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# Sudan



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# Foreword

The Government of Sudan and WHO are working together to effectively improve the public health situation in the country with special emphasis on the five key regional priorities:

- health security and prevention and control of communicable diseases;
- noncommunicable diseases, mental health, violence and injuries, and nutrition;
- promoting health through the life-course;
- health systems strengthening; and
- preparedness, surveillance and response.

The strategic directions to address these priorities are broadly in line with WHO's 12th General Programme of Work, the Programme Budget 2016–2017 endorsed in May 2015 by the 68th World Health Assembly and the five strategic areas of work endorsed by the WHO Regional Committee for the Eastern Mediterranean in 2012.

Reliable and timely health information is essential for policy development, proper health management, evidence-based decision-making, rational resource allocation and monitoring and evaluation of the public health situation. While the demand for health information is increasing in terms of quantity, quality and levels of disaggregation, the response to these needs has been hampered because of fragmentation and major gaps and weaknesses in national health information systems.

The strengthening of health information systems is a priority for WHO in the Region. Intensive work with Member States since 2012 has resulted in a clear framework for health information systems and 68 core indicators that focus on three main components: 1) monitoring health determinants and risks; 2) assessing health status, including morbidity and cause-specific mortality; and 3) assessing health system response. In order to successfully achieve this important goal, concerted and aligned action at national and international level are required to address the gaps and challenges in the health information systems of all countries. This will ensure the generation of more effective evidence to monitor improvement in the health situation, nationally, regionally and globally.

This comprehensive health profile is intended to serve as a tool to monitor progress in the health of the population. It was produced by a team at the Federal Ministry of Health using a standardized template and guidelines under the technical supervision of WHO to ensure comparability with other countries of the Region. WHO's collaboration with its Member States will strengthen the national health information systems, and enable the generation of timely and reliable evidence to assess the health situation and trends, and the health

system response. Most important, it will provide the information needed by health policy and decision-makers.

Sudan has made significant achievements in health during recent decades despite the challenges the country is facing. The government is focusing on universal health coverage and improving the quality of care. An integrated model for health programme management and development of a one-health plan to align the efforts of all health partners are main outcomes of efforts to improve the effectiveness of resource allocation and monitoring. The country is working to improve evidence generation through revitalization of the health information system. The Sudan Health Observatory ([www.sho.gov.sd](http://www.sho.gov.sd)) was launched in 2014 as an open access tool for information sharing and dissemination. Sudan is currently in the process of developing the next 5-year strategic plan for the health sector (2017–2021).

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# Introduction

The population of Sudan has increased by 49.5% in the past 25 years, reaching 39.6 million in 2015. It is estimated that 66.7% of the population live in rural settings (2012), 17.0% is between the ages of 15 and 24 years (2015), and life expectancy at birth is 63 years (2012). Literacy rates (2012) are 87.9% for youth (15 to 24 years), 73.4% for total adults and 65.3% for adult females.

The burden of disease attributable to communicable diseases is 52.8%, noncommunicable diseases 33.9% and injuries 13.4% (2012). The share of out-of-pocket expenditure is 78.9% (2013) and the health workforce density is 2.5 physicians and 4.5 nurses and 3.9 midwives per 10 000 population (2014).

The public health issues facing the country are presented in the following sections: communicable diseases, noncommunicable diseases, promoting health across the life course, health systems strengthening, and preparedness, surveillance and response. Each section focuses on the current situation, opportunities and challenges faced, and the way forward. In addition, trends in population dynamics and in selected health indicators are analysed to provide policy-makers with evidence and forecasts for planning.





# Communicable diseases

HIV

Tuberculosis

Malaria

Neglected tropical  
diseases

Vaccine-preventable  
diseases

# Communicable diseases

- A study to provide baseline data about the prevalence of HIV among people who inject drugs is underway.
- There has been a significant reduction in tuberculosis-related mortality, and a decline in incidence and prevalence.
- There has been a 70% increase in treatment of soil-transmitted helminthiasis compared to the previous year.
- A measles catch-up campaign has been conducted for children aged 9 months to 15 years old and has achieved high administrative coverage.

## HIV

The HIV prevalence is low. The estimated number of pregnant women living with HIV is 2500 (1), while antiretroviral therapy coverage to prevent mother-to-child transmission is 2.0% (2). Estimated antiretroviral therapy coverage is 5.0% (2).

There is a national strategic plan for HIV control for 2014–2016, in line with the national health sector strategic plan (2012–2016). A study to provide baseline data about the prevalence of HIV among people who inject drugs is underway. Testing for HIV is routinely done as part of antenatal care services in a limited number of public health facilities. The Global Fund to Fight AIDS, Tuberculosis and Malaria supports the HIV response for most-at-risk groups. An active referral system will be supported by the Global Fund to ensure that newly diagnosed cases from HIV testing sites are referred to antiretroviral therapy centres for treatment. Transportation facilities are also being supported by the Global Fund to ensure prophylaxis coverage of infants for the first six weeks and confirmation of the infant's HIV status through polymerase chain reaction testing. Challenges include: achieving higher coverage of key populations with HIV preventive packages, given the cultural and legal context for female sex workers and men having sex with men in the country; fully integrating HIV testing into antenatal care in primary health care facilities; ensuring effective referral mechanisms for HIV cases detected from voluntary counselling and testing; preventing mother-to-child transmission of HIV; and retention in antiretroviral therapy.

Improving the quality and completeness of the HIV strategic information system with a special focus on electronic patient monitoring is a priority, as is improving coverage of most-at-risk populations with preventive and treatment services, especially female sex workers and men who have sex with men, and improving knowledge about other key populations and arranging the necessary coverage with preventive and treatment services. More focus needs to be given to ensuring quality of care and treatment services for prevention of mother-to-

child transmission of HIV by using CD4 count or viral load testing in patient monitoring and integrating the management of tuberculosis and HIV co-infection in antiretroviral therapy centres, in addition to improving patient retention in treatment for 12 months and ensuring adequate infection control measures. Reducing HIV stigma in health care settings is another focus area. HIV testing needs to be integrated into reproductive health services to improve uptake by pregnant women and ensure referral of those found to be HIV positive to antiretroviral therapy centres. Priorities for the next three years include the integration of antiretroviral therapy into the hospital system to mitigate the drawbacks of standalone antiretroviral therapy centres for the prevention of mother-to-child transmission of HIV and for treatment indicators. In addition, a system for external quality assurance needs to be established for HIV testing services. Ensuring the accessibility of HIV and sexually transmitted diseases prevention and treatment services in humanitarian settings is another priority.

## Tuberculosis

The tuberculosis-related mortality rate is estimated at 25.0 per 100 000 population (3). A total of 20 181 detected tuberculosis cases were reported in 2013, of which 5980 (30%) were new sputum smear-positive cases (3). The treatment success rate of new and relapsed cases registered in 2012 was 75.0% (3). Drug-resistant tuberculosis is estimated at 1.9% among new cases and 20.0% among previously treated cases (3).

