Maternal Mortality in Cabinda, Angola

Description of the Reproductive Health Care Available

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List of abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Care
BHP	Basic Health Law
DHS	Demographic Health Survey
EmOc	Emergency Obstetric Care
GSB	General State Budget
GDP	Gross Domestic Product
HUR	Health Unit Responsabile
HDI	Human Development Index
HIV	Human Imunodeficiency Virus
ITN	Insecticide-Treated mosquito Nets
ITPp	Intermittent Preventive Treatment in pregnancy
IPC	Intrapartum Care
MMR	Maternal Mortality Ratio
MNH	Maternal, Newborn Health
MDG	Millenium Development Goal
MOMI	Missed Opportunities in Maternal and Infant Health
MICS	Multiple Indicators Cluster Survey
NHP	National Health Plan
NHS	National Health System
INEMA	National Institute of Medical Emergency of Angola
NIS	National Institute of Statistics
INEA	National Institute of Statistics of Angola
NPAD	New Partnership for Africa´s Development
OECD	Organisation for Economic Co-operation and Development
PMNCH	Partnership for Maternal, Newborn and Children Health
PWIS	Population Welfare Integrated Survey
PNC	Posnatal Care
PPC	Postpartum Care
PHS	Provincial Health Secretary
STD	Sexually Transmited Disesases
SBA	Skilled Birth Attendant
SADC	Southern African Development Community
SP	Sulfadoxine and Pyrimeyhamine
UN	United Nations
WHO/AFRO	World Health Organization - Regional Section of Africa

Abstract

English

Angola is among the countries that most contributes to the high mortality rates observed worldwide. The Maternal Mortality Ratio in 2010 was 450/100,000 live births [1]. The proportion of women that die during reproductive age due to maternal causes is estimated to be 13.1% indicating a high burden of maternal mortality in the country [2].

Although the country has signed the Countdown Initiative, a cooperation set to track the progress of maternal health indicators until 2015, still not much is known about women´s health at the national and sub-national level which does not allow researchers and local authorities to describe the country maternal continuum of care. The aim is to prevent maternal deaths, through the improvement of maternal health and universal access to reproductive health – the Millennium Development Goal 5.

We intend to describe maternal health care in the province of Cabinda, specifically the continuum of care [3, 4], accounting for health services, interventions available and professionals involved in the provision of care.

Information Sources: The available data describing the health status of Angola citizens is limited. The latest reliable national source for health indicators was the PWIS [5, 6] conducted in 2008-2009. Several international reports were reviewed whenever national reports concerning maternal health were not available. Secondary data sources were accessed with permission from the health authorities of the Cabinda province. The reports produced by the health units of the province, aggregated in the 2012 Annual Report Activities for Cabinda Provincial Health Secretary [7] were consulted.

Data Findings: The total catchment population covered by Cabinda health facilities, for 2012, was 407,836 people [8]. The female population represents 50.9% of the total population and women between 15-49 years represent 22.9%[8].

From 68,325 antenatal visits, 34.6% were first consults and 65.4% follow-ups. The number of women seen was not reported. If the number of deliveries at Cabinda district (30,265) is used, we found that those women would have had at least 2.3 appointments during pregnancy.

30,265 births were performed in health units, and only 4.3% were caesarean sections.

Maternal deaths were only reported by 1st of May Maternity. A total of 35 maternal deaths per 14,937 live births were reported, with an estimated MMR was 234/100,000 live births. Infections and haemorrhage account for more than 65% of the deaths, although hypertensive disorders also have a considerable proportion of attributed deaths.

The density of skilled health workers was below the internationally recommended 23/10,000 population [9] at 5.57/10,000 population.

Conclusion: In 2012, the province of Cabinda had a reported MMR of 234/100,00 live births. This may suggest that the province has already achieved the MDG5 set for Angola as a MMR of 290/100,000 live births. However, and considering the data available this cannot be assumed. That is, MMR is still high, despite availability of health units and health workers, particularly when compared to other districts in Sub-Saharan Africa.

An underreporting of maternal deaths was observed at the province level and the estimation of the core indicators of progression was not possible due to lack of data. Research, in cooperation with local authorities, should be conducted to collect primary data and define strategies to improve the overall quality of maternal care and to determine the real burden of maternal mortality and morbidity.

Portuguese

Angola encontra-se entre os países que mais contribui para as elevadas taxas de mortalidade a nível mundial. Em 2010, a taxa de mortalidade materna foi 450/100,000 nados-vivos [1]. Estima-se que 13.1% de mulheres em idade reproductiva morram devido a causas obstétricas, indiciando o elevado fardo da mortalidade materna no país [2].

