

### 3.0 DEMOGRAPHIC DATA

The Sub-Saharan Africa (SSA) effort to overcome illness and disease of the last 25 years has had mixed results (World Bank, *Better Health in Africa [BHA]*, 1995). SSA as a generic description excludes Eritrea and Namibia (due to lack of data), La Réunion, and South Africa (due to differences from other SSA countries). Overall, infant mortality is 55 percent higher, and average life expectancy is 11 years less in SSA than in the rest of the world's low-income, developing countries. Maternal mortality, at 700 women per 100,000 live births, is almost double that of other low- and middle-income developing countries and, according to World Bank estimates, more than forty times greater than in the EMEs (World Bank BHA, 1995). Clearly, SSA has not yet made the demographic transition described in Section 2.3. In order to understand the magnitude of the problem, it is useful to develop a set of key indicators. Table 1 presents a brief definition of some of the most important demographic terms. These definitions are standard in the literature and are abstracted from the World Bank's *Better Health in Africa* (World Bank BHA, 1995). These terms are also used in data presented in the 1991 Cameroon Demographic Health Survey (CDHS) cited in this analysis. A series of demographic data sections will be presented next. These sections focus on Cameroon and the project areas in Cameroon; in addition, a series of selected comparative rates for SSA and EME are also presented so that the Cameroonian statistics can be placed in perspective.

#### 3.1 POPULATION

Overall, Cameroon has shifted from a low annual growth rate of 1.6 percent (1950-55) to a current rate of almost 3.0 percent. This shift is due, in part, to a significant decline of approximately 30 percent in the crude death rate from 1976 to 1987. Table 2 presents basic demographic data for the entire country. More detailed data from the 1976 and 1987 Cameroonian census is shown in Table 3 along with 1991 data from the 1991 Demographic Health Survey. 1993-1997 estimates by the Cameroon MOPH are also in Table 2 and 3. Table 4 presents the population distribution and density data for each of the 10 provinces. The average population density in Cameroon is only 25 inhabitants per square kilometer; however, there are significant variations across provinces. The southeast portions of Adamoua Province and the contiguous northeastern section of the Center Province are very sparsely populated. This area is frequently called the "vast empty space." By design, a substantial portion of the pipeline corridor passes through this empty space. In general, the proposed pipeline generally does not traverse the most densely populated areas with the exception of the Mefou department where Yaoundé is located. The Age Population Pyramid is shown in Figure 7.

The 1991 Demographic and Health Survey (DHS) found that women give birth to an average of 5.8 children during their lifetimes, which represents a 10 percent decline since 1978. The 1993-1997 data are consistent with this rate. This figure masks a significant urban/rural differential: average parity for women in Yaoundé and Douala is estimated at 4.4 children, while for rural women it is 6.3. Knowledge of modern methods of contraception has increased from 29 percent

to 66 percent of women in union during the period 1978-1991, but the 1991 DHS found that only 4.3 percent of these women were using a defined contraceptive method.

If current demographic indicators remain constant, Cameroon's population will reach 15.5 million by the year 2000 and 21 million by the year 2010. However, using alternative population growth scenarios prepared by the Futures Group these results are projected (World Bank, 1995):

- Projection A: Fertility declines to 4.0 by the year 2010 and reaches 3.0 in 2025 with corresponding populations of 17.9 million in 2010 and 24 million in 2025
- Projection B: Fertility declines to 3.0 in 2010 and 2.2 in 2025 with corresponding populations of 16.3 million in 2010 and 20 million in 2025.

If mortality rates continue to decline and emphasis is not placed on reducing fertility, Cameroon's population will double every 22 years, with corresponding increases in the demand for social services, including health and education. Figure 8 presents population projections for Cameroon as a whole and the two largest cities, Yaoundé and Douala, in particular.