There has been a significant reduction in tuberculosis-related mortality, and a decline in incidence and prevalence. A tuberculosis prevalence survey has been carried out; the final results, which were endorsed in May 2015, indicate that the prevalence of all forms of tuberculosis has declined.. The 18 states in the country report to the national tuberculosis programme from facilities on a quarterly basis. A nationwide tuberculosis management units network has been maintained since 1994 providing anti-tuberculosis drugs and tuberculosis microscopy services free of charge, with supply integrated into the central medical supplies system. A mix of home and facility-based directly observed treatment, short-course is used for treatment of patients, and 25 private clinics are involved in the management of tuberculosis cases according to national tuberculosis programme guidelines. A total of 30 operational research studies on priority areas of the national tuberculosis programme have been conducted. One of the most important challenges to the programme is improving referral of suspected cases from the widely expanding primary health care facilities network to the tuberculosis management units. Other challenges include the establishment of a comprehensive multidrug-resistant tuberculosis management system, comprehensive implementation of collaborative tuberculosis and HIV activities, and ensuring strict implementation of infection control measures in tuberculosis management units. The quality and completeness of tuberculosis strategic information system also needs to be improved.

The main focus needs to be on improving tuberculosis case detection. This can be achieved through better utilization of missed opportunities in primary health care settings, expanding coverage with tuberculosis diagnostic and treatment services through better mapping of areas in need and redistribution of services, increasing the number of tuberculosis management units providing services on a daily basis, and ensuring accessibility of services to those working in mining areas, pastoralists and those in humanitarian settings. More private sector facilities also need to be involved in providing tuberculosis diagnostic and treatment services according to the national protocol. Improving the treatment success rate to 90% is another important priority, through reviewing and improving implementation of the directly observed treatment, short-course strategy, strengthening the defaulter tracing system by attracting more nongovernmental and civil society organization volunteers and the support of the Global Fund, and improving patient and contact education by health care providers. Increasing HIV testing for tuberculosis patients and actively referring HIV positive patients to antiretroviral therapy centres is another area of focus. Through the support of the Global Fund, multidrug-resistant tuberculosis diagnostic and treatment services will be expanded to cover more states based on five zonal laboratories providing GeneXpert testing and culture services, in line with improving multidrug-resistant tuberculosis surveillance. Updating tuberculosis treatment guidelines for adults and children and improving management of childhood tuberculosis are other priority focus areas.

## Malaria

The country is considered a high burden and high risk country for malaria. Total confirmed malaria cases decreased from 933 267 in 2003 to 526 931 in 2012 (4). Coverage in targeted areas for households that have at least one long-lasting insecticidal net for malaria prevention is 36.2% (2012), and 10.5% of people with at least one net had slept under a long-lasting insecticidal net the previous night (5). Based on sampling, prevalence of the malaria parasite was found to be 3.3% (5).

Malaria is a major public health problem in the country. The main vector control interventions are indoor residual spraying in targeted areas with irrigation schemes, use of long-lasting insecticidal nets, larval source management and space spraying in emergency situations. The proportion of household ownership of insecticide-treated nets in target areas is a little over half and the proportion of people who slept under insecticide-treated nets the previous night is low. Annual indoor residual spraying operational coverage has remained above 90% in Gezira and Sinnar states, the two priority states supported by Global Fund resources. Only a little over a third of areas in the country are covered by larval source management interventions. A comprehensive malaria programme review was conducted in 2012 based on which a malaria control strategy was developed for the years 2014–2016, addressing the gaps highlighted in the review. The main challenges include integration of malaria surveillance into the already established communicable disease surveillance system, improving the reporting of primary health facilities to the federal department health

management information system, overcoming financial limitations to the expansion of indoor residual spraying to other target states, sustaining government resources committed to the expansion of larval source management services, increasing utilization of insecticide-treated nets in target areas, achieving 80% coverage of persons suspected to have malaria with a diagnostic test and improving compliance of health care providers with national malaria treatment guidelines.

A key area of focus is moving states with very low malaria transmission into the pre-elimination phase of malaria control. A main priority area is to expand the coverage of malaria vector larval source management services in the main urban settings through mobilization of domestic resources and the reactivation of state malaria-free initiatives and the coordinating role of the higher presidential health sector coordination council. Increasing coverage with larval source management services will go hand in hand with sustaining high coverage with long-lasting insecticidal net and indoor residual spraying in target localities. The main priorities for malaria control are increasing access to malaria diagnostics, improving compliance of health care providers in use of malaria diagnostics for confirming the disease and ensuring easy access of positive cases to free first line artemisinin-based combination therapy. Ensuring the compliance of more private sector facilities with the national protocol for diagnosis and treatment of malaria, and integrating routine malaria surveillance into the communicable disease surveillance system, which has wide country coverage, are other areas of focus.

## Neglected tropical diseases

The country remains at precertification stage for dracunculiasis and is still endemic for cutaneous and visceral leishmaniasis, as well as blinding trachoma (6). In 2012, 3165 cases of visceral leishmaniasis were reported, while in 2013, there were 677 cases of leprosy reported (6). In 2013, 89 872 people were reached as part of a mass treatment campaign for soil-transmitted helminthiasis, 2 074 774 for schistosomiasis, 292 739 for lymphatic filariasis and 335 791 for trachoma (6).

Of the 17 globally-listed neglected tropical diseases, nine are a recognized public health problem in the country. These include: leishmaniasis, schistosomiasis, lymphatic filariasis, onchocerciasis, trachoma, guinea worm, mycetoma, soil transmitted helminthes and leprosy. Large populations living in rural areas are infected by one or more of these diseases. Neglected tropical diseases rank among the most important causes of disease in school-age children and are estimated to represent more than 40% of the disease burden due to all tropical diseases, excluding malaria. Schistosomiasis, in particular, is an increasing public health problem. Intestinal and urinary bladder chronic inflammation are endemic in the country with varying prevalence rates. The country is in the precertification phase of guinea worm disease eradication. In June 2013, two confirmed cases of guinea worm disease were reported from South Darfur State. Since 2012, large-scale treatment (17 mass drug

administration rounds) has resulted in interrupted transmission of onchocerciasis in Abu Hamad area, River Nile State, and treatment has been stopped; as of 2014, the country is in the assessment phase. In 2013, fewer cases of visceral leishmaniasis were reported compared to the previous year, and over two million people were treated for schistosomiasis. Also, there was a 70% increase in treatment of soil-transmitted helminthiasis compared to the previous year. Implementation of a four year plan is underway with an international donor agency to expand coverage of diagnostic and treatment services for visceral leishmaniasis to all endemic states beyond the two states currently covered. Challenges for neglected tropical diseases control include sustaining drug supplies and running costs for mass drug administration campaigns and follow-up prevalence surveys.

