



Senegal

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Senegal Country Report



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General Country Profile

Geography and Population

Senegal is a country in west Africa with a land area of 196,722 sq km. The country is bordered by the North Atlantic Ocean and the countries of Gambia, Guinea-Bissau, Mali and Mauritania. Its land boundaries span for 2,684 km and coastline boundaries for 531 km. The tropical climate is hot and humid with rainy season from May to November and a dry season from December to April dominated by dry, hot, dusty harmattan wind. Senegal has a population of eighteen million people (estimated in 2022) with a large and growing youth population, 40.38% are between 0-14 years and the growth rate is 2.57%. Fertility remains high because of the low use of family planning, continued wish for large families and early childbearing. Senegalese youths face vague prospects because of the country's high illiteracy rate, which is more than 40%, whereas 65% of males are literate compared to just 40% of females. Additionally, the high unemployment rate, even among university graduates, and the widespread poverty exacerbate the problem, particularly for women who are disproportionately affected. Average life expectancy at birth is 69.96 years, 68 years for men and 72 years for women.¹

The country is divided to fourteen regions as follows: Dakar, Diourbel, Fatick, Kaffrine, Koalack, Kédougou, Kolda, Louga, Matam, Saint-Louis, Sédhiou, Tambacounda, Thiès, Ziguinchor (Figure 1). The population is mostly concentrated in the west with a major urban area in Dakar, the capital (3.3 million residents, 2022) and 70% in rural areas. 46.7% of the population lives under the poverty line with an unemployment rate of 48% (2007 est.). The majority of the labor force is occupied in the agriculture sector (77.5%) followed by industry (22.5%) and services (22.5%).^{1, 2}



Figure 1. Fourteen regions of Senegal

History and Culture

Senegal is among the few countries in the world with the evidence of life from the Paleolithic era to present. Starting in the 15th century Netherlands, Great Britain, France and Portugal started to trade along the Senegalese coasts. Senegal's favorable location on the western tip of Africa made it a site to trade enslaved people. At the height of the slave trade almost one third of the Senegalese were enslaved. France took possession of Senegal in the late 1800s after abolishing slavery in 1815. In 1960 French gave independence to the merged Senegal and French Sudan as the Mali Federation. However, the union broke up after only a short time.¹

Much of the population identifies with the Muslim religion (around 97%) and the remaining 3% are mostly Roman Catholic. The official language of the country is French while the most widely spoken language is Wolof. Other spoken languages include Pular, Jola, Mandinka, Serer and Soninke. The majority of the population belongs to the Wolof ethnicity (40%) followed by Pular (27.5%), Serer (16%), Mandinka (5%), Jola (4%), Soninke (2%) and others (includes Europeans and persons of Lebanese origin).¹

Government and Legal System

Senegal has a presidential republic government and legal system is based on French law; judicial review of legislative acts in Constitutional Court. Senegal is one of the most stable democracies in Africa and has been involved in many international peace conversations and regional mediation. President Macky Sall has been the chief of state since 2012 and his current term will end in 2024. In 2012 president Macky Sall, who was elected under a reformist policy agenda, inherited an economy with high energy costs, a complicated business environment and a culture of overspending. Although the movement of Democratic Forces, a separatist movement in southern Senegal has led to a low-level of insurgency, since 2012 there has been an unofficial cease-fire in place and only sporadic incidence of violence has been reported.¹

Economy and Employment

The economy of Senegal relies heavily on industries such as mining, construction, tourism, agriculture, and fisheries, which are the primary sources of employment in rural areas. Senegal's exports mainly consist of phosphate mining, fertilizer production, agricultural products, and fishing, and the country is also exploring potential oil reserves. Despite this economic activity, Senegal is largely dependent on foreign investment and donor assistance.¹

President Sall proposed the Emerging Senegal Plan (ESP) in 2014, which has the main goal to implement economic reforms and investment projects to assist economic growth while preserving macroeconomic stability and debt sustainability. Bureaucratic difficulties and challenging business climate are among the factors that may be responsible for the decreasing rate of implementation his plan.¹

In 2020, Senegal had a gross domestic product (GDP) of \$24.9 billion and a gross national income (GNI) per capita of \$1,430, which places it in the category of lower-middle-income countries (LMICs).³ The different components that make up the GDP by end use can be outlined

as follows: Household consumption accounts for the highest share at 71.9%, followed by government consumption at 15.2%, investment in fixed capital at 25.1%, investment in inventories at 3.4%, while exports of goods and services represent 27% and imports of goods and services are at -42.8%. In 2017 it has been estimated that Senegal has a public debt of 48.3% and external debt of 8.571 billion dollars. ^{1,3}

