge of two ways to avoid HIV/AIDS** climbed to 56.3%. Knowledge about HIV was significantly higher for the IMCI group at both levels. However, questions related to the topic brought with them a series of challenges in obtaining open responses. In fact, the issue was found to be especially taboo among older women who often declared they never heard of the disease or did not know how to avoid it while displaying signs of uneasiness and insisting on moving on to the next question when probed or asked to confirm that they had in fact never heard of the disease. This trend may have biased results by underestimating the knowledge of mothers and potentially displaying false differences between IMCI groups.

DISCUSSION

Although results suggest that the effect of IMCI implementation in the Menoua Department on under-five morbidity and on the knowledge and practices of caretakers is null, it is important to note that the contiguous location of all three IMCI groups makes leakage of the IMCI intervention into non-IMCI areas very likely. Families and caretakers of young children often have wide networks of kin and acquaintances located in various parts of the department. These large networks and increasing use of multiple communication channels certainly contribute to the spread of knowledge to parts of the department which have not yet benefited from the IMCI strategy. Movement from one health zone to another is also relatively easy and caretakers from non-IMCI areas are able to seek health services from one of the two IMCI groups/areas if they wish to do so. In addition, challenges encountered during the survey and discussed above may have inserted error in the results presented here. Hence, the absence of a statistically significant effect of IMCI on the health of the population in this study does not necessarily indicate failure of the IMCI program.

Poor evidence of the presence of a positive effect of IMCI on the population may also be explained by the fact that the community based component of the strategy in the Menoua Department has not been fully implemented as in the East Province C-IMCI program. In fact, the project has had to face high community health worker turnover for lack of incentives, time and recognition. Though Tockem attempted to resolve the issue through

remunerated refresher trainings in April of 2011, the time allowed for the trainings to translate into increased knowledge, change in health behaviors and morbidity may have been insufficient (4 months). This may explain the lack of statistical difference between the IMCI + and IMCI groups.

Beyond the role of community health workers in the passing of health messages to caretakers, it is important to remember that the IMCI strategy contains three components and that the effect of any IMCI strategy emanates from the joint effect of all three components. In this light, results of immunization rates and ITN use suggest a systemic issue with the supply and access to prevention services. While immunization has certainly been underestimated due to poor immunization card records, the poor immunization coverage results correlate with findings of the 2010 evaluation where only 5 out of 23 facilities visited had all essential medicines in stocks. Shortage of ITNs in health facilities as reported by several respondents and a few health workers, certainly contributed to the low utilization rate thereby translating in high prevalence of fever and malaria among children during the two weeks preceding the survey.

In view of the doctor and nurse to population ratios and the lack of supervision identified through the 2010 evaluation, health worker performance may also play a role in the lack of evidence of an effect on population health and behaviors in the IMCI and IMCI + groups compared to the non-IMCI group. Yet, it is impossible for us to confirm these hypotheses as this study did not evaluate the performance of the community health workers, health system or health workers.

COMPARISON WITH DEMOGRAPHIC HEALTH SURVEY 2011 PRELIMINARY RESULTS

While this study may fail to clearly establish the presence of an effect of IMCI on the population served by IMCI trained health workers and CHWs, it is important to highlight that findings do provide a snapshot of the health status of the population at the departmental level.

These findings may be compared to the results of the Demographic Health Survey (DHS), conducted in the spring and summer of 2011, and evaluated for consistency. DHS surveys are regarded as standard and strongly reliable sources of information on the health status of developing countries across the world. Results from this nationwide study can be disaggregated at the provincial level and used to determine where the Menoua Department – one of the few departments benefitting from the IMCI strategy – stands in comparison to the West Province of Cameroon, and Cameroon as a whole. The 2011 preliminary results are presented in Table 13.

Table 13. Comparison of 2011 DHS and 2011 KPC surveys

Indicators	**2011 DHS Results Cameroon (n=15,852)**	**2011 DHS Results West Province (n=1,320)**	**2011 KPC results (n=919)**
Birth spacing	X	X	69
Mother with TT2	73.3	87.7	89
Birth assisted by qualified attendant	63.6	95.8	97
Exclusive Breastfeeding	20.2	X	59
Complementary Feeding	76.3	X	91
Hand washing	X	X	01
Hand washing before cooking and before feeding the child	X	X	26
Wasting	14.6	4.9	X
Full immunization (by age 12 months)	X	X	58
Full immunization	53.2	63.7	64
Measles immunization	70.6	79.8	81
ITN use	21.1	X	17
Recognition of danger signs	X	X	72
Provision of more liquids and food to sick child	X	X	03
Provision of more liquids to sick child and continue feeding	X	X	09
Provision of more liquids to sick child	X	X	31
HIV/AIDS knowledge (ABC)	X	X	40
HIV/AIDS knowledge	X	X	56

Source: Institut National de la Statistique, *Enquête Démographique et de Santé et à Indicateurs Multiples (EDS-MICS) 2011. Rapport Préliminaire*, 2011

Overall, indicators reported in the DHS 2011 preliminary results report follow the same trend. In fact, according to the DHS national and provincial data, the performance of the West Province in all indicators of health knowledge and practices is above that of the rest of the country. Furthermore, the Menoua Department consistently displayed coverage slightly above the West Province coverage calculated through the DHS survey. Though it is impossible to determine whether the observed differences are significant due to the absence of statistical analysis, results of both surveys were found to be consistent therefore validating to some extent overall Menoua Department results obtained in the 2011 KPC survey.

Although ITN use coverage is only reported at the national level, the indicator stands out as it is the only one for which coverage is higher for the country than for the Menoua Department. Without a doubt, ITN ownership and use is a serious issue in the department and the rest of the country. Things may change dramatically with the granting of over 70 million dollars by the Global Fund for scaling up malaria control in Cameroon in January of 2011 [86]. Yet as of August 2011, the distribution of free ITNs sponsored by the Global Fund had yet to take place.

COMPARISON WITH PAST LQAS SURVEYS

Comparison of results from the present KPC study with previous assessments of knowledge and practices discussed earlier is important to understand each indicator's trend and to identify areas of weakness. Although the goal of the LQAS surveys used in 2006 and 2010 was to identify specific health zones which did not meet the desired coverage levels, aggregation of the data allowed Tockem and local health authorities to see what coverage looked like at the departmental level. Compiled results of the 2006 baseline and 2010 mid-point LQAS surveys are presented in Table 14.