A key priority is to establish well-structured, integrated and adequately resourced neglected tropical diseases departments at state level. Increased and sustainable domestic and donor funding is needed to ensure the sustainability of over 90% coverage of populations in endemic areas with preventive chemotherapy for five diseases (schistosomiasis, soil-transmitted helminthiasis, lymphatic filariasis, onchocerciasis and trachoma) through integrated mass drug administration. A collaborative effort is needed involving the federal surveillance department, and surveillance departments and neglected tropical diseases focal persons at state level, to achieve certification of the country as free of guinea worm disease in 2016. Another priority is to establish a national mycetoma disease control programme that is integrated into the community interventions department in the Communicable and Noncommunicable Disease Control Directorate of the Federal Ministry of Health, including epidemiological mapping of the disease and efforts to include the disease in the WHO list of neglected tropical diseases. Another focus area is to integrate the reporting of all neglected tropical diseases into the national health information system.

## Vaccine-preventable diseases

Immunization coverage among 1 year-olds improved between 1990 and 2013 for BCG from 77.0% to 93.0%, DTP3 from 62.0% to 93.0%, measles from 57.0% to 85.0% and poliovirus from 62.0% to 93.0% (7). Neonatal tetanus coverage increased during the same period from 72.0% to 74.0% (7). In 2013, hepatitis B (HepB3) vaccine coverage among 1 year-olds was 93.0% (7). Rotavirus vaccine was introduced in 2011 and pneumococcal vaccine was introduced in August 2013. A measles catch-up campaign was conducted for children aged 9 months to 15 years old in November 2013 and achieved high administrative coverage. However, localized outbreaks of measles occurred in late 2014 and continued in 2015. There is a low prevalence of neonatal tetanus and hepatitis B among children under-5 years of age. Many additional vaccines are planned to be introduced (meningitis in 2016, yellow fever in 2017) as part of the routine immunization programme schedule.



# Noncommunicable diseases

Noncommunicable diseases

Mental health and substance abuse

Violence and injury

Disabilities and rehabilitation

Nutrition

# Noncommunicable diseases

- A multisectoral action plan for control of noncommunicable diseases has been developed and is in the endorsement stage.
- A disability strategy has been developed and was endorsed in 2014.
- The country has adopted the community-based management of acute malnutrition strategy.

## Noncommunicable diseases

The burden of noncommunicable diseases causes 33.9% of all deaths. Cardiovascular diseases account for 11.6%, cancers 5.2%, respiratory diseases 2.4% and diabetes mellitus 1.8% of all deaths (8). As a result, 17.0% of adults aged 30–70 are expected to die from the four main noncommunicable diseases (9). More than 9.5% of adolescents (13–15 years of age, 13.7% boys, 5.1% girls) have ever smoked cigarettes, while 27.6% of youth report exposure to passive smoking (10). Prevalence of insufficient physical activity in adolescents (11–17 years of age) is 91.9% (91.2% boys, 92.3% girls) (11). Raised blood pressure in adults above 18 affects 32.0% of the population (35.1% male, 28.8% females), while obesity affects 6.0% (3.8% males, 8.2% females) (11).

A national strategy for noncommunicable diseases and cancer control has been developed, as well as guidelines for the screening of the most common cancers and the diagnosis and treatment of hypertension, diabetes, asthma and rheumatic heart disease. In addition, a multisectoral action plan for control of noncommunicable diseases has been developed and is in the endorsement stage. The noncommunicable diseases services package has been integrated into selected primary health care facilities in two states.

A key priority for noncommunicable diseases control is to complete the mapping of the prevalence of the main noncommunicable diseases, by state, in order to prioritize interventions, and to develop structures with the capacity to manage the response at state level within an integrated disease control approach. Full integration of management of target noncommunicable diseases into the primary health care setting is another important priority. There is also a need to mobilize resources for awareness raising and behaviour change interventions on the risk factors for noncommunicable diseases, in collaboration with the Federal Ministry of Health, using a multisectoral approach. Other key priority areas include establishing screening programmes for the early detection of breast and cervical cancer using the primary health care network of facilities and sound referral mechanisms to treatment centres.



## Mental health and substance abuse

Neuropsychiatric disorders are estimated to contribute 6.5% of the burden of disease (12) and the suicide rate is 17.2 per 100 000 per year (13).

Mental health services are organized in terms of service areas, but the structure is strongly centralized. There are 17 specialized mental health clinics in the country, with limited specific care for children and adolescents. The users treated in outpatient facilities are primarily diagnosed with schizophrenia and related disorders, while other disorders include anxiety, hysteria and epilepsy. Psychotropic medicines are available. There is no follow-up care in the community. There are community-based residential care facilities and two psychiatric hospitals available that are at full occupancy rate. The number of beds and patients has increased by 25.0% in the last five years.

Key priorities include the integration of mental health interventions and services into primary health care and the development of state mental health action plans for normal and emergency settings.

## Violence and injury

The percentage of deaths caused by injuries in 2012 was 13.4%; of this, unintentional injuries accounted for 72.6% (of which 32.3% were due to road traffic injuries and 16.0% were a result of fire, heat and hot substances), while intentional injuries accounted for 27.4% (39.5% as a result of self-harm and legal intervention and 38.1% as a result of interpersonal violence) (8). In 2010, the estimated road traffic fatality rate was 25.1 per 100 000 population (14).

For post-injury trauma care, there is a universal emergency access telephone number and 11%–49% of the seriously injured are transferred by ambulance (14). There are four major hospitals with specialized trauma units and a specialized national emergency care training for doctors but not for nurses. There are also centres for supporting women and children who are victims of violence, with a special focus on conflict-affected areas.

Laws exist against most key road safety risk factors but need to be strengthened. Child injury prevention needs to be addressed in national child health plans. An in-depth assessment of the trauma care system would help identify and address service gaps. There is also a need to strengthen the injury information system and to address the gap in injury data between what is reported and what is estimated.

## Disabilities and rehabilitation

Disability prevalence is 4.9% and is higher among males (5.0%) than females (4.7%) (15). Age-specific disability prevalence is highest in the above 65 age group (30.1%) and lowest among those aged 0–14 years (2.4%) (15). Types of disability include: mobility (18.1%), visual (31.5%), mental (24.2%), hearing (13.2%) and speech (4.0%) (15).

The United Nations (UN) Convention on the Rights of Persons with Disabilities was signed in 2007 and ratified in 2009 with its Optional Protocol. The National Council for the Disabled is the national coordination mechanism and is chaired by the Minister of Welfare and Social Security, with representation of persons with disabilities. The Council has a five-year plan (2012–2016) and a disability strategy was developed and endorsed in 2014. Most of the disability services are provided through governmental or nongovernmental day care centres. Rehabilitation services are limited, although they are very successful in dealing with some types of disability such as blindness. Community-based rehabilitation programmes, including assistive device services, are also very limited.