Based on the latest available data, as of 2022, the unemployment rate in Senegal is estimated to be around 22.9 and the inflation rate in 2023 is around 9.4%.⁴⁻⁵

Physical and Technological Infrastructure

Telecommunication

Senegal telecom market continues to grow steadily and has been supported by an increased demand during the COVID-pandemic. The number of mobile subscribers has increased 6.7% in 2020 and 4.1% in 2021, while the number of fixed broadband subscribers increased 17.5% in 2021. 43% of population has access to internet with mobile internet platforms as the majority of all internet access; however, the quality of services continues to disrupt the market. Orange group's local subsidiary Orange Senegal (Sonatel) remains the dominant provider of both fixed-line and mobile network. The other main providers who compete effectively with Sonatel are Free Senegal and Expresso Telecom.⁶ There is generally a reliable urban Telecommunication with a fiber-optic network. Around two-thirds of all fixed-line connections are in Dakar. Mobile-cellular services are continuously replacing fixed-line even in rural areas. Roughly one person per 100 uses fixed-line, whereas 114 mobile subscribers exist per 100 persons. ¹

Electricity

In Senegal, 71% of the population has access to electricity, dominantly in urban areas with 94% and rural areas with lower extent, around 50% accessibility. 84% of electricity is generated by fossil fuels, the rest is mainly produced by hydroelectricity and solar energy. The cost of electricity is the main obstacle for Senegal's development. It's worthy to mention that the cost of electricity in Senegal is among the highest in the world. USAID, through the Power Africa initiative launched by the US President, is backing Senegal's efforts to enhance its power supply dependability and expand its electricity generation capacity. It is expected that with adoption of a comprehensive integrated plan full access is achieved by 2025.¹

Transportation

In Senegal there are a total of 20 airports, nine with paved runways and eleven unpaved, additionally 907 km railways, 16,665 km roadways (only 6,126 km of the total roadways are paved)¹, 1,000 km waterways and 35 commercial harbors connect the country internally and internationally.¹ For each of the country's eighteen million inhabitants, the network of roads and highways corresponds to 0.97 meters. This puts Senegal in 206th place in the global ranking. However, the country's size and population density of around 87 inhabitants per km² must also be taken into account. Countries with the same or larger areas and fewer inhabitants naturally achieve other values and have to connect remote areas to the transport network. The latest data on the number of passenger cars in Senegal is from 2015, which reported a total of

666,000 passenger cars registered in the country.⁷ However, it's worth noting that this figure is likely to have increased in the intervening years as Senegal's economy and population have grown. Road traffic in Senegal with an average of 3670 traffic fatalities per year (2012 - 2019), is considered quite dangerous. This relates to around 4.3 accident fatalities per 24.1 inhabitants per year. This figure is 12.2 in the USA and 17.1 worldwide.⁸

Water and Sanitation

Among Senegalese, 81% have at least basic access to water services, whereas only 21% of the total population has access to safety managed sanitation.⁵ Those in resource limited areas have considerably lower access to safe drinking water and sanitation, have the highest malnutrition rate and are more vulnerable to low rainfall, which negatively impacts agricultural harvest. Senegal has made rapid progress in expanding access to safe water and sanitation for its citizens over the past 10 years. However, there are significant regional disparities in access to water and sanitation, with rural areas encountering the largest gaps in access.⁵ Most financially challenged people live in rural areas, where resources are more limited, and poverty is deeper. The rural areas in the country's south and east are markedly behind in services. Among rural people with lower income, access ranges from 48-61 percent for drinking water and only 10-31 percent for sanitation.⁹

National Health Care Profile

WHO indicates the infant mortality rate in Senegal of 28 per 1000 live births, under five mortality rate of 38 per 1000 live births and maternal mortality rate of 315 per 100,000 live births. With 60% of the population under 25 the top five causes of death are neonatal disorder, ischemic heart disease, lower respiratory infection, malaria and diarrhea (Figure 2). In 2019 HIV/ AIDS was reported as the fourteenth cause of death, preceded by non-communicable diseases such as diabetes, chronic kidney disease, cirrhosis and congenital defects.¹⁰