Table 14. Comparison of 2006, 2010 LQAS and 2011 KPC surveys

Indicators	**Program Objectives (%)**	**2006 LQAS results (n=133)**	**2010 LQAS results (n=111)**	**2011 KPC results (n=919)**
Birth spacing	95	88	77	69.3
Mother with TT2	80	57	77	89.1
Birth assisted by qualified attendant	95	88	95	96.5
Exclusive Breastfeeding	70	41	57	59.3
Complementary Feeding	95	89	90	91.3
Hand washing	50	13	07	0.5
Hand washing before cooking and before feeding the child	X	X	X	25.8
Wasting	05	13	02	X
Full immunization (by age 12 months)	90	63	89	57.8
Full immunization	X	X	X	64.3
Measles immunization	90	63	91	80.9
ITN use	75	17	29	17.2
Recognition of danger signs	80	70	82	72.1
Provision of more food and liquids to sick child	50	02	03	2.9

Indicators	**Program Objectives (%)**	**2006 LQAS results (n=133)**	**2010 LQAS results (n=111)**	**2011 KPC results (n=919)**
Provision of more liquids to sick and continue to feed	X	X	X	8.8
Provision of more liquids to sick child	X	X	X	30.7
HIV/AIDS knowledge (ABC)	X	X	X	39.6
HIV/AIDS knowledge	75	59	78	56.3

Source: Fleury C., *Evaluation du Programme de Coopération dans le Département de la Menoua.* 2010

Although no statistical test could be performed to assess the significance of any difference observed, coverage trends over time are very heterogeneous. In fact, while indicators of neonatal tetanus prevention, births assisted by qualified personnel, and feeding practices have consistently increased over the five year period, most other indicators show high levels of coverage fluctuation.

Strengths

Two of the thirteen key indicators have reached their respective project objectives including mother's tetanus toxoid immunization. This accomplishment suggests that health structures in the region have an adequate capacity base to accomplish higher immunization coverage among children 12-23 months old. Further, the high rates of assisted delivery indicate that access to care along with appropriate health seeking behaviors around child birth in the Menoua Department have been achieved. The nature of childbirth, as a potentially very hazardous event in the life of a mother and her child requiring instantaneous assistance, may have contributed to the higher coverage level of

this practice. Yet, this is an encouraging demonstration of the fact that families can access care when sought appropriately.

Finally, appropriate feeding practices are rising and approaching project targets suggesting that healthy behaviors in the area can be improved. Despite the fact that nutrition status of the child was not evaluated in this study, it is likely that these changes continue to reduce wasting among children under five as seen in the IMCI-MCE study in Bangladesh where feeding practices improved in both IMCI and comparison groups resulting in decreased wasting and stunting rates among children under five [52].

Weaknesses

While some health behaviors and practices may have improved in the Menoua Department, others including hand washing and provision of more liquids and food to a sick child have decreased or stagnated at low levels. Given that hand washing and increased food and fluids are priority messages in IMCI for disease prevention and home-base management, the low response levels on these two issues are very troubling. Such results echo findings from the 2009 IMCI evaluation performed in Armenia where some indicators measured were inexplicably found to have decreased overtime while others increased in the right direction [63]. Still, this contrasts with results obtained in the East province of Cameroon and South-Western Nigeria IMCI evaluations where all health behavior indicators measured increased overtime [62, 78]. It is difficult to explain the decreasing trends observed in this study which have also, for the most part, suffered from possible respondent bias as explained in the result section. Yet, possible factors

participating in the evolution of this concerning trend may lie in the execution of the three IMCI components. Unfortunately, as mentioned earlier, performance and execution of each component were not evaluated in this study.

Overall, this study brings forth new evidence on the effect of IMCI implementation, and shows the extent to which health behaviors and practices, which are targeted by the strategy, are complex and not necessarily correlated in the way they change within and across communities. In addition, this study points to the influence and effect that the IMCI strategy may have on comparison communities which are located at the border of IMCI intervention areas and may lead to improved health status and behaviors in these communities. Finally, the outcome of this study testifies of the importance of holistic evaluations looking at all three components of the IMCI strategy, since the effect of the program is really only a product of all three interventions.

LIMITATIONS

Several factors have certainly impacted the validity of the data presented here or rendered their interpretation difficult. Firstly, time and resources limitations prevented the principal investigator and Tockem staff members from conducting the three day training designed to train enumerators. As a result, evidence of misunderstandings with the questions came about throughout the survey. These issues had to be addressed by the principal investigator retrospectively and may have introduced some error in the surveys administered in the first few days of the study. Data quality assurance activities could not be completed as planned in reason of electricity shortages and late submission of the questionnaires. As a result serious patterns of bias coming from one of the teams in the way they were asking the question regarding hand washing could not be addressed in time and all data recorded by them on hand washing practices had to be excluded from the analysis.

Delimitation of villages and neighborhoods is virtually non-existent in the region. The fact that the team had to rely on local informants to determine the boundaries of each cluster certainly brought some bias in the way houses were selected. In other words, the point of origin supposed to be located at the center of the cluster may not have always truly been at the center thus excluding parts of the cluster which should have been covered by the team.

Beyond theoretical and methodological issues, the survey was affected by serious difficulty in accessing some of the selected clusters. As a result, some of the clusters were not completely assessed. In one case, a village which was located behind mountains and could not be accessed by car or motorbike but only by foot through a four hour trek up and down the mountain was not visited at all. Instead, mothers originating from that particular village were found at the nearest health clinic on immunization day. Although mothers from the desired village were thus captured in the survey, the way in which they were selected certainly affected results of the study. Finally, it is evident that the survey team has failed to overcome the misunderstandings and expectation bias expressed by the population throughout the study. This is especially true for indicators of ITN use and knowledge about HIV which are strongly believed to have been underreported by respondents to express a need for more ITNs, or unwillingness to discuss taboo topics and behaviors related to the HIV/AIDS epidemic. In general, some respondents testified that they are often surveyed by various groups, at home or at the health facility level. As a result, survey fatigue and anticipation of questions phrased similarly to questions asked in the past may have impacted the results, especially in the case of hand washing.

Lastly, in the analysis of the results, the lack of information on socio-demographic factors makes discounting of confounders impossible. For instance, the IMCI group is located in and around the city of Dschang making this group disproportionately composed of urban or semi-urban residents. In addition, it is also important to note that three other programs addressing issues related to IMCI were reported to be serving the population of the Menoua Department in all three health districts at the time of the study.