The integrated national eye health plan 2014–2019 focuses on the development of specialized and sub-specialized eye care cadres, development of comprehensive eye care services at state level, screening and management of diabetic retinopathy as part of the national diabetes management and control programme, and strengthening networking with nongovernmental organizations to cover the financial gaps in the implementation of the national plan. The main challenges for eye health include the provision of accessible comprehensive eye care services at district /state level, integration of primary eye care into primary health care, improving the quality and visual outcome of cataract surgery, and the screening and management of glaucoma and diabetic retinopathy. Data on ear health and hearing loss are scarce and deficient. Other challenges include the acute shortage of specialists, audiologists and nurses (at state level and in rural areas), the lack of a surveillance system for ear and hearing care, and a lack of funding for ear and hearing care, which is not included in the defined basic package in the recently endorsed national strategy for primary health care (2012–2015).

A key priority is to develop a national disability health strategy and action plan based on the WHO global disability action plan 2014–2021. This is an important first step and consolidated efforts are required to ensure full implementation. There is also a need to develop and strengthen allied health personnel and postgraduate courses in audiology and otolaryngology to bridge the gap in ear and hearing care, and to integrate ear health into the primary health care service package and national health management information system.

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<sup>2</sup> WHO Regional Office for the Eastern Mediterranean, unpublished data, 2014.

## Nutrition

The estimated prevalence of various conditions due to malnutrition in children under 5 years of age is: 32.2% underweight, 16.4% wasting, 5.3% severe wasting and 35.0% stunting (16). The prevalence of anaemia in pregnant women is 23.0% and consumption of iodized salt is 9.5% (17). Initiation of breastfeeding within one hour after birth is 73.2%, while 41.0% of children under 6 months are exclusively breastfed..

Rates of malnutrition have remained high for the past 25 years, putting the country in the status of continuous emergency and reflecting the limited progress that has been made. Community volunteers are central to nutrition education, counselling and social mobilization efforts. Since 2010, the country has adopted community-based management of acute malnutrition as the strategy for the treatment of malnutrition (severe and moderate). Vitamin A supplementation is regularly done through child health days and immunization campaigns. Addressing malnutrition has encouraged long-term intersectoral collaboration and coordination.

There is a need for governmental bodies to lead and promote the implementation process of community-based management of acute malnutrition within their structures as part of their respective development plans and priorities.



# Promoting health across the life course

Reproductive,  
maternal, newborn,  
child and adolescent  
health

Ageing and health

Gender, equity  
and human rights  
mainstreaming

Social determinants  
of health

Health and the  
environment

# Promoting health across the life course

- The maternal and child health strategy is being updated and a road map for the reduction of maternal and newborn mortality 2010–2015 has been developed.
- Social determinants of health and Urban HEART steering and technical committees have been formed and approved by the government.
- The government has endorsed the WHO regional strategy on health and the environment and framework for action 2014–2019 and is preparing a national strategy.

## Reproductive, maternal, newborn, child and adolescent health

The maternal mortality ratio in 2010 is 216 per 100 000 live births and the under-5 mortality rate is 83 deaths per 1000 live births (17).<sup>1</sup> The leading causes of under-5 mortality are acute respiratory infection (18.0%), diarrhoea (11.0%), prematurity (14.0%) and intrapartum-related complications (12.0%) (20). The proportion of women receiving antenatal care coverage (at least one visit) is 74.3% and (at least four visits) 47.1% (17). Unmet need for family planning is 29.0% and the contraceptive prevalence rate is 9.0% (17).

The leading causes of maternal mortality are postpartum haemorrhage, eclampsia and sepsis. The key determinants of preventing maternal mortality, including contraceptive use and involvement of skilled birth attendants, remain at low levels. The country lags behind the targets of Millennium Development Goals 4 and 5 for reducing maternal and child mortality, and the government has signed an accelerated maternal and child health plan for achieving them. The maternal and child health strategy is currently being updated and a road map for reduction of maternal and newborn mortality (2010–2015) has been developed. Key challenges include the lack of financial resources, a shortage and inequitable distribution of health human resources, and instability in some areas of the country.

The way forward includes mobilizing the required resources for the developed plans and placing greater focus on increasing the coverage of the related essential life-saving interventions.

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<sup>1</sup> UN estimates are 311 per 100 000 live births for maternal mortality ratio (18) and of 70 per 1000 live births for under-5 mortality rate (19).

## Ageing and health

Life expectancy at birth rose by 8 years between 1990 and 2012 (from 55 years to 63 years) (20). In 2010, the ageing population, above 60, represented 4.9% of the total population (21).

Detailed information on the status and distribution of the ageing population, and their economic, social and health status, is lacking. The rights of the elderly are guaranteed in the 2005 Constitution, which stipulates that “the State guarantees the right to respect the dignity of the elderly and provides them with necessary medical care and services as regulated by law.” However, there are still serious gaps and challenges which prevent the full implementation and realization of these rights. There is a lack of specialized health care for the elderly and social care for the poor, as well as a clear national plan of action, despite efforts to develop a national policy for the elderly. One strategic objective of this policy would be to “provide social and health care for the elderly within the family and empower the family to provide needed support to its elders.”

Establishing a multisectoral body and national programme for ageing and health will be an important first step towards addressing the existing challenges. In addition, the momentum created by the launch of the *World report on ageing and health* in October 2015 and the related global strategy and action plan could support efforts for a national strategy. Capacity-building is also needed for providing elderly-friendly services through the primary health care system.

## Gender, equity and human rights mainstreaming

The country falls among the lowest countries in the gender inequality index, ranking 140 among 152 countries in terms of gender inequality (22). Female adult (above 15 years of age) literacy is relatively low at 65.3% (23) and participation in the labour force is 31.2% (24). Women and youth have the highest rates of illiteracy and mobility.

Women contribute a large portion of the household income, but most work in marginal, informal and low-paying jobs (petty trading, tea selling), with risk of harassment and violence. Women have little control over how household income is spent, including health expenditure. Disease risk is allied to poverty, which is widespread among all age groups including pregnant women and children. It is also concentrated among migrants, refugees, prisoners, rural populations and indigenous populations, where social inequality and political marginalization may impede access to health services. Additional barriers are created by sociocultural limitations, poor sanitation, poor access to health information, lack of informed consent in testing and treatment, and the inability to pay user fees for medical services. Although the country is not a party to the Convention on the Elimination of All Forms of Violence Against Women, it is party to other equity-related global commitments. However, gender and other equity efforts are scattered across sectors and UN agencies.

Challenges include inadequate financial and human resources, inadequate data, competing priorities and the effects of years of conflict. Sociocultural conditions and gaining community support can also be challenging.

Health information, including surveillance, on the drivers of rights-based vulnerabilities needs to be further strengthened, and capacities and resources mobilized. Advocacy for the integration of gender, equity and rights-based approaches into health programmes and services is also needed, as is multisectoral coordination with technical support from concerned UN agencies. Active community involvement to ensure that interventions are acceptable is needed to enhance the likelihood of effective implementation.