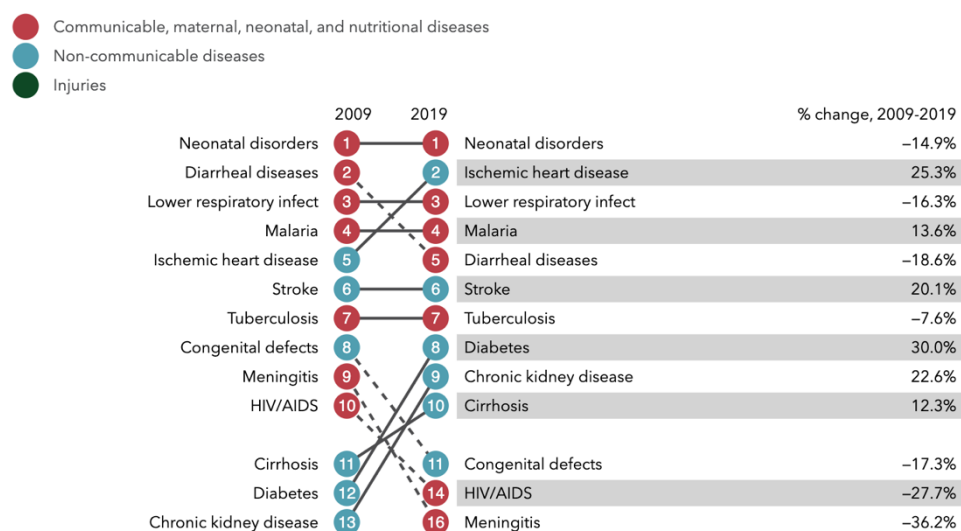


Figure 2. Top ten causes of deaths in 2019 and changes from 2009-2019 (from IHME 2019)

Health care expenditure, structure and policy

Current health expenditure is 4% of GDP; in 2019 health expenditure has been estimated to be 65 dollars per person, from which 34 dollars has been paid out of pocket, 15 dollars by government and around 15 dollars paid by prepaid private spending and development assistance for health.⁷ Senegal has a middle range performance on Universal Health Coverage (UHC) and an effective coverage index of 50. Since the 1990s decentralization reform has allowed the public sector to engage with private profit and non-profit sectors through collaboration between government and community based or non-governmental institutions. The aim of this reform was to reach vulnerable parts of the population including seniors above 60 years old and pregnant women for caesarian care.¹¹

In 2013 Senegal initiated a UHC program to reduce inequality and vulnerability. The program aims to improve access to healthcare by implementing a set of strategies. One of these strategies is to reform the social health insurance policies of organizations that cover formal sector employees and their families. Another strategy is to expand health coverage for employees of the informal and rural sectors by using Community-based health insurance (CBHI) and financial support from state and local governments. The program also aims to strengthen existing policies that exempt older people and pregnant women from paying for care. In addition, the program will implement new policies to provide free healthcare for children under five years of age. The UHC program is funded by a combination of governmental subsidies, household contributions and external funding provided by development partners. These funds are essential for the sustainability and improving of service packages and expanding coverage in the informal sector.¹¹

Health workforce and infrastructure

In all health policies, the equitable distribution of resources is an issue in terms of accessibility to quality health services and optimization of the population's health level. The Ministry of Health and Social Action (MSAS) of Senegal has developed a 2019-2023 health map adopted in the Council of Ministers on July 25, 2018, to produce evidence to support strategies and interventions in terms of needs in health structures, equipment, human resources, rehabilitation, etc.¹²

Telemedicine

The published report of Senegal's health map demonstrated that the specialized health care, as well as specialized doctors and technicians, are largely concentrated in large urban areas and there is a limit in access to specialized health personnel in the out of center regions and rural areas. To address these deficits, the usual methods (recruitment of personnel, construction and equipment) have shown their restrictions. Consequently, achieving Universal Health Coverage (UHC) will also require innovative solutions such as Information and Communication Technologies (ICT).¹³ In this regard, Senegal's ministry of health and social action has developed a digital health strategy plan 2018-2023 and has represented the development of digital health as an extraordinary opportunity for Senegal.¹³

The strategic and cross-cutting nature of digital health has led to the adoption of a participatory approach throughout the process, involving many stakeholders from the health and ICT sectors. To this end, Senegal's national Digital Health initiative will include the strategy, the action plan and the monitoring and evaluation plan. It is envisioned that by 2023, the Digital Health Strategy will enable Senegal to sustainably improve universal health coverage for the population and ensure that stakeholders make decisions based on quality and secure information.¹³

Coverage

The results of 2019 report showed a geographic coverage radius of 4.9 km on average for a health post (public or private), 6.5 km for a public health post, 25.2 km for a public health center, 41.7 km for EPS hospital (Établissement Public de Santé/ Public Health Establishment), and 40.1 km for EPS hospital and private equivalents. For population coverage, a public health post covers an average of 10,855 inhabitants, a center 162,051 and an EPS 445,641.¹²

Availability of services and health units

Integrated all public and private facilities in Senegal are as follows:

- Health Posts (HP)
- Level 1 and 2 Health Centers (CS1, CS2)
- Public Health Establishments (EPS1, EPS2, EPS3)

Almost all of Senegal's health posts have the three main units, which are the pharmacy, the medicine and the maternity ward, with 99.2%, 97.7% and 84.8% respectively. In health centers (types 1 and 2), reception and emergency units, eye care units and medical imaging are available at 46%, 48% and 60% respectively.