- The Onchocerciasis or river blindness program seeks to eliminate the disease in the region through the distribution of Mectizan, a drug fighting the parasitic infection.
- The Prevention of Mother To Child Transmission (PMTCT) program seeks to reduce transmission of HIV from mother to child by way of increased testing among pregnant women, distribution of Anti Retro Viral (ARV) drugs to pregnant women, and education on newborn nutrition.
- The Malaria program works to decrease malaria morbidity and mortality through the provision of Artemisinin based Combination Therapy (ACT), bed nets, and case management training in health facilities and at home. This program had not been launched in all health areas at the time of the study.

Despite the presence of these programs in the region, stakeholders who participated in the study all agreed that no significant difference should exist between the IMCI groups.

CONCLUSION

Key health practices and behaviors of hand washing, provision of more foods and fluids to a sick child, ITN use, immunization, and recognition of danger signs were all identified as priority areas to achieve better health impact on the population of the Menoua Department. All these key health knowledge and practices are part of the information and education package relayed by both health staff and community health workers to individuals, families, and communities. The survey data indicates that satisfactory levels of these important behaviors have not been achieved. Therefore, it is reasonable to conclude that the IMCI strategy implemented in the Menoua Department is not reaching its full potential. Aforementioned areas of weaknesses must be addressed by the program to achieve objectives set in 2006 and to contribute to the achievement of Millennium Development Goal 4 in Cameroon by the year 2015.

RECOMMENDATIONS

In order to foster progress towards improved health among children in the Menoua Department, Tockem needs to identify and address gaps and barriers preventing the appropriate application of IMCI guidelines by health staff and community health workers. The following recommendations lay out a series of actions that will enable Tockem and its partners to formulate new guidelines and principles for the execution of the IMCI strategy in the region:

1. **Carry out a health facility assessment to evaluate the current performance of health workers in carrying out the essential IMCI tasks of assessment, classification, treatment, and follow-up** (as done through the 2010 mid-point evaluation).

   This assessment should also consider workload of each health worker as high workloads may impact individual consultations of sick children.

2. **Develop interventions to improve health worker performance based on results of this assessment.**

   This may include carrying out refresher trainings to address gaps in health worker knowledge and practice identified in the health facility assessment along with renewed efforts to improve health system's performance through the provision of health equipment and supplies, and the design of solutions to address the low health worker to population ratios.

3. **Assess the current effectiveness of the Community Health Workers' work regarding current level of active participation, knowledge and practice.**
   Beyond assessments of community knowledge and behaviors, information on the actual delivery of health messages by CHWs in terms of quality and frequency is needed.
4. **Meet with community leaders and community health workers to identify the need for and the potential to address health needs at the community level.**
   Continued and increased involvement of the community in the execution of the IMCI strategy in the region has the power to significantly improve the quality of specific interventions and results ensued.
5. **Develop and test a community model with appropriate tasks, regular capacity strengthening, and supportive supervision.**
   Piloting innovative strategies within the IMCI framework may be of great use to Tockem and its partners in defining effective solutions in a cost effective manner.

Although aforementioned recommendations directly transpire from the results and observations made through this study, it would be determinant for the project to conduct additional research projects to better understand some of these findings and let new recommendations emerge. More specifically, understanding the lower coverage levels found in the IMCI group in terms of home-based management of child illness practices will be necessary to better tailor the work done by CHWs in the area. Additionally, it will be important to understand the fluctuations observed in time for all priority indicators to determine the causes of observed decreases in coverage and address them appropriately.

Most importantly, high quality communication and coordination between evaluation teams across the years is absolutely indispensable. In fact, many limitations present in this study could have been avoided with appropriate sharing of information and preparation. In light of these limitations, specific factors need to be anticipated and addressed before the start of future research. This will maximize the quality of the data obtained in the future and help make the elaboration of action plans and the adoption of future directions more clear for the IMCI program.

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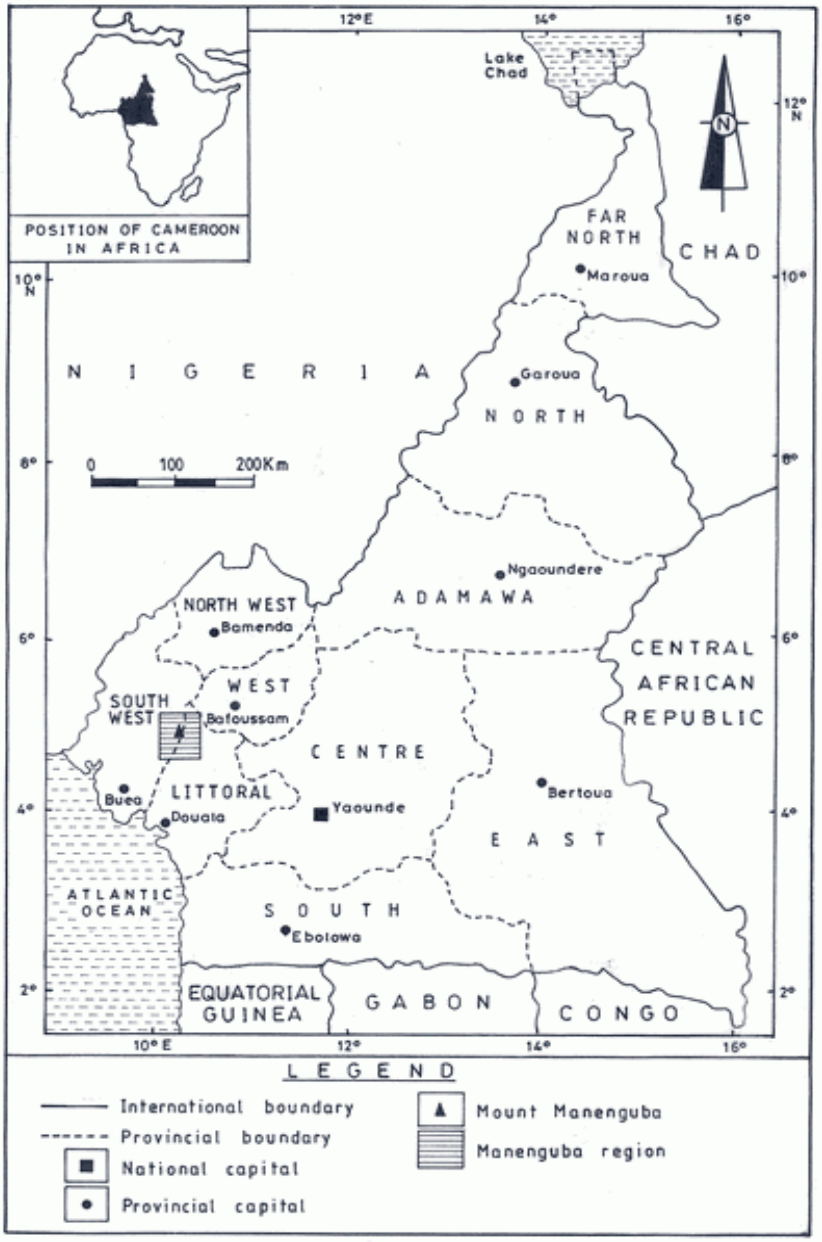
APPENDICES