## Social determinants of health

The country is ranked at 166 out of 187 countries across the world on the human development index (22). The population at poverty level was 46.5% in 2009 (24). The urban population increased between 1990 to 2012 from 28.6% and 33.3%, while access of the rural population to improved water sources increased from 75.0% and 87.2% (24). In 2010, the age group 0–24 years accounted for 61.7% of the total population (21). The adult literacy rate in 2012 was 55.7% (25), while overall unemployment was 14.8% and youth unemployment (15–24 years) 23.8% (24).

Social determinants of health and Urban HEART steering and technical committees have been formed by the government to support the process of addressing the social determinants of health in different sectors through including health in all policies and ensuring intersectoral integration and coordination. There are now 11 healthy cities in the country registered with WHO. Priority issues include access to safe water, literacy, the health system, healthy lifestyles and unemployment. Challenges include the inadequacy of financial and human resources, competing priorities and the effects of years of conflict.

There is a need to build on existing efforts to scale up action for the integration of social determinants into the health and other sectors' plans and programmes based on the identified priorities.

## Health and the environment

It is estimated that 97 000 people a year die as a result of environmental factors and 24.0% of disability-adjusted life years is attributable to the environment (26). Access to improved sanitation facilities is 24.0%, while access to improved drinking-water is 55.0% (20). An estimated 12 300 deaths were due to inadequate water, sanitation and hygiene in 2012 (27). It is estimated that 72.1% of the population uses solid fuels (biomass for cooking, heating and other usages) (28), resulting in an estimated 14 000 deaths per year as a result of indoor pollution (29).



Both indoor and outdoor pollution have very serious effects on the population. Most still use solid fuels for cooking and incense burning. Evidence indicates high levels of particulate matter in the air. Climate change has affected the pattern of rainfall and resulted in floods, and conflicts in different parts of the country have created risks to environmental health. The government is preparing environmental health legislation, developing a database on environmental health hazards, developing national capacity for preparedness and response to climate change-related environmental emergencies, and strengthening occupational health services. It has also drafted a national strategy and framework for action 2015–2019 with wide representation of all related stakeholders. The draft strategy focuses on: water, sanitation and hygiene; waste management; food safety; occupational health; air quality; environmental health in emergencies; chemical safety; and environmental health services in health care facilities. Climate change and sustainable development are identified as cross-cutting issues.

The priority for the government is to validate the strategy at the state level and to commence its implementation.



# Health systems

National health  
policies, strategies  
and plans

Integrated people-  
centred health  
services

Access to medicines  
and health  
technologies

Health systems,  
information and  
evidence

# Health systems

- There is agreement to move towards the “one plan, one budget, one report” approach for the health sector to increase coordination and collaboration between all stakeholders.
- A primary health care expansion plan 2012–2016 has been developed to extend coverage of quality primary health care services from 86.0% to the whole population.
- The government has endorsed a national policy for promoting local pharmaceutical manufacturing that emphasizes increasing accessibility to medicines and making use of the allowances provided by the Doha Declaration.
- A health research policy and strategy have been endorsed and a national health observatory website launched.

## National health policies, strategies and plans

Total expenditure on health per capita at the international exchange rate increased between 2005 and 2013 from US\$ 34.5 and US\$ 115.0, of which general government expenditure on health increased from US\$ 11.9 to US\$ 24.3 (30). General government expenditure on health as a percentage of total expenditure on health decreased during the same period from 34.5% to 21.1%; however, total expenditure on health as a percentage of the gross domestic product increased from 4.1% to 6.5% (30). The health financing system is characterized by a high share of out-of-pocket expenditure at 75.8% (2013), an increase from 65.5% in 2005 (30). Total expenditure on health from external sources decreased during the same period from 3.9% to 2.6% (30).

The national health sector strategic plan 2012–2016 aims to improve the health status of the population, especially poor, underserved, disadvantaged and vulnerable groups. Three directions for action are identified: strengthening primary health care by expanding high quality, people-centred services, and improving equity in access; strengthening referral care; and ensuring social protection by increasing health insurance coverage, reducing reliance on out-of-pocket payment, and provision of a universal minimum package of health care. The Federal Ministry of Health has formulated 22 health system policies, including a national health policy (2007). A monitoring and evaluation framework (2011) and strategy (2014) have been developed by the Federal Ministry of Health to ensure accountability. The “one plan, one budget, one report” approach is being adopted for the health sector and one strategic plan was developed for 2015 at the federal level and in three states. Training is occurring at state and federal levels to support the development of a 2016 plan and for

the third strategic plan (2017–2021). Planning will be done from the bottom up, starting with community-based needs at locality levels, up to state and federal levels. A policy and planning forum, involving non-health sectors, has been created to support the integration of health into all policies. Policy dialogue is continuing on universal coverage and health system reform.

Priorities include strengthening effective leadership, good governance and accountability of the health system, improving equitable coverage and accessibility of high-quality integrated primary health care, and ensuring that health system financing is sustainable, efficient and equitable and provides social protection to the population.

## Integrated people-centred health services

In 2014, the density of hospitals per 100 000 population was 1.2 (31), while for provincial hospitals it was 0.67 and specialized hospitals 0.03 (showing no change since 2010) (32). Hospital bed density per 10 000 population was 8.1 in 2014 (31). Health workforce density increased between 2010 and 2013 from 9.4 to 10.8 per 100 000 population (33). From 2004 to 2008 the health workforce density for physicians increased from 2.2 to 2.8 per 10 000 population. In 2014, the density of physicians was 2.5 per 10 000 population and specialists was 0.4 per 10 000 population (31). For nurses and midwives it decreased from 9.2 to 8.4, for dentists from 0.3 to 0.2 and for pharmacists from 1.0 to 0.1 (33). In 2014, the density of nurses was 4.5 per 10 000 population and midwives was 3.9 per 10 000 population (31). The number of psychiatrists working in the mental health sector in 2011 was 0.06 per 100 000 population (34).

A primary health care expansion plan (2012–2016) has been developed to extend coverage of quality primary health care services from 86.0% to the whole population. The main aim is to improve access to essential primary health care services. This has been done through: the construction and equipment of 92 new family health care centres and 176 family health units; the training of over 800 community health workers, with an additional 1000 people undergoing basic community health training, achieving 74.0% of the target across the 18 states; and the basic training of an estimated 6000 community midwives (72.0% of the target) and around 215 assistant health visitors (full achievement of the target). In addition, an estimated 1400 medical assistants are now enrolled in basic training. The curricula of all existing medical cadres have been upgraded and a postgraduate programme of family medicine for doctors in health centres has been established at the public health institute and implemented in six states. High priority has been given to strengthening the referral system through the training of doctors at rural hospitals. Another key policy of the Federal Ministry of Health is provision of free drugs for children under 5 years of age to reduce child mortality and morbidity in order to accelerate reaching Millennium Development Goal targets. However, although family practice is part of the national health policy, the

programme covers only 15.0% of primary health care facilities in Gezira, Khartoum and White Nile states. Poor quality of care and medical errors remain challenges for health care delivery.