Apesar de o país ter assinado a "Countdown Initiative", uma cooperação definida para seguir o progresso dos indicadores de saúde materna até 2015, ainda pouco se sabe sobre a saúde da mulher ao nível nacional e sub-nacional, o que não permite aos investigadores e autoridades locais descrever o continuum do cuidado materno. O objectivo é prevenir mortes maternas através da melhoria da saúde maternl e acesso universal à saúde reproductivo – o 5º Objectivo de Desenvolvimento do Milénio.

Assim, pretendemos descrever os cuidados de saúde maternos na província de Cabinda, especificamente o continuum dos cuidados [3, 4], ou seja, taxa de cobertura pré-natal, cuidados intra-parto, cuidados pós-parto, proporção de unidades de saúde, intervenções disponíveis, e profissionais envolvidos no cuidado.

Fontes de Informação: Os dados disponíveis para descrever o estado de saúde dos cidadãos Angolanos são limitados. Em 2008-9 foi realizado o Inquérito de Bem Estar da População (IBEP) que fornece os dados nacionais mais recentes e confiáveis no que concerne aos indicadores de saúde [5, 6]. Quando relatórios nacionais não se encontravam disponíveis relativamente à saúde materna, diversos relatórios internacionais foram consultados. Após autorização, das autoridades de saúde da província de Cabinda, fontes secundárias de dados foram consultadas. Os relatórios dos estabelecimentos de saúde da província, agregados no Relatório Anual de Actividades da Secretaria Provincial de Saúde para 2012, foram examinados [7].

Resultados: As unidades de saúde em Cabinda tinham, em 2012, como população alvo 407,836 pessoas [8]. A população feminina representava 50.9% do total populacional e mulheres entre 15-49 anos representavam 22.9%[8].

De um total de 68,325 consultas pré natais, 34.6% foram primeiras consultas e 65.4% de seguimento. O número de mulheres observadas não foi registado. Se o número de partos no distrito de Cabinda (30,265) for usado como denominador, uma média de 2.3 consultas por mulher terão sido realizadas durante a gravidez.

30,265 partos ocorreram em instituições de saúde e, destes 4.3% foram cesarianas.

Apenas a Maternidade 1º de Maio registou mortes maternas. Em 14,937 partos, 35 mulheres morreram, sendo que a taxa de mortalidade materna foi de 234/100,000 nados vivos. Hemorragias e infeccções representam mais de 65% do total de mortes, ainda que os distúrbios hipertensivos também tenham uma proporção considerável de morte atribuidas.

A densidade de profissionais especializados foi 5.57/10,000 pessoas, abaixo da recomendada, 23/10,000 pessoas [9].

Conclusão: Em 2012, Cabinda teve uma TMM estimada de 234/100,00 nados vivos. A sugestão de que a província já atingiu o 5º ODM, estabelecido para Angola de 290/100,000 nados vivos, pode surgir. No entanto, e considerando os dados disponíveis tal não pode ser assumido. Isto é, a TMM permanece alta, apesar da disponibilidade de estabelecimentos e de profissionais de saúde, particularmente se compararmos estes valores com outros distritos da África Sub-Sariana. Um sub registo de mortes maternas foi observado na provincia e a estimativa dos principais indicadores não foi possível por falta de dados. Investigação, em cooperação com as autoridades locais, deve ser conduzida para recolha de dados primários que permitam conhecer o verdadeiro impacto da mortalidade e morbilidade materna e, definir estratégias para melhorar a qualidade dos cuidados.

1. Demographics and Health in Cabinda, Angola

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After almost 30 years of conflict, Angola has developed strategies and policies aimed at rebuilding and rehabilitating infrastructure, road networks, sewage systems, water supply, electricity and housing [10]. The health of the population and respective indicators has been the picture of this evolution even though its improvement occurs slowly and intermittently.

1.1. Country Demographics

Angola is located on the west coast of southern Africa. It has a total area of 1,246,700 km^2, a coastline of 1650 km, and eighteen provinces: Luanda, Cabinda, Zaire, Bie, Kwanza Norte, Kwanza Sul; Kubango, Lunda North, Lunda South; Uige, Moxico, Huila, Namibe, Benguela, Bengo, Malanje, Huambo and Cunene. It borders with the following countries: the Democratic Republic of Congo, Congo, Namibia and Zambia, and was in armed conflict until 2002. The projection data from the National Institute of Statistics of Angola [8], estimates a population of 18,576,568 inhabitants for 2012, 14.9 inhabitants/km$^{2;}$ where 47.3% are under the age of 14, 50.4% between 15 and 64 years, and only 2.3% are over 65. The life expectancy is 48.9 years, with 47.1 years for men and 50.8 years for women, result of the high child and maternal mortality ratios and also the impact of preventable infectious diseases among healthy and young population [11, 12].