APPENDIX A

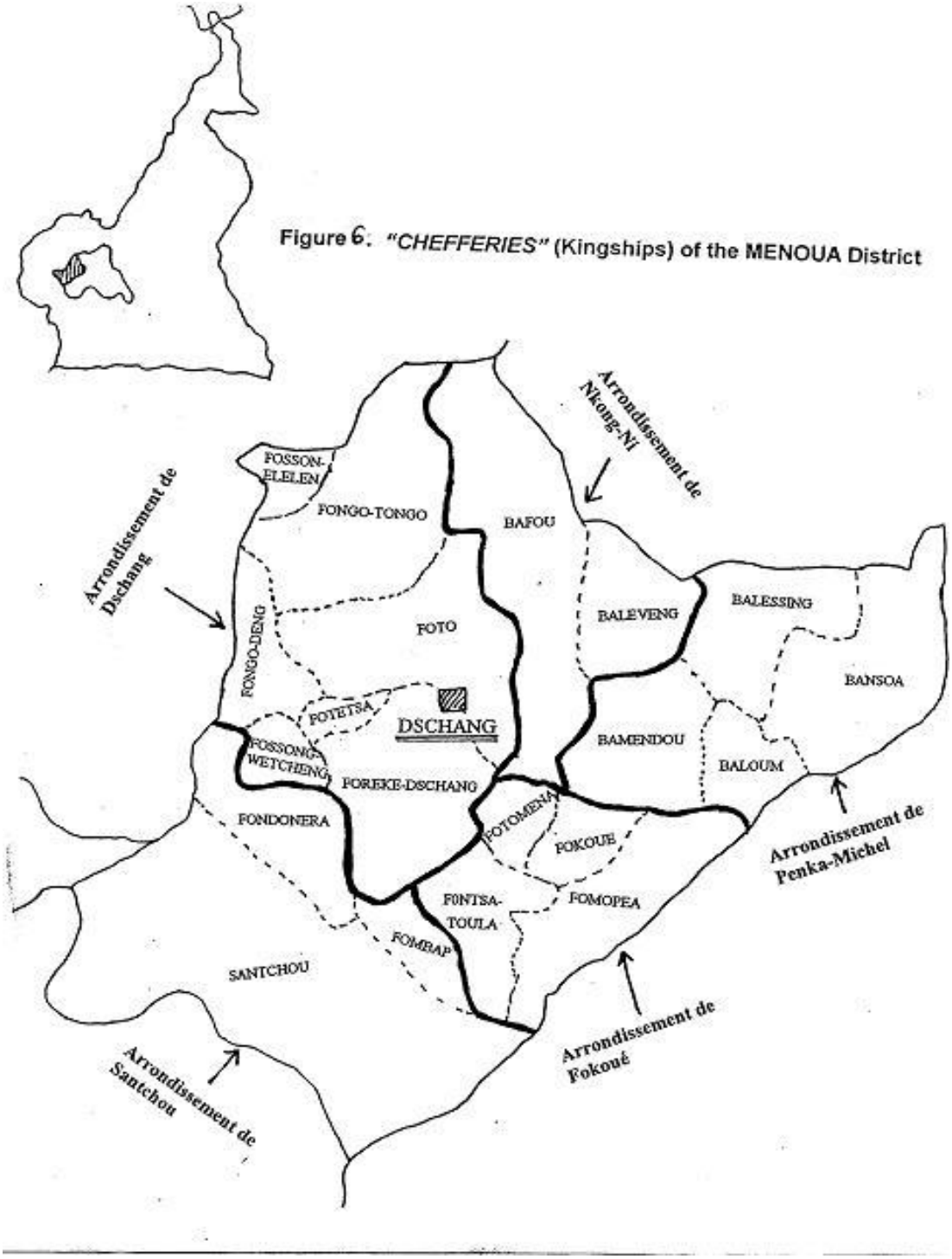
MAP OF CAMEROON



MAP OF THE WEST PROVINCE OF CAMEROON

*This map does not show the Noun Department which is located along the Eastern borders of the Bamboutos, Mifi, Koung Khi and Nde Departments. It is the largest department of the West Province

MAP OF CAMEROON, THE WEST PROVINCE AND THE MENOUA DEPARTMENT



APPENDIX B

KPC QUESTIONNAIRE (ENGLISH AND FRENCH VERSIONS)

Original CORE Group Rapid CATCH questionnaire

This questionnaire targets mothers of children less than 24 months of age.

1. RECORD INTERVIEW DATE

DAY		MONTH		YEAR	

2. How old are you?
   RECORD AGE OF RESPONDENT IN YEARS: ___ ___

3. How many children living in this household are under age five? _____

4. How many of those children are your biological children? _____

What We Know: Birth intervals of at least 24 months (the minimum recommended duration between successive pregnancies) are associated with a lower risk of death and illness in children. The following table can be used to estimate the amount of time that elapsed between the births of the respondent's two youngest children. It should be noted, however, that this question only pertains to surviving children and therefore may not accurately depict child spacing within the target community.

5. READ ONE OF THE FOLLOWING QUESTIONS BASED UPON MOTHER'S RESPONSE TO Q.4:

   ONLY 1 CHILD UNDER FIVE: "What is the name, sex, and date of birth of that child?"

   MORE THAN 1 CHILD UNDER FIVE: "What are the names, sexes, and dates of birth of your two youngest children?"

	NAME	SEX	DATE OF BIRTH
1		1. MALE 2. FEMALE	__ __ / __ __ / __ __ DD MM YY
2		1. MALE 2. FEMALE	__ __ / __ __ / __ __ DD MM YY

ALL SUBSEQUENT QUESTIONS PERTAIN TO THE YOUNGEST CHILD UNDER AGE TWO

Anthropometry

What we know: In poor countries, malnutrition is a contributing factor in more than half of all under-five deaths. Body dimensions (weight and height) reflect the overall health and well-being of individuals and populations. The prevalence of low weight-for-age (underweight) can be used to assess nutrition interventions and is a required indicator for all projects funded under USAID's Title II (Food Assistance) Program.