Improving equitable coverage and accessibility of integrated primary health care and ensuring high quality primary, secondary and tertiary health care are the major priorities for service provision, together with ensuring a stable and equitably distributed health workforce with an appropriate mix of skills to meet agreed health sector needs.

## Access to medicines and health technologies

In 2012, the medicines prices, availability, affordability and price components survey found that the mean availability of originator brand and generic medicines in the public sector was 4.3% and 49.3%, respectively, while in the private sector it was 8.4% and 69.3%, respectively. Also, it was found that the final patient prices for generic medicines in the public sector are about 2.2 times their international reference prices and the final patient prices for originator brands and lowest priced generics in the private sector are about 6.8 and 2.9 times their international reference prices, respectively (35).

The national pharmaceutical sector is governed by the 25 year national pharmaceutical strategy 2005–2029. The national medicines policy was updated in 2012 and approved in 2014. The national essential medicine list was updated and approved in 2014, building upon the approved national standard treatment guidelines set in 2013. There is no national programme or committee to monitor medicines use, although the government is in the process of setting up a national surveillance system to contain antimicrobial resistance. However, there is an endorsed pricing policy for registered medicines that applies to the public and private sectors, as well as nongovernmental organizations, and also a national medicine price monitoring system for retail and patient prices. There is also a national policy to provide some medicines free of charge at public health care facilities, applying to children less than 5 years of age, pregnant women and patients at emergency wards, as well as to medicines for malaria, tuberculosis and HIV/AIDS patients. The country is not a member of World Trade Organization and there are no current laws containing the Agreement on Trade-Related Aspects of Intellectual Property Rights flexibility and safeguards, and no WHO prequalified products are locally produced. However, in 2015, the government endorsed a national policy for promoting local pharmaceutical manufacturing that emphasizes increasing accessibility to medicines and the use of the allowances provided by the Doha Declaration. The country has also joined the WHO Good Governance for Medicines programme in 2010. In 2011, a national assessment for good governance for medicines was carried out. In 2015, the Federal Minister of Health issued two decrees to establish a good governance for medicines steering committee and a good governance for medicines technical committee to develop a country framework.

Improving equitable access to quality essential pharmaceuticals and health technologies is a priority for the country.

## Health systems, information and evidence

The routine health information system is based on quarterly and annual reporting from health facilities and on daily and weekly communicable diseases surveillance reporting, with data published annually in a health statistics report. A national health information strategy 2012–2016 has been developed focusing on integration, improving reporting and data quality, computerizing the system, and building human and infrastructure capacity. To strengthen the health management information system and improve the quality and accessibility of health indicators data, an integrated health information system and district health information system have been developed, with a community health information system in the piloting phase. The health information system is being digitized and around 7000 health workers have been trained in the new format. A national list of indicators has been developed and registries and reporting forms updated.

There is a research directorate within the health information, research and evidence administration that acts as secretariat to a health research council that involves stakeholders from outside the Ministry. In 2014, a health research policy and strategy were endorsed and a national health observatory website launched to become a platform for dissemination of health information and to aid in evidence-based decision-making. A strategy for civil registration and vital statistics has been developed and an e-health strategy developed, although progress on implementation has been slow. The health information system faces the challenges of fragmentation and verticality with health programmes having their own systems for collecting data.

Priorities include full implementation of the integrated health information system to address fragmentation, verticality and different data flow channels, the rolling out of the district health information system project to aid digitization of the health information system, and the strengthening of the health research system and updating the national health research priority list.





# **Preparedness, surveillance and response**

Alert and response  
capacities

Epidemic and  
pandemic-prone  
diseases

Emergency risk and  
crisis management

Food safety

Poliomyelitis  
eradication

Outbreak and crisis  
response

# Preparedness, surveillance and response

- Implementation of International Health Regulations (IHR 2000) based on the results of the last assessment has been carried out for the different core competencies.
- The early warning system for disease outbreaks established in the Darfur region has been effective in the timely detection and monitoring of potential health threats.
- Routine oral polio vaccine type 3 coverage is high, with 94.0% children covered and surveillance indicators above certification standards.
- The country's capacity to identify and respond to outbreaks has been strengthened.

## Alert and response capacities

The government has requested a second extension to meet the obligations for implementation of International Health Regulations (IHR 2000) by June 2016, necessitated by the significant changes faced in relation to the separation of South Sudan. The government has submitted a new two-year IHR implementation plan. Meanwhile, the country has experienced emerging and re-emerging diseases.

Implementation of IHR is based on the results of an assessment of core competencies. The Federal Ministry of Health is the designated IHR national focal point. An IHR committee has been established to monitor implementation. A review of IHR-related legislation has also been undertaken, and the endorsement of the revised legislation is under way. An intersectoral coordination mechanism is in place providing a platform for addressing IHR requirements, particularly those related to information sharing. A functioning system exists for surveillance and response to public health events, particularly for infectious, food safety and zoonotic events. An assessment of points of entry has been conducted and a plan developed for strengthening surveillance and response at them. The capacity to perform laboratory testing for public health events is available at the federal level, but needs to be systematized.

Surveillance and response capacities for public health events, laboratory capacity, human resources and risk communication need to be expanded at state and local levels. The existing financial resources to meet IHR obligations are limited and efforts need to be made to mobilize additional funds. Surveillance and response to chemical and radiation emergencies are limited and need strengthening at federal and state levels.

## Epidemic and pandemic-prone diseases

The country has seen repeated outbreaks of cholera, viral hepatitis caused by hepatitis E virus, meningococcal meningitis, yellow fever, Rift Valley fever and other types of viral haemorrhagic fever.

The protracted civil conflicts and humanitarian emergency situation in the country often act as drivers of repeated outbreaks. However, the early warning system for disease outbreaks established in the Darfur region has proved to be effective in the timely detection and monitoring of potential health threats. The country's commitment to establishing one integrated diseases surveillance system throughout the country is a step towards building an effective public health system for surveillance, preparedness and response to epidemic- and pandemic-prone diseases. The introduction of conjugate polysaccharide vaccine for meningococcal meningitis in high risk areas and a mass prevention campaign for yellow fever are two important landmarks that will effectively eliminate two major public health problems in the country. The introduction of yellow fever vaccine into the routine immunization programme and enhanced surveillance for the appearance and circulation of new strains of epidemic meningitis are required if the country is to protect these health gains. In 2013, case-based surveillance was implemented as a strategy for early detection of every single case reported through the system to minimize under-investigation and misdiagnosis of meningitis cases.