As illustrated by the Yaoundé and Douala projections, the rate of urbanization is also increasing from 28.5 percent in 1976, to 37.8 percent in 1987, to an estimated 42 percent in 1991 and 45.3 percent in 1997. If the current rate of urbanization continues, the government estimates that 50 percent of all Cameroonians will live in cities by the year 2000. The major cities of Douala (1,094,100 inhabitants) and Yaoundé (955,300 inhabitants) are growing at rates of 5 and 6 percent per year respectively, due to the influx of young Cameroonians (under 25 years of age) seeking education and employment opportunities. By the year 2000, Yaoundé and Douala will each have about 1.5 million inhabitants.

### **3.2 COMPARATIVE DEMOGRAPHIC DATA**

There are significant differences in key health indicators between SSA and other countries. Table 5 shows a comparison between Cameroon, SSA, and high-, middle-, and low-income countries for life expectancy, infant mortality, and maternal mortality. As this table illustrates, Cameroon has a significantly better performance relative to SSA for infant mortality and maternal mortality; in addition, overall life expectancy is slightly higher than the SSA level.

Table 6 is a comparison of multiple core demographic statistics. In general, Cameroon performs at or better than the SSA averages in most categories. There are subtle, probably insignificant, differences in the various rates as a function of source (i.e., World Bank estimate, UN population estimates).

### 3.3 GENERAL HEALTH PARAMETERS

Data in this section is derived directly from the 1991 DHS published in 1992 and presented in the 1995 World Bank Staff Appraisal Report for a major Nutrition, Fertility and Health Project. The MOPH 1993-1997 update estimates are consistent with these data.

#### 3.3.1 Maternal Health

As shown in Tables 5 and 6, Cameroon has a high maternal mortality rate, 430 per 100,000 live births. This rate indicates that there is a problem associated with women of childbearing age. The main causes of this elevation in maternal mortality are obstetric hemorrhage and sepsis (infection), both of which can be complicated by prevalent conditions such as malaria and anemia (World Bank, 1995). Nationally, 64 percent of all deliveries occurring in the five years before the 1991 DHS survey took place in health facilities. Friends or relatives assisted twenty-one percent of deliveries, 12 percent were assisted by traditional birth attendants, and 4 percent were unassisted.

The level of maternal health varies significantly among provinces and between urban and rural areas. Provincial level data on maternal mortality range from 900 per 100,000 live births in Maroua (Extreme North Province) to 250 per 100,000 live births in Bamenda (Northwest Province). The DHS survey found that in Yaoundé/Douala, mothers received antenatal care for nearly all births (99 percent), and the majority of mothers (86 percent) were vaccinated against tetanus. In rural areas, however, only 71 percent of the births involved antenatal care and tetanus toxoid was given in only 61 percent of pregnancies (World Bank, 1995).

#### 3.3.2 Child Health

Children under five years of age are at a significant health risk in Cameroon. The infant mortality rate is estimated at 65 per 1,000 live births and the under five mortality rate is 126 per 1,000 live births. The 1991 DHS study found that in the two weeks preceding the survey, nearly 1 in 5 children had had an episode of diarrhea, 1 in 10 children under five had suffered from coughing and rapid breathing, and 1 in 4 children under five had had a fever. Only 41 percent of children with fevers and 50 percent of children with diarrhea were taken to a health facility for treatment.

The DHS study found the main causes of death among children under five to be (in descending order of importance) diarrhea, malaria, measles, respiratory infections, and malnutrition; 60 percent of malaria deaths occur in children in this age group.

Although vaccine-preventable diseases did not figure prominently in the causes of mortality and morbidity for Cameroon as a whole, these diseases are apparent at the provincial level. MOPH data on measles (East, Littoral, North, and South Provinces) and neonatal tetanus (Center, East, Extreme North, and North Provinces) confirm UNICEF findings that these diseases are the

most significant causes of death for infants less than one year old, accounting for 34 percent of all infant deaths in 1986. UNICEF also estimates that less than 40 percent of Cameroonian children were fully vaccinated by their first birthday against childhood diseases (tuberculosis, diphtheria, whooping cough, tetanus, polio, and measles). Figure 9 presents the overall vaccination coverage at both national and provincial levels.