6. May I weigh (NAME)?
    1. YES
    2. NO → **SKIP TO Q.8**

7. IF MOTHER AGREES, WEIGH THE CHILD AND RECORD WEIGHT BELOW. RECORD TO THE NEAREST TENTH.

___ ___ . ___ KILOGRAMS

Maternal and Newborn Care

What we know: Neonatal tetanus is the second leading cause of death from a vaccine-preventable illness among children. A pregnant woman should receive at least two tetanus toxoid injections to prevent tetanus in her baby. Delivery assistance by skilled health personnel is also recommended to ensure hygienic conditions for safe delivery, as well as early recognition, treatment, and/or referral of complications in the mother and/or baby.

8. Before you gave birth to (NAME) did you receive an injection in the arm to prevent the baby from getting tetanus, that is, convulsions after birth?
    1. YES
    2. NO → **SKIP TO Q.10**
    8. DON'T KNOW → **SKIP TO Q.10**

9. How many times did you receive such an injection?
    1. ONCE
    2. TWICE
    3. MORE THAN TWO TIMES
    8. DON'T KNOW

10. Now I would like to ask you about the time when you gave birth to (NAME). Who assisted you with (NAME'S) delivery?
    A. DOCTOR
    B. NURSE/MIDWIFE
    C. AUXILIARY MIDWIFE
    D. TRADITIONAL BIRTH ATTENDANT _____
    (NAME)
    E. COMMUNITY HEALTH WORKER
    F. FAMILY MEMBER _____
    (SPECIFY RELATIONSHIP TO RESPONDENT)
    G. OTHER _____
    (SPECIFY)
    Y. NO ONE

Breastfeeding and Nutrition

What We Know: Exclusive breastfeeding of infants until about six months of age, appropriate complementary feeding from about six months of age, and continued breastfeeding until 24 months are critical nutrition behaviors aimed at improving the nutritional and health status of infants and young children. Immediate placement of the newborn at the mother's breast reduces the risk of hypothermia in the newborn and allows the infant to reap the nutritional and anti-bacterial/anti-viral benefits of the mother's colostrum. Although immediate breastfeeding is ideal, initiation of breastfeeding within the first hour of life leaves little opportunity for the introduction of prelacteal feeds and is conducive to establishing optimal infant-feeding behaviors.

11. Did you ever breastfeed (NAME)?
    1. YES
    2. NO→**SKIP TO Q.13**

12. How long after birth did you first put (NAME) to the breast?
    1. IMMEDIATELY/WITHIN FIRST HOUR AFTER DELIVERY
    2. AFTER THE FIRST HOUR

13. I would like to ask you about the types of liquids and foods that (NAME) consumed yesterday during the day or at night. Did (NAME) have. . .

READ EACH OF THE FOLLOWING AND PLACE A CHECK MARK IN THE BOX NEXT TO EACH ITEM CONSUMED.

	LIQUID/FOOD	**CONSUMED IN LAST 24 HOURS?**
A	Breastmilk?	
B	Plain water?	
C	Other liquids?	
D	Mashed, pureed, solid, or semi-solid foods?	
E	Anything else? SPECIFY: _____ _____ _____	

Child Immunization

What We Know: (1) Some of the major causes of morbidity, disability, and mortality in children are preventable by vaccines. Timing is very important: a child should be fully immunized against the five vaccine-preventable diseases (poliomyelitis, diphtheria, pertussis, tetanus, and measles) by his/her first birthday. (2) In contexts where vitamin A deficiency is a problem, vitamin A supplementation has also been cost-effective in improving child-health outcomes.

Measles is one of the five leading causes of child deaths worldwide. Consequently, measles prevention has been identified as a major priority within the child survival community. This questionnaire provides CS projects with two options:

A) Assess full immunization coverage before the first birthday [Qs. 14 and 15] using information recorded on children's vaccination cards

B) Assess measles vaccine coverage [Q. 16] based upon maternal reports of measles vaccination

Whereas full immunization coverage before age one can only be assessed among children with immunization cards, projects that choose Option B may ask all mothers—regardless of whether the child has a card or not—if the child was immunized against measles.

IF OPTION A IS CHOSEN, OMIT QUESTION 16 FROM THE QUESTIONNAIRE. IF OPTION B IS CHOSEN, OMIT QUESTIONS 14 AND 15.

14. Do you have a card where (NAME'S) vaccinations are written down?
IF 'YES'ASK 'May I see it please?'

1. YES, SEEN BY INTERVIEWER
2. NOT AVAILABLE (lost/misplaced, not in home)→**SKIP TO Q.17**
3. NEVER HAD A CARD→**SKIP TO Q.17**
8. DON'T KNOW→**SKIP TO Q.17**

15. RECORD INFORMATION EXACTLY AS IT APPEARS ON (NAME'S) VACCINATION CARD.

	DAY		MONTH		YEAR	
BCG						
POLIO 0						
POLIO 1						
POLIO 2						
POLIO 3						
DPT 1						
DPT 2						
DPT 3						
MEASLES						
VITAMIN A						

16. Did (NAME) ever receive an injection to prevent measles?
    1. YES
    2. NO
    8. DON'T KNOW

Malaria Prevention

What We Know: In countries where malaria is endemic, the disease has had adverse effects on the health and survival of young children. One means of reducing malaria transmission is through the use of insecticide-treated mosquito nets.

Questions 17 through 19 can be omitted in non-endemic areas.

17. Do you have any bednets in your house?
    1. YES
    2. NO→**SKIP TO Q.20**
    8. DON'T KNOW→**SKIP TO Q.20**

18. Who slept under a bednet last night? CIRCLE ALL THAT APPLY.

A. CHILD (NAME)
B. RESPONDENT
C. OTHER INDIVIDUAL(S) _____
(SPECIFY)

19. Was the bednet ever soaked or dipped in a liquid to repel mosquitoes or bugs?
1. YES
2. NO
8. DON'T KNOW

Integrated Management of Childhood Illnesses (IMCI)

What We Know: In recent years, there has been a trend towards the integrated management of the most important causes of childhood deaths: pneumonia/acute respiratory infections, diarrhea, measles, malaria, and malnutrition. Community IMCI entails the recognition of key signs of illness that warrant treatment, effective home management of childhood illnesses, and timely and appropriate care-seeking outside of the home, when necessary.