The government has identified the following priorities: increasing geographical and population coverage of the national surveillance system by upgrading and expanding electronic disease surveillance, integrated disease surveillance and response, event-based and community-based surveillance, and entry point surveillance; mobilizing additional financial resources to enhance IHR implementation; developing national guidelines for integrated disease surveillance and response, community-based surveillance and event-based surveillance to support IHR implementation; strengthening disease mapping and forecasting; capacity-building for epidemiology field officers; expanding indicator-based surveillance through facility-based sentinel sites to cover 26% of health facilities; developing standard operating procedures, manuals, protocols and national guidelines for operational issues in disease preparedness, surveillance and response.

## Emergency risk and crisis management

The country is susceptible to both natural and man-made disasters that cause significant loss of life, livelihoods and infrastructure, reversing development gains. The annual loss attributable to natural disasters (based on data from 1994–2013) is on average 38.4 deaths, or 0.12 per 100 000 inhabitants, with losses in purchasing power parity of US\$ 63.6 million and losses to gross domestic product of 0.06% (36).

The major threats to public health are internal conflict, epidemics, floods and droughts. Floods are the most common cause of emergencies in the country, affecting around 20.0% of the population annually, with the most devastating events occurring in the Northern, River Nile, White Nile and Khartoum states. On the other hand, the country has also suffered a number of severe droughts in past decades, which have undermined food security and are strongly linked to human displacement and related conflicts. Vulnerability risk assessment and mapping for different hazards, including floods, is used in guiding planning and formulation of emergency response and preparedness policy. Although most attention has been on response work, preparedness has started to gain considerable focus in emergency plans. States receive emergency buffer stocks on an annual basis. Emergency management guidelines on nutrition, environmental health, mental health and community risk reduction have been prepared and distributed to all states.

The priorities of the government are to develop an emergency human resources for health policy and strategy and a national hospital emergency preparedness and response template, expand emergency information systems and rehabilitate of 60% of assessed hospitals to comply with structural safety measures.

## Food safety

A national strategy on food is in the process of being developed. The country has a very complex food safety system with several ministries and both federal and state level involvement. As of 2014, food control activities are thinly spread and not applied in a uniform manner across the country. Moreover, the complex food safety system allows for a number of gaps and overlaps. Even at the level of available laboratory and inspection equipment, there are many gaps. Coordination and data exchange needs to be strengthened, while food legislation, food inspection and surveillance systems, and laboratory capacity need to be updated and strengthened.

## Poliomyelitis eradication

Polio eradication efforts started in 1994. The last endogenous wild poliovirus case was reported in 2001. An importation in 2004 led to an outbreak and spread of the virus to countries in the Horn of Africa, with the last case reported in June 2005. The country has subsequently had importations of wild poliovirus in 2007 and 2008, with one and two cases, respectively. The last wild poliovirus outbreak was in 2009, when an importation led to five cases in two states. The genomic sequencing indicated a link with wild poliovirus circulating in South Sudan. The country has been polio-free since then.

In 2014, routine oral polio vaccine type 3 coverage was high reaching 94.0% of children. Surveillance indicators are above certification standards. In 2014, the non-polio acute flaccid paralysis (AFP) rate was 2.7 per 100 000 population aged less than 15 years and

stool adequacy rate was 97% (37). Although the surveillance system is sensitive and routine vaccination is high, the country faces two challenges: circulating vaccine-derived poliovirus in South Sudan and the pool of susceptible children in inaccessible areas in South Kordofan (an estimated 180 000 unvaccinated children). The Federal Ministry of Health, supported by WHO, implemented two national and two subnational polio vaccination campaigns in 2014. Independent monitors reported 90.0% or greater coverage in all monitored districts. In addition, checkpoint vaccination posts were established at the entry and exit points of insecure areas to mitigate the risk of low immunity among inaccessible children.

The polio preparedness and response plan needs to be updated regularly and tested in the field for its appropriateness.

## Outbreak and crisis response

The country has been in ongoing conflict for over 11 years, with around 5.4 million people in need of humanitarian support. More than 3.1 million people directly affected by conflict have been displaced and 1.1 million people have been affected by severe food insecurity and emergency levels of acute malnutrition. In Darfur, South Kordofan, Abyei and Blue Nile states, in particular, access to basic health services has been compromised by insecurity and conflict, with almost 50.0% being delivered through external humanitarian support that focuses on life-saving interventions. Significant disparities of access to essential and specialized health care exist and are deepening between conflict and non-conflict areas, and between rural and urban communities. The protracted crises continue to undermine the gains or progress of development efforts. The coverage of routine vaccination remains low, especially in areas affected by conflict that, combined with the hardships of displacement, creates a significant risk for outbreaks of vaccine preventable, and water- and vector-borne, diseases. The country faced large scale outbreaks of yellow fever and measles in 2012–2013, malaria and dengue fever in 2014, and measles in 2015.

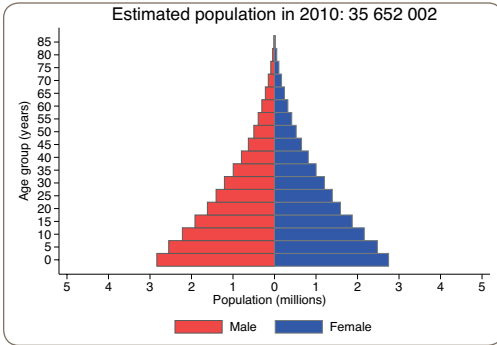
A system for health resources availability mapping exists, with regular updating from more than 800 health facilities, along with a sentinel-based (380 sites) early warning and response system that covers all relevant states. Until integrated disease surveillance is established, which should include a list of notifiable diseases, the early warning and response system remains the most reliable mechanism of alert for public health threats. In addition, the country is covered by an incident tracking system run by the Federal Ministry of Health (supported by WHO). The country's capacity to identify and respond to outbreaks has been strengthened over recent years, with 182 alerts being timely investigated and response initiated in 2014. However, the system depends on external support through the humanitarian funding mechanism. In late 2014, the government began scaling up its preparedness for Ebola virus disease by assessing its level of preparedness and readiness, using the WHO assessment checklist, and identifying critical gaps for improvement. The country's response to humanitarian needs is based on a cluster approach supported by the

humanitarian country team and the Office for the Coordination of Humanitarian Affairs. The Federal Ministry of Health, with the support of WHO, is involved in the coordination of the humanitarian response, data management, technical support for identification and prioritization of humanitarian needs, strategy development and support services. Emergency preparedness and response for the health sector is well institutionalized, with a strong emergency preparedness and response department, and national emergency preparedness and response plan, supported by policies, guidelines, protocols and standards.

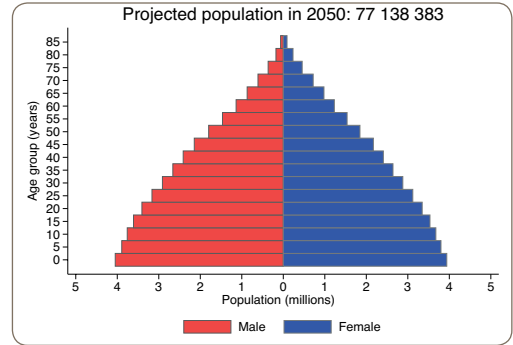
The priority of the country is to prepare a strategic plan for epidemic surveillance and response to outbreaks notified to the Federal Ministry of Health and the training of federal and state rapid response teams for communicable disease outbreaks with a focus on Ebola virus disease.