### **3.3.3 Nutrition**

Results from the 1991 DHS indicated that there were significant nutritional problems: 24 percent of children under five suffer from moderately to severely chronic malnutrition (height-for-age measure); 3 percent suffer from moderate to severe acute malnutrition (weight-for-height measure), and 14 percent are underweight (weight-for-age measure). Comparison of these results with the 1978 National Nutritional Survey indicated that there was a serious problem in the Provinces of Adamoua, North, Extreme North, and East, where chronic malnutrition increased from about 15 percent to 25 percent and acute malnutrition from 1 percent to 4 percent.

The DHS found a clear age-specific pattern in the prevalence of malnutrition in Cameroon, from less than 2 percent incidence of stunting, malnutrition, and wasting in infants aged 1 to 6 months to over 33 percent stunting, 20 percent underweight, and 10 percent wasting between the ages of 18 and 24 months. The DHS concluded that inappropriate infant and child feeding practices were strongly associated with the high levels of undernutrition found in Cameroon.

The nutritional status of women also raised concern. The 1978 National Nutrition Survey showed that pregnant women suffered from deficiencies of iron, calories and lipids and gained only one-third the normal weight gain during pregnancy. As a result of poor maternal nutritional status, 13 percent of babies in Cameroon were born with low birth weights in 1985 (DHS, 1992; World Bank, 1995). The high levels of malaria are a major contributor to this problem and illustrate the interconnectedness across health problems and observed outcomes.

### **3.3.4 Women's Health Issues**

Health variables specific to women are extremely important and have consistently been a major focus of demographic and health surveys sponsored by USAID and the World Bank. The 1991 DHS (published in 1992) included 3,871 women ages 15-49. Table 7 presents several of the key demographic variables unique to women. Comparisons are shown between Cameroon, SSA, less developed countries, and more developed countries. In general, Cameroonian values demonstrate a mixed pattern relative to SSA and other less developed countries as a group. Until there is significant improvement in major demographic variables for women, it is unlikely that sustained health improvements can be achieved (World Bank, 1995).

### **3.4 CAMEROON HEALTH SYSTEM**

#### **3.4.1 Public Health Sector Organization and Management (Based upon the World Bank 1995 Staff Appraisal Report)**

The Ministry of Public Health (MOPH) is Cameroon's principal governmental agency addressing health issues, although the National Social Security Fund (CNPS) also provides services through its network of clinics. Other agencies involved in health research, education, and communication include the Ministries of: Higher Education and Scientific Research (medical training), National Education (school-based health programs), Social Welfare and Women's Affairs (health, family planning, and nutrition education to women's groups), Agriculture (health education to women's agricultural groups), and Economy and Finance (consideration of population variables in the national development planning process).

The current organizational structure of the MOPH was established by ministerial decree No. 89/011 in January 1989. This decree established six central directorates. The Directorate of Hospital Medicine is responsible for planning, administering and supervising all public hospitals; it also oversees private hospitals. The Division of Training and Cooperation manages the paramedical training institutions. The Directorate of Preventive and Rural Medicine is responsible for epidemiological surveillance, control of endemic diseases, and execution of the Expanded Program of Immunization (EPI). The Directorate of Pharmacy is in charge of planning the supply of drugs to all health facilities, assuring their quality, and inspecting all public and private pharmacies. The Directorate of Studies, Planning and Health Statistics plans and executes capital investment projects and performs data collection and analyses, which include planning, monitoring, and evaluating health facilities. The Directorate of General Affairs is in charge of general administration, personnel, finance, and health facility management. The Directorate of Family and Mental Health is responsible for the promotion of mother, child, and juvenile health which includes family planning, nutrition, and information, education, and communication (IEC).