20. Sometimes children get sick and need to receive care or treatment for illnesses. What are the signs of illness that would indicate your child needs treatment? *DO NOT PROMPT. CIRCLE ALL MENTIONED.*

A. DON'T KNOW
B. LOOKS UNWELL OR NOT PLAYING NORMALLY
C. NOT EATING OR DRINKING
D. LETHARGIC OR DIFFICULT TO WAKE
E. HIGH FEVER
F. FAST OR DIFFICULT BREATHING
G. VOMITS EVERYTHING
H. CONVULSIONS
I. OTHER _____
(SPECIFY)
J. OTHER _____
(SPECIFY)
K. OTHER _____
(SPECIFY)

21. Did (NAME) experience any of the following in the past two weeks?
READ CHOICES ALOUD AND CIRCLE ALL MENTIONED BY RESPONDENT.

A. DIARRHEA
B. BLOOD IN STOOL
C. COUGH
D. DIFFICULT BREATHING
E. FAST BREATHING/SHORT, QUICK BREATHS
F. FEVER
G. MALARIA
H. CONVULSIONS
I. OTHER _____
(SPECIFY)

J. OTHER _____
(SPECIFY)

K. NONE OF THE ABOVE→ **SKIP TO Q.24**

22. "When (NAME) was sick, was he/she offered less than usual to drink, about the same amount, or more than usual to drink?"
1. LESS THAN USUAL
2. SAME AMOUNT
3. MORE THAN USUAL

23. When (NAME) was sick, was he/she offered less than usual to eat, about the same amount, or more than usual to eat?
1. LESS THAN USUAL
2. SAME AMOUNT
3. MORE THAN USUAL

HIV/AIDS

In light of the multidimensional, multigenerational impact of AIDS on populations throughout the globe, an increasing number of PVOs are including activities related to HIV/AIDS in their child survival projects. Traditionally, PVO strategies have focused on increasing knowledge and awareness in communities. Some PVOs are now beginning to explore means of ameliorating the negative impact of the disease on children and communities. Nevertheless, widespread knowledge of the modes of HIV transmission is a critical first step in thwarting the spread of HIV/AIDS.

24. Have you ever heard of an illness called AIDS?
1. YES
2. NO→ **SKIP TO Q.26**

25. What can a person do to avoid getting AIDS or the virus that causes AIDS?
CIRCLE ALL MENTIONED.

A. NOTHING
B. ABSTAIN FROM SEX
C. USE CONDOMS
D. LIMIT SEX TO ONE PARTNER/STAY FAITHFUL TO ONE PARTNER
E. LIMIT NUMBER OF SEXUAL PARTNERS
F. AVOID SEX WITH PROSTITUTES
G. AVOID SEX WITH PERSONS WHO HAVE MANY PARTNERS
H. AVOID INTERCOURSE WITH PERSONS OF THE SAME SEX
I. AVOID SEX WITH PERSONS WHO INJECT DRUGS INTRAVENOUSLY
J. AVOID BLOOD TRANSFUSIONS
K. AVOID INJECTIONS
L. AVOID KISSING
M. AVOID MOSQUITO BITES
N. SEEK PROTECTION FROM TRADITIONAL HEALER
O. AVOID SHARING RAZORS, BLADES
W. OTHER_____
(SPECIFY)
X. OTHER_____
(SPECIFY)
Z. DON'T KNOW

Hand-washing Practices

What We Know: Washing hands at appropriate times is one of the most important ways of preventing the spread of disease. WHO and UNICEF have acknowledged appropriate hand washing as a key family practice to improve child health and nutrition in communities. USAID's Environmental Health Project (EHP) also recognizes that community-wide changes in hygiene practices are critical to achieving reductions in illness and death among young children.

26. Before we end, I'd like to ask one more question. When do you wash your hands with soap/ash?
DO NOT PROMPT. CIRCLE ALL MENTIONED.

A. NEVER
B. BEFORE FOOD PREPARATION
C. BEFORE FEEDING CHILDREN
D. AFTER DEFECATION
E. AFTER ATTENDING TO A CHILD WHO HAS DEFECATED

X. OTHER _____
(SPECIFY)

Version of the questionnaire used by Tockem in 2011

Questionnaire used by Tockem

Questionnaire de l'enquête KPC pour l'Evaluation Rapide de la Santé des Enfants de 0 à 24 mois dans le département de la Menoua

Ce questionnaire cible les mères d'enfants de moins de 24 mois.

1. NOM DE L'ENQUETEUR : 2. FORMATION SANITAIRE :
3. VILLAGE : 4. NUMERO DU GROUPE : D'ETUDE :
5. DATE D'INTERVIEW :

JOUR		MOIS		ANNEE	

6. Vivez-vous à (nom du village) depuis plus d'un an?
    1. OUI
    2. NON
    8. NE SAIT PAS
7. Lorsque votre enfant est malade où allez-vous pour le faire soigner?
    1. FORMATION SANITAIRE (NOTER LE NOM) _____
    2. AUTRE (PRECISER) _____
8. Quel âge avez-vous ? NOTER L'AGE DE LA MERE EN ANNEES : ___ ___
9. Quelle est votre date de naissance ?

JOUR		MOIS		ANNEE	

10. Combien d'enfants de moins de cinq ans vivent dans ce foyer ? ___ ___
11. Combien de ces enfants de moins de cinq ans sont vos enfants biologiques ? ___ ___

12. Avez-vous perdu un enfant biologique de moins de 5 ans durant les 12 derniers mois ?
    1. OUI
    2. NON → **ALLER A Q .14**
13. Où est-ce que cet enfant est décédé ?
    1. FORMATION SANITAIRE
    2. A LA MAISON
    3. AUTRE (PRECISER) _____

14. LIRE UNE DES QUESTIONS SUIVANTES EN FONCTION DE LA REPONSE PRECEDENTE EN Q11 :

UN SEUL ENFANT DE MOINS DE 5 ANS : "Quel est le nom, le sexe, la date de naissance de cet enfant ?"

PLUS D'UN ENFANT DE MOINS DE 5 ANS : "Quels sont les noms, sexes et dates de naissance de vos deux plus jeunes enfants ?"