Figure 1 Geographical positioning of Angola

Source: WHO – Angola Factsheets of Health Statistics 2010

According to the Human Development Report 2013 [13], Angola is still in 148th place among 187 countries with a Human Development Index (HDI) of 0.508, and still classified as a country with a low HDI, despite the economical and technological advances made in the last decade. The health system constitutes one of the cornerstones of this development

along with education and economics, as they aim to decrease inequality among the population.

"The changes in the political, social and economical development of Angola in recent decades directly affect the health of the population. The National Health System is today a landmark of social policy geared towards human development [14]", but there is still a long way to go as we can see when analysing the HDI for inequality that is 0.298 [13], clearly showing high discrepancies among the population.

1.1.1. Cabinda: Province Demographics

Cabinda is a province with 7,283km^2, approximately 421,541 inhabitants [8], with a distribution of 58 inhabitants/km^2. It consists of four municipalities: Cabinda, Buco Zau, Belize and Cacongo, 7 communes and 386 villages (*bualas*). The principal activities are: oil production (representing 70% of Angola production), wood, coffee, and other basic goods. The majority, around 70% of essential goods are imported. 80% of the population lives in Cabinda and the remaining are distributed in the other districts [15].

Since the end of the armed conflict in 2002, the government in collaboration with local authorities, including the Provincial Governor and Provincial Health Secretary (PHS) have developed projects aimed at not only the restructuring of infrastructure, as well as, increasing the accessibility of the population to primary health and hospital care [16]. In the last ten years, there has been an increase of approximately 55% in the number of units available, and an increase in the number of beds, specialties and diagnostics available [7].

The Population Welfare Integrated Survey (PWIS) [5, 6] provides an overview of the current status of welfare in the country; Table 1 presents data for Cabinda [17].

Table 1 Cabinda Province Indicators

Indicators	Data
Population	407 836 (annual estimate of population for 2012)** 421 541 for 2013**
Birth Registration	59.1% (children between 0 – 59 months)
Pre-school	20.2% (attending)
Malaria	42.1% (Households with at least one Impregnated Thread Net)
Breastfeeding	84.5% (women between 12 – 49 years old with a living birth on the last 12 months, according to start of breastfeeding)
Comprehensive knowledge of HIV/AIDS	92.9% (population with 12 or more years old, according the ways to prevent HIV/AIDS transmition)
Child work	13.7% (children 5 – 14 years old)
Household	95.7% (living in an inappropriately built home)
Water	58.6% (use of potable source of drinking water)
Basic Sewage	84.4% (uses appropriate sewage)
Electricity	60.2%

Source: *INE Angola http://www.ine.gov.ao/xportal/xmain?xpid=ine&xpgid=indicators_province&indicators_province=6779467*
*** INEA - Projecçao da Populaçao 2009-2015, 2012*

1.2. Health System in Angola

Historically, the Angolan National Health System (NHS) has two phases: the pre-colonial, which lasted until 1975 and, after 1975, the post-independence. Its first milestone, Law 21-Bin 1992 [18] redefined the National Health Policy (NHP); further Law 9/75 [14, 19] fully socialized health care financing and created the possibility and necessity of extending health care to private entities with the aim of expanding the range of services and improving overall health conditions in the country.

> "The National Health Policy defined by Law 9/75 of December 13th, essentially aimed at improving the sanitary state of the country, the health care system adopted was of the National Health Service type, one that is fully socialized. The universal tendency is to progressively increase spending by the State in health care through the materialization of this principle.
>
> It urges the redefining of National Health Policy where a new funding system reorganizes the National Health Service in such a manner that it allows for the adaptation of existing resources and the private sector continues to exist.
>
> The association between the interests of the public and private sectors in a collective effort to improve these conditions, seeks to promote the opening of private medical-sanitary institutions, which may lead to ample opportunities for those who want to invest in this sector in order to contribute to the satisfaction or contributing to the needs of the population and improving the sanitary condition of the country."