Neurology and psychiatry services are not available in EPS1, while others are poorly represented (11% for orthopedics, 20% for dermatology and cardiology respectively). Reception and emergency services, pediatrics, gynecology and medical imaging are available to more than 80%.

In the EPS2s, anesthesia/resuscitation services, emergency unit, medical imaging, cardiology, internal medicine, gynecology, pediatrics and nephrology are more than 80% available. On the other hand, psychiatry, pediatric surgery and gastroenterology are poorly available (14%).

The EPS3s are poorly supplied with geriatrics and gerontology (9%), rheumatology, neurosurgery and neurology (14%), and maxillofacial surgery or stomatology (27%). Medical imaging, maintenance, dentistry, anesthesia-intensive care, and occupational medicine services are available for 80%¹²

Share of employers in the provision of human resources

The Health Development Committees, the Boards of Directors of the EPSs, the Territorial Collectivities and the Technical and Financial Partners (TFPs) have provided 50.1%, 16.2%, 4.5% and 0.5% respectively of the health personnel at all public service points. The State,

through the civil service, the Ministry of Health and Social Action (MSAS), the universities and the Defense and Security Forces (FDS), has recruited 28.7% of the current staff. In addition, the State has made available 67.5% of doctors, 56.9% of State nurses and senior health technicians and 72.4% of State midwives.¹²

Staff and types of care

According to the health map of Senegal the total number of health workers of the country is 31,292, in which the assistance staff for medical care specialties, dental care and primary care represents 23%; medical staff related to primary care 18%; emergency care personnel 0.8% (with 76% men) and medical specialty care personnel 0.9% while health workers who deal with maternal, neonatal and infant-child care represents 9% of the total number of personnel.

The distribution of medical health personnel dedicated to maternal, neonatal and infant/juvenile care services appears to be almost linear, with proportions ranging from 11.8% for the Thiès region to 5.2% for the Ziguinchor region, and from 8.4% (Diourbel), 6.5% (Saint Louis) and 6.3% (Louga) respectively. Dakar region accounts for 31% of the agents assigned to this type of service.¹²

Gender and the health care workforce

Men are more represented in most types of health care, notably medical imaging, equipment maintenance, IT-support services, emergency care, cardiology, nephrology, rehabilitation and psychic and psychiatric care. On the other hand, there is a predominance of women in maternal, neonatal and infant/juvenile care, laboratory services, ophthalmological care and social work. It should also be noted that there are as many men as women in cancer care.¹²

National Radiology Profile

According to the 2019-2023 health map report of the ministry of health and social action of Senegal the medical radiology personnel consists mainly of radiologists, radiology technicians, medical imaging technicians and senior medical imaging technicians. National level health centers (level one and two) are equipped with 59.6% medical imaging units.¹²

Medical Imaging Services	Availability	Number of EPSs	Percentage of Availability
EPS1	9	10	90%
EPS2	13	14	93%
EPS3	10	11	91%

Table 1. Availability of medical imaging services at the EPS 1, EPS 2, EPS 3

Human Resources of Health Services Delivery Points: Current Status

	PS	CS1	CS2	EPS1	EPS2	EPS3	Total
Medical Imaging personnel		10	8	16	47	93	174

Table 2: Current distribution of medical imaging health workers

The personnel involved in medical imaging is diversely distributed, ranging from 54.4% for the regions of Dakar, Diourbel 7.3% and Thiès 7%. The regions of Sédhiou, Kaffrine and Kédougou have 0.7% of personnel each, while Kédougou is the last region with 0.3% of agents.¹²

Regions	Occupation	Occupation	Occupation	Occupation	Total
	Radiologist	Radiology technician	Medical imaging technician	Senior medical imaging technician	Total
Dakar	44	1	6	46	97
Diourbel	3		0	7	10
Fatick	0			3	3
Kaffrine	0		1		1
Kaolack	2			6	8
Kedougou					
Kolda	1			1	2
Louga	2		0	1	3
Matam	1			2	3
Saint Louis	2		1	4	7
Sedhiou	0			1	1
Tambacounda	1			3	4
Thies	3		3	6	12
Ziguinchor	2			3	5
Total	61	1	11	83	156