Ministerial decree No. 89/011 also organized the provincial health system to reflect the administrative division of the country. Health delegations were established in each of the ten provinces. Headed by a provincial delegate who reports directly to the Minister of Public Health, the provincial health delegation comprises six services (corresponding to the central MOPH directorates) and supervises all health activities in the province including hospitals, pharmaceutical supply, planning and statistics, training, and administration. Provinces are subdivided into departments under the authority of the departmental public health service, which has responsibility for hospitals and health centers as well as for preventive and rural health services.

The Declaration of Health Sector Policy organizes health services at three levels comprising: (a) local health centers, usually staffed by certified nurses and providing preventive and basic

curative care to the surrounding population; (b) district and departmental hospitals (of 100 to 150 beds), usually staffed by at least one physician and providing first referral services for the health centers; and (c) provincial and central level hospitals (of more than 200 beds) providing specialized medical services.

As a result of a rapid expansion of health facilities in the late 1970s and early 1980s, Cameroon today possesses an important network of health structures. MOPH lists 1,031 government-operated health facilities, which include 1 teaching hospital, 2 referral hospitals, 3 central hospitals, 8 provincial hospitals, 38 departmental hospitals, 132 district hospitals, and 847 health centers. Despite the large number of facilities, coverage remains a problem in both rural and urban areas.

Facility maintenance and equipment repairs are a concern. There is not overall policy governing equipping and maintenance of health centers. The annual budget allocates less than 1 percent of the estimated amounts for repairs. In addition, within the Ministry of Public Health, coordination and planning of maintenance activities is divided between the Directorate of Hospital Medicine (responsible for biomedical equipment and its maintenance) and the Directorate of General Affairs (responsible for maintenance of health facilities and transport).

Owona, et al. (1993) reviewed and critiqued the Pharmacy Health Care (PHC) policy that was established in 1989. Kamdoum (1996a and b) provides an extensive two part review of the overall health plan and the impacts of the economic recession experienced by Cameroon which has seriously and significantly affected the PHC program such that it appears to be functioning at a substantially lower level than projected in 1989. Hence, with the exception of the Yaoundé area, the overall health infrastructure present along the project corridor is anticipated to be minimal. The June 1998 health map (which include morbidity and mortality tables) for the four Provinces which will be traversed by the project are presented in Figures 10 through 13.

### **3.4.2 Private Health Sector Organization**

Non-profit religious missions and for-profit clinics constitute the bulk of private providers of health care. There is also a growing number of non-governmental organizations involved in health activities. Numerous traditional practitioners provide services to the population, and are recognized, organized and syndicated. However, this group is not licensed and their operations are not subject to well-defined standards or quality control; hence, their activities remain largely undocumented. For-profit facilities represent about 5 percent of the 539 private health facilities identified by MOPH; they are located in the major cities of Yaoundé, Douala, Garoua, Maroua, Bafoussam, and Bamenda. MOPH estimates that in 1992 there were 322 physicians (including 78 in the confessional sector) and 39 pharmacists in the private sector.

Religious health facilities, organized by the principal denominations, make up the majority of the private health system in Cameroon. The Catholic Health Services (SCS) of Cameroon comprise 179 health facilities (including 8 hospitals) and 1,315 personnel. SCS data estimate

about 1.5 million consultations performed in 1991-1992. About half of these consultations took place within the Diocese of Yaoundé (including the surrounding rural villages) and half in the other Dioceses of Douala, Bamenda, and Garoua. In addition, SCS operates two training schools (in Yaoundé and Bamenda) which train nurses and nurses' aides. The SCS recently published the results of their 3-year training program for primary care services (Wyffels, 1998).

Protestant health services (FEMEC) comprise 122 health facilities (including 24 hospitals) and 2,633 personnel (including approximately 80 expatriate staff). FEMEC estimates the number of consultations at about 2 million for 1991. The Ad Lucem Medical Foundation operates 7 hospitals and 11 health centers, totaling about 2,000 beds, in four Provinces (West, Center, Littoral and South). In addition, Ad Lucem is involved in the importation of essential drugs for the non-profit private sector.