	NOM DE L'ENFANT	SEXE	DATE DE NAISSANCE
1		1. MASCULIN 2. FEMININ	__ __ / __ __ / __ __ JJ MM AA
2		3. MASCULIN 4. FEMININ	__ __ / __ __ / __ __ JJ MM AA

TOUTES LES QUESTIONS SUIVANTES FONT REFERENCES AU PLUS JEUNE ENFANT DE MOINS DE DEUX ANS

I - Anthropométrie

15. Puis-je peser (NOM DE L'ENFANT) ?
    1. OUI
    2. NON **ALLER A Q.15**

16. SI LA MERE EST D'ACCORD, PESER L'ENFANT ET NOTER LE POIDS CI-DESSOUS. NOTER AU DIZIEME PRES.

___ ___ . ___ KILOGRAMMES

II - Santé de la mère et du nouveau-né

17. Avant de mettre au monde (NOM DE L'ENFANT), avez-vous reçu une injection dans le bras pour protéger le bébé contre le tétanos?
    1. OUI
    2. NON **PASSER A Q.17**
    8. NE SAIT PAS **PASSER A Q.17**

18. Combien de fois avez-vous reçu cette injection ?
    1. UNE FOIS
    2. DEUX FOIS
    3. PLUS DE DEUX FOIS
    8. NE SAIT PAS

17 Maintenant j'aimerais vous parler de la naissance de (NOM DE L'ENFANT). Qui vous a assisté pour l'accouchement de (NOM DE L'ENFANT) ? *ENTOURER TOUTES REPONSES CITEES.*
    1. DOCTEUR
    2. INFIRMIERE/SAGE FEMME
    3. SAGE FEMME AUXILLIAIRE
    4. ACCOUCHEUSE TRADITIONNELLE
    5. AGENT DE SANTE COMMUNAUTAIRE
    6. MEMBRE DE LA FAMILLE
    7. AUTRE _____
       (PRECISER)
    8. PERSONNE

III - Prévention du Paludisme

18 Avez des moustiquaires dans la maison ?

1. OUI
2. NON **PASSER A Q.21**
8. NE SAIT PAS **PASSER A Q.21**

19 Qui a dormi sous une moustiquaire la nuit dernière ? *ENTOURER TOUTES REPONSES CITEES.*

1. ENFANT (NOM DE L'ENFANT)
2. INTERVIEWEE
3. AUTRE(S) PERSONNE(S)_____
(PRECISER)

20 Est-ce que la/les moustiquaire/s a/ont déjà été trempée ou plongée dans un liquide qui repousse les moustiques ou insectes ?

3. OUI
4. NON
9. NE SAIT PAS

IV - Prise en Charge Intégrée des Maladies de l'Enfance (PCIME)

21 –Parfois les enfants sont malades et ont besoin de soin ou de traitement. Quels sont les signes de la maladie qui vous indiquera que votre enfant a besoin de traitement ? *(PRENDRE VOTRE TEMPS. ENTOURER TOUT CE QUI A ETE MENTIONNE PAR L'INTERVIEWEE)*

1. NE SAIT PAS
2. NE SEMBLE PAS BIEN OU NE JOUE PAS NORMALEMENT
3. NE MANGE PAS OU NE BOIT PAS
4. SOMNOLENCE OU DIFFICULTE A SE REVEILLER
5. FORTE FIEVRE
6. RESPIRATION DIFFICILE ET RAPIDE
7. VOMIT TOUT
8. CONVULSIONS
9. AUTRE _____
(PRECISER)
10. AUTRE _____
(PRECISER)
11. AUTRE _____
(PRECISER)

NOMBRE DE REPONSES CORRECTES (Réponse 1 à 8) _____

22 Est-ce que (NOM DE L'ENFANT) a eu un des signes ci-dessous durant ces deux dernières semaines ?

LIRE A HAUTE VOIX LES PROPOSITIONS ET ENTOURER TOUTES CELLES

RETENUES PAR L'INTERVIEWEE.

1. DIARRHEE
2. SANG DANS LES SELLES
3. TOUX
4. DIFFICULTE A RESPIRER
5. RESPIRATION RAPIDE/ESSOUFFLEMENT
6. FIEVRE
7. PALUDISME
8. CONVULSIONS
9. AUTRE _____
   (PRECISER)
10. AUTRE _____
    (PRECISER)
11. RIEN DE MENTIONNER CI-DESSUS□ **PASSER A Q.25**

23 "Quand (NOM DE L'ENFANT) était malade, lui a-t-on donné à boire moins que d'habitude, environ la même quantité que d'habitude, ou plus que d'habitude ?"

1. MOINS QUE D'HABITUDE
2. MEME QUANTITE
3. PLUS QUE D'HABITUDE

24 "Quand (NOM DE L'ENFANT) était malade, lui a-t-on donné à manger moins que d'habitude, environ la même quantité que d'habitude, ou plus que d'habitude ?"

1. MOINS QUE D'HABITUDE
2. MEME QUANTITE
3. PLUS QUE D'HABITUDE

V - VIH/SIDA

25 Avez-vous déjà entendu parler d'une maladie appelée SIDA ?

1. OUI
2. NON **PASSER A Q.27**

26 Que peut faire une personne pour éviter d'avoir le SIDA ou le virus qui cause le SIDA ?
ENTOURER TOUTES LES REPONSES MENTIONNEES.

1. ABSTINENCE SEXUELLE
2. UTILISATION DE CONDOM
3. LIMITER LES RELATIONS SEXUELLES A UN PARTENAIRE/RESTER FIDELE A UN PARTENAIRE
4. LIMITER LE NOMBRE DE PARTENAIRES SEXUELS
5. EVITER LES RELATIONS SEXUELLES AVEC LES PROSTITUEES
6. EVITER D'AVOIR DES RELATIONS SEXUELLES AVEC UNE PERSONNE QUI A PLUSIEURS PARTENAIRES
7. EVITER DES RELATIONS SEXUELLES AVEC DES PERSONNES DU MEME SEXE
8. EVITER LES RELATIONS SEXUELLES AVEC DES PERSONNES QUI SE FONT DES INJECTIONS INTRAVEINEUSES DE DROGUES.
9. EVITER LES TRANSFUSIONS SANGUINES
10. EVITER LES INJECTIONS
11. EVITER DE S'EMBRASSER
12. EVITER LES PIQURES DE MOUSTIQUES
13. RECHERCHER UNE PROTECTION AUPRES D'UN GUERISSEUR TRADITIONNEL
14. EVITER DE PARTAGER RASOIRS/LAMES
15. AUTRE_____
    (PRECISER)
16. RIEN
17. NE SAIT PAS