# Demographic profile

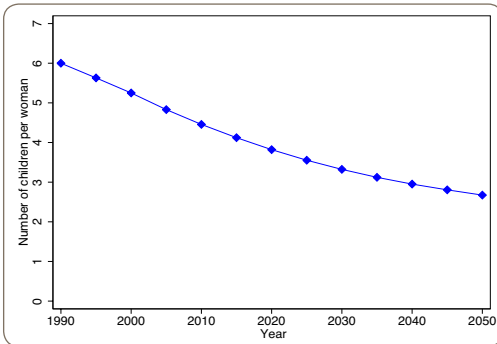
Population pyramid 2010



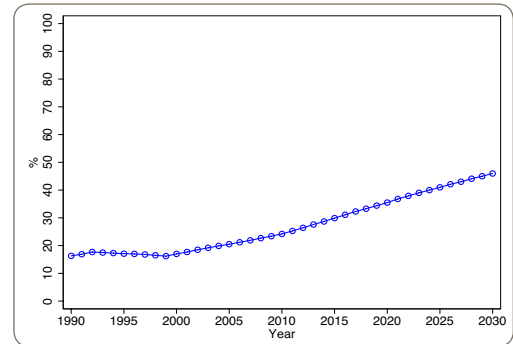
Population pyramid 2050



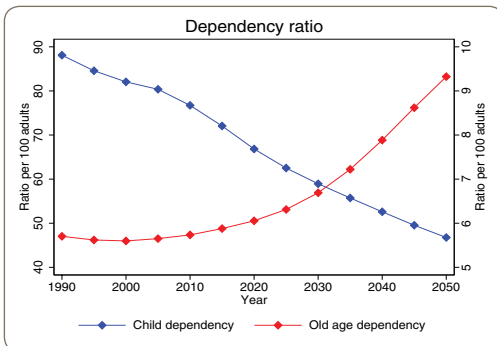
Total fertility rate



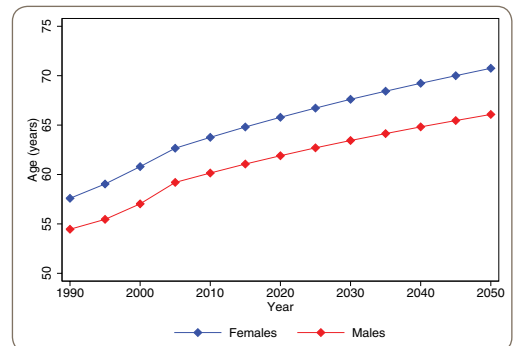
Need for family planning satisfied



Dependency ratio



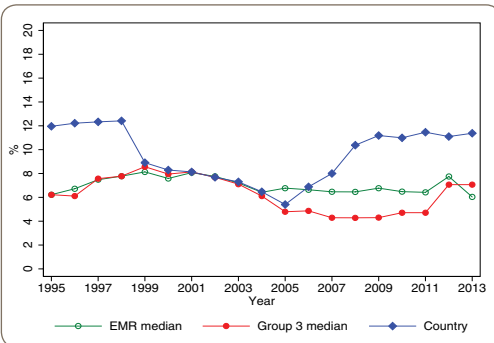
Life expectancy at birth



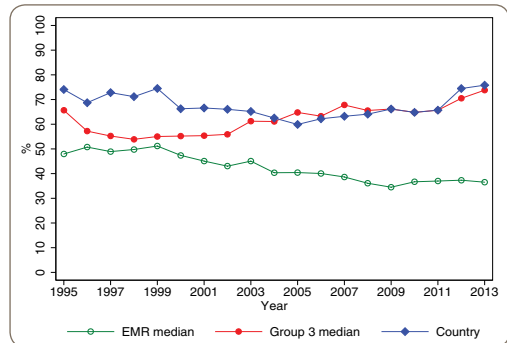
Source for all graphs: (21)

# Analysis of selected indicators

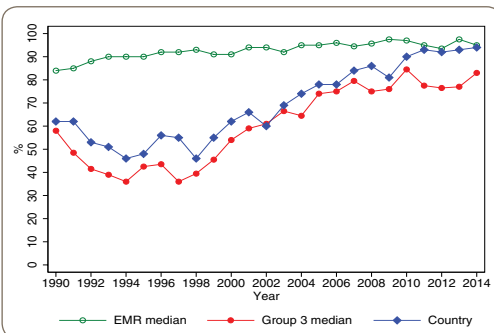
General government expenditure on health as % of general government expenditure (30)



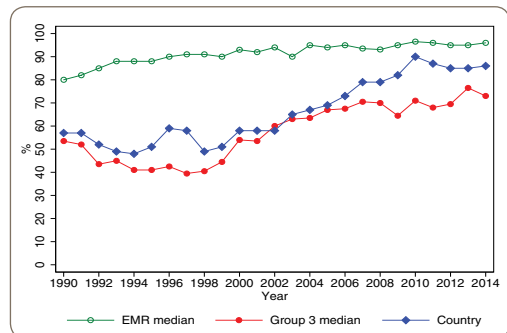
Out-of-pocket expenditure as % of total health expenditure (30)



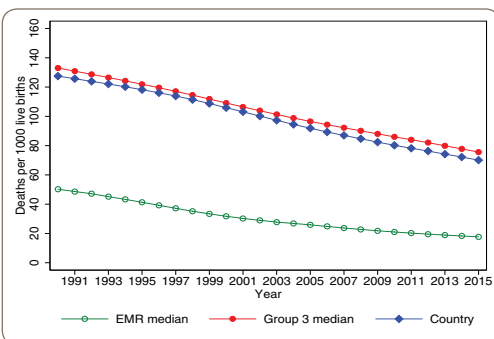
DPT3/pentavalent coverage among children under 1 year of age (%) (7)



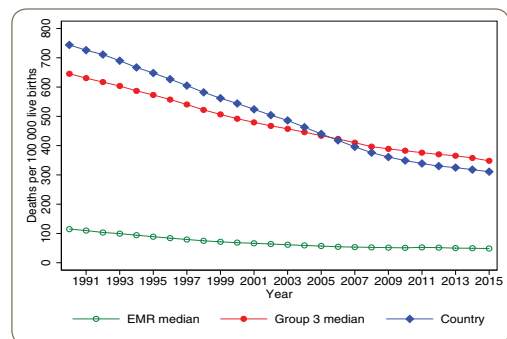
Measles immunization coverage (%) (7)



Under-5 mortality (per 1000 live births) (19)



Maternal mortality ratio (per 100 000 live births) (18)





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