Table 3. Distribution of medical imaging officers by region at the EPS Level

Medical imaging staff in public health institutions are represented by 39% of radiologists, 1% of radiology technicians, 7% of medical imaging technicians and 53% of senior medical imaging technicians. The Dakar region alone accounts for 62% of these categories of medical imaging staff.¹²

Regions	Health center (CS)	Health center (CS)	Health center (CS)
	Radiologist	Senior medical imaging technician	Tootal
Dakar	1	6	7
Diourbel		0	0
Fatick		0	0
Kaffrine		0	0
Kaolack		1	1
Kedougou		1	1
Kolda		2	2
Louga		4	4
Matam		0	0
Saint Louis		0	0
Sedhiou		0	0
Tambacounda		1	1
Thies		2	2
Ziguinchor			
Total	1	17	18

Table 4. Distribution of medical imaging agents by region at the health center level (CS)

The table above shows that only the Dakar region has radiologists in its health centers. Senior technicians represent 94% of the staff dedicated to medical imaging services. The Dakar region accounts for 38% of these agents. The regions of Diourbel, Fatick, Kaffrine, Matam, Saint Louis, Sédhiou and Ziguinchor do not have senior medical imaging technicians.¹²

Medical imaging human resource requirements

A total of 164 medical imaging staff are needed in the country, as the tables below demonstrate.

Needs at the National Level:

Occupation	Needs	Over-staffing
Radiologist	29	0
Medical imaging technician	8	0
Senior medical imaging technician	127	0

Table 5. Total number of medical imaging staff needed in medical imaging ¹²

Needs at the level of reference health services/ EPS:

Occupation	EPS1	EPS2	EPS3
Radiologist	6	3	20
Medical imaging technician	8	0	0
Senior medical imaging technician	0	28	12

Table 6. The number of medical imaging staff needed at the level of public health institutions ¹²

Needs at the level of basic health services/ CS:

Occupation	PS	CS1	CS2
Radiologist		0	0
Superior medical imaging technician		67	20

Table 7. Number of medical imaging staff needed at basic level ¹²

Required Equipment

Medical imaging equipment needs at the level of reference health services (EPS1, EPS2, EPS3):

Equipment	ESP1	ESP2	ESP3
Angiography			7
Mammography	6	7	3
Digital radiology equipment and accessories		5	2
X-ray equipment (Standard and with contrast)	6	3	2
Doppler Ultrasound			8
Standard/ simple Ultrasound			
Magnetic Resonance Imaging (MRI)			10
Computer Tomography (CT)	8	3	5

Table 8. Number of medical imaging required at public health institutions ¹²

Medical imaging equipment needs in health centers and health posts:

Equipment	CS1	CS2	PS
Digital radiology equipment and accessories	51	6	
Standard/ simple Ultrasound	9		

Table 9. Number of medical imaging required at basic level¹²

The above table for medical imaging equipment in health posts and health centers in Senegal reveals that there is a need for fifty- one digital radiology devices in level one health centers and six devices for level two health centers with no surplus.⁸ Besides, concerning digital medical

imaging services Abdoul A. BA et al. showed that in 2016 among twelve public and private referral centers in different regions of Senegal digital exams were only stored in one center via PACS Cloud (Picture Archiving and Communication Systems) in a single service while the rest were archived temporarily on hard disk.¹⁴

Conclusion

The fight against social inequalities is a priority in the government of Senegal. The Ministry of Health and Social Action (MSAS) develops policies and strategies to ensure equity in health. This has been justified by updating the 2009-2013 health map. With the new 2019-2023 health map, the Government aims to improve territorial equity in health, to increase the density of the health care offer to support the achievement of universal health coverage and to raise the technical platforms, including through the use of telehealth. This monitoring report is a fundamental pillar of the policy of access to quality health care in terms of needs for health structures, human resources, equipment, rehabilitation, etc. Not only national but international organizations and individuals can benefit from this updated health map to support the government of Senegal to create new health structures, acquire required equipment and recruit human resources, as well as teaching and training of professional health workers in Senegal. Additionally, the government of Senegal is ambitious to implement digital health and Telehealth as it has been shown in the Digital Health Strategic Plan 2018-2023. It is an essential tool for closing the gaps identified in the health map. Considering all the health requirements and gaps mentioned, including in the field of medical imaging, global health radiology can play an important role as Senegal continues its progress in healthcare and above.

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