NOMBRE DE REPONSES CORRECTES ____

VI - Pratique du lavage des mains

27 J'aimerai vous poser une autre question. Quand vous lavez-vous les mains avec du savon/détergent ?
(PRENDRE VOTRE TEMPS. ENTOURER TOUT CE QUI A ETE MENTIONNE PAR L'INTERVIEWEE)

1. JAMAIS
2. AVANT DE PREPARER LE REPAS
3. AVANT DE NOURRIR LES ENFANTS
4. APRES ETRE ALLER AUX TOILETTES
5. APRES AVOIR NETTOYE UN ENFANT QUI A ETE A LA SELLE
6. AUTRE _____
   (PRECISER)

VII - Allaitement et Nutrition

28 Avez-vous allaité (NOM DE L'ENFANT)?

1. OUI
2. NON □ **SAUTER LA Q.29**

29 Combien de temps après la naissance avez-vous mis (NOM DE L'ENFANT) au sein pour la première fois?

1. IMMEDIATEMENT/DANS LES HEURES QUI ONT SUIVI L'ACCOUCHEMENT
2. APRES LES PREMIERES HEURES.

A ce niveau de l'enquête trois scenarios se présentent

a) L'enfant a entre **0 et 5 mois** (moins de 6 mois) il faut lui administrer la question 30 sur l'allaitement exclusif.

b) L'enfant a entre **6 et 9 mois**, il faut lui administrer la question 30-bis sur le sevrage.

c) Enfin l'enfant a entre **12 et 23 mois**, il faut lui administrer les questions 31 et 32 sur les vaccinations.

---

30 Allaitement Exclusif (0-5 mois)

Nom de l'enfant _____ Date de naissance _____
Age:_____ Mois

J'aimerai vous demander quels types de liquides et d'aliments (NOM DE L'ENFANT) a consommé hier durant la journée ou la nuit.
A-t-il reçu: *LIRE CHAQUE PROPOSITION ET COCHER LA CASE CORRESPONDANTE SI L'ELEMENT A ETE CONSOMME.*

	LIQUIDE/ALIMENT	**CONSOMME DANS LES 24 HEURES PASSEES?**
1	Lait maternel ?	
2	Eau ?	
3	Autres liquides ?	
4	Aliments écrasés, en purée, solides ou semi-solides ?	
5	Autres choses? PRECISER: _____ _____	

30-bis Sevrage (6-9 mois)

Nom de l'enfant _____ Date de naissance _____
Age:_____ Mois

J'aimerai vous demander quels types de liquides et d'aliments (NOM DE L'ENFANT) a consommé hier durant la journée ou la nuit.

A-t-il reçu: *LIRE CHAQUE PROPOSITION ET COCHER LA CASE CORRESPONDANTE SI L'ELEMENT A ETE CONSOMME.*

	LIQUIDE/ALIMENT	**CONSOMME DANS LES 24 HEURES PASSEES?**
1	Lait maternel ?	
2	Eau ?	
3	Autres liquides ?	
4	Aliments écrasés, en purée, solides ou semi-solides ?	
5	Autres choses? PRECISER: _____ _____	

VIII - Vaccination Infantile (12-23 mois)

Nom de l'enfant _____ Date de naissance _____ Age:_____ Mois

31 Avez-vous un carnet de vaccinations où sont inscrits les vaccins de (NOM DE L'ENFANT) ?
SI OUI DEMANDER « Puis-je le voir, s'il vous plait ? »

1. OUI, VU PAR L'ENQUETEUR
2. PAS DISPONIBLE (perdu/égaré, pas ici, ne sais pas, ou n'a jamais eu)

32 REPORTER EXACTEMENT LES INFORMATIONS COMME ELLES SONT INSCRITES SUR LE CARNET DE VACCINATION DE (NOM DE L'ENFANT).

	JOUR		**MOIS**		**ANNEE**	
BCG						
POLIO 0						
POLIO 1						
POLIO 2						
POLIO 3						
DTC 1						
DTC 2						
DTC 3						
ROUGEOLE						
VITAMINE A						

APPENDIX C

DISTRIBUTION OF PARTICIPANTS BY VILLAGE VISITED

VILLAGE	Frequency
ASSANG	9
BADJEGHANG 1	11
BADJEGHANG 2	9
BADJONG	10
BAKASSA	10
BAKOKO	12
BAKOUA	9
BALATSIT TCHOUO	10
BALETCHI 2	10
BALI	10
BANDJA	9
BANESSINTSIT	9
BANKI	10
BANOCK	12
BASSESSAH LOH	10
BASSESSAH SOH	10
BATOUGONG	9
BATOULETSI	11
BATSIMBI	10
BAWASSA	10
BEBONG	10
CENTRE COMMERCIAL	12
DJEU	10
DJIO	10
DJULLAH	9
DZEMYA	9
ETODEUL	10
FAMGHOUO	10
FIALA FOTSEM	13
FONAKEUKEU	10
FONGWANG	10
FONTSAM	10

VILLAGE	Frequency
KEKANG	19
KING PLACE FW	10
LA VALLEE	9
LATCHOUET	10
LATSIT SOOC	10
LEFANG	10
LEM	10
LEPOH	16
LESSANHA	9
LITIAPOUH	10
LONAKO	10
MADAGASCAR	11
MADAGASCAR SANTCHOU	10
MANZOKO	10
MBENG KEMEGHO	10
MEKIA	10
MEKOUEH	10
MELIA	10
MENAH	10
MENKA	10
MENOUET	10
METCHOU	10
METSAH	11
MIATSUET	9
MINPEUH	10
MOLEPEU	10
MPIH 1	9
MPIH 2	10
NDENKOP	9
NDEU UANTOCK	10
NEPIEH	10
NFEU	10

VILLAGE	Frequency
NGOUA	10
NGUI	9
NGUI 1	10
NGUI 2	11
NGUI 4	15
NGUIM	11
NTSAH	11
NZA'AH	21
NZEMGNY	9
NZIFODA	10
SA'A	10
TALE	10
TCHOUALE	20
TCHOUSSO	10
TCHUEFFI	10
TEINGUE MARCHE	10
TOUFAM	9
TSADENG	9
TSINFOU 2	10
TSINGSAAH	9
TSISSANG	8
ZEMLAH	20
ZENGMEU	12

*Highlighted villages were selected twice through the proportional to size sampling method used in this study.