### **3.5 DEMOGRAPHICS AND HEALTH OF ADULTS**

While the demographics of children in the developing world have been well described, the burden of adult ill health has received far less scrutiny. Adults can be defined as those aged 15 through 59 years (Feachem, 1992). Based upon this terminology, children are those younger than 15 years and the elderly as those aged sixty years and older. The adult group typically represents those members of a society who are economically productive, biologically reproductive, and responsible for the support of children and elderly dependents.

While infant mortality rates are quite high in SSA, and Cameroon in particular, almost 90 percent of children generally survive to reach the adult demographic category. Within the adult age group in SSA, approximately 38 percent of 15 year olds do not survive to age sixty (Feachem, 1992). Similar statistics can be calculated for Cameroon based upon crude death rates and life expectancy statistics. Relative to the attention paid to the CCD, adult health has not been a major focus of either international agencies or governments. The adult sector is a substantial source of morbidity (illness) and mortality (death) and generally consumes over 50 percent of health sector resources even in developing countries (Feachem, 1992).

Demographic trends in Cameroon and SSA are having the effect of increasing the absolute and relative importance of adults and their health problems. For the proposed project, adult health issues are important since the labor force to build, operate, and maintain the pipeline and other project facilities will draw upon the local adult population. Approximately 52 percent of the Cameroonian population are in the adult category ages 15-64, representing a figure that is consistent with the overall SSA average (Table 8).

From a disease distribution perspective, it has been recognized that the majority of deaths for children (age 0-14) are due to the CCD superimposed upon a background of low birth weight, malnutrition, and poor sanitation and environmental conditions. This observation has led to directed efforts to 1) emphasize primary prevention interventions (e.g., immunizations), 2) reduce exposure to environmental and behavioral risk factors, and 3) use cost-effective approaches to case management (Feachem, 1992). In addition, as described in previous

sections, there have been substantial characterization of the magnitude and nature of maternal illness (morbidity) and death.

Recent data in developing countries indicate that the spectrum of adult mortality may be different than the 0-14 age group. Most adult mortality is typically due to three broad categories:

- Communicable and reproductive diseases, particularly tuberculosis (TB) and AIDS
- Non-communicable disorders (e.g., cancer, digestive, respiratory, circulatory)
- Injuries (e.g., transport, intentional).

These data imply that child and adult mortality vary independently such that single indicators of mortality (e.g., infant mortality rates) may not be sufficient to monitor impacts to both adult and child mortality. In addition, according to Murray, et al. (Feachem, 1992), the pattern of mortality by cause is not a simple function of the overall level of mortality or life expectancy and may not be a fully appropriate estimator or predictor.

Adult mortality is typically estimated by measurements based on vital registration systems, censuses, or surveys. As of 1992, no SSA country had a vital registration system. Since vital registration systems, censuses, and surveys are infrequent and expensive, gaps in the empirical database on mortality are filled in by international agencies (e.g., World Bank, UNDP) by using model-based estimates. Despite this limitation, there are extensive demographic and health services databases for Cameroon.

For the proposed project, overall mortality and morbidity rates provide a window on the relative disease burden; however, the childhood communicable diseases have a distorting impact relative to adults. The adult burden of disease may have significant differences from the 0-14 age group due to the role of sexually-transmitted diseases (STDs) (i.e., AIDS and subsequent vulnerability to other infections), injuries and other non-communicable lifestyle-related problems (alcohol, tobacco, etc.). For example, the projected disease burden (year 2020) due to tobacco is enormous and is anticipated to be one of the most significant problems. As previously discussed, there are different approaches to these problems (i.e., public health and clinical interventions, instruments of policy). Each of these strategies has a role in approaching the problem of adult health both for the proposed project and for the country in general. In order to better focus these potential strategies and their opportunities for health improvement, a detailed analysis of the Cameroonian disease burden will be presented in the next section.