The introduction of the Basic Health Law (BHL) Law 2/00 [20], marked another historic moment, its aim was to adapt the structure of the Angolan Health Ministry in order to make it more effective in the implementation of health policy change. In November 24th, 2010, through the Presidential Decree 262/10 [21], the Angolan government approved the National Plan of Health (NPH), as a way to address health challenges regionally, nationally and internationally. Further, with the aim of meeting commitments made in relation to the Millennium Development Goals, the policies and strategies of health in the African Union, the New Partnership for Africa's Development (NEPAD), the World Health Organization - Regional Section for Africa (WHO/AFRO) and the Southern African Development Community (SADC). Since 2002, the country has undergone a period of high economic growth, mainly

due to the petrol sector, which accounts for over 50% of the Gross Domestic Product (GDP) and 95% of exports. However, despite this economic development, "the health status of the Angolan population is characterized by low life expectancy at birth, high rates of maternal and infant mortality, a high burden of communicable diseases and increasing chronic and degenerative diseases, as well as premature mortality [21]".

The Angolan health care system is organized in three levels of care and it is currently estimated that, through the different levels of available health care, it provides assistance to 70% of the population [14] with human resources distributed as follows:

Table 2 Distribution of Human Resources in 1980 and 2010 in Angola

Year	Doctors	Nursing Professionals	Diagnostic Technicians	Therapeutic Technicians
1980	101 nationals 460 expatriates	573 expatriates (distributed through the different areas)		
2010	1001 nationals 526 expatriates	27 465 (nursing auxiliaries, and few college/university graduates)	2120 (only 95 with college/university education)	2667 (72,6% with mid-level education and the remainder with basic)

Source: Angola, P.-P.d.R.d. and MINSA, *Decreto Presidencial nº262/10 – Política Nacional de Saúde*, in *Diário da República I Série, Novembro, Vol. 222.*2010: Luanda

Fonte: Plano Nacional de Desenvolvimento Sanitário – MINSA 2002-2005. Análise MINSA, 2009.

Figure 2 Distribution of the service levels of the existing National Health Service of Angola
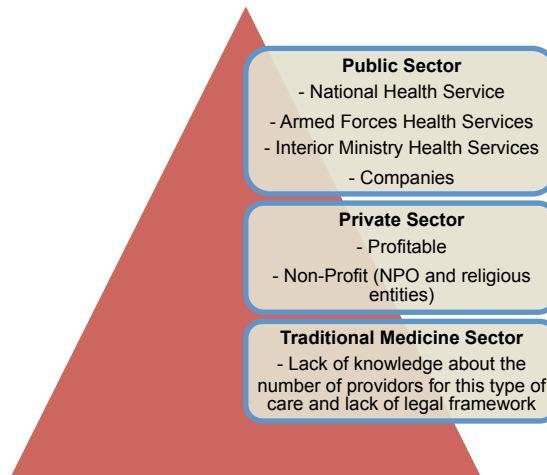
Figure 3 Hierarchical organization and structure of health care in Angola

1.2.1. Health Financing in Angola

Until 1992, the Angolan health care system was based on the universal model. Thereafter, the publication of Law 21-B/92 [18] legalized the private health sector and there became a need for citizens to contribute appropriate amounts to care provided, based on the type of care and socio-economic status. Therefore, the current funding model has a market economy philosophy. According to the source of capital, funding for the three sectors is as follows:

- Public Sector: receives 87% of the funding and is obtained through the General State Budget (GSB), loans or grants from international organizations (WHO, the Food Bank Against Hunger, and others);
- Private Sector: families and/or businesses pay for health services through acquisition plans or private health insurance;
- Mixed Sector: resulting from public-private partnerships [14].

A summary of the progression of health investment by the government of Angola from 2002 to 2013 is shown below, in Table 3, using data collected from the General State Budget of the Ministry of Finance [22]. The progression is more clearly illustrated in Graphs 1 and 2, a significant increase in the GSB can be observed and was accompanied by an increase, albeit less pronounced, of the percentage allocated to various components of health care. To note, a decrease in this percentage between 2004 and 2007, from 5.69% to 3.68%, was perhaps due to the priority given to the reconstruction of infrastructure and reconciliation of the economy with a balance of debt and investment in roads, defence and restructuring of the country's politics. By 2007, the government's priorities included the reconstruction of the country, particularly infrastructure [22].

Table 3 Health Expenditures of the State Budget for 2002-2011

Year	Total SGB Kz	% SGB in Health	Amount Kz	%OGE in Hospital Services	Amount Kz	% OGE for Public Debt
2002	197 296 687 958,00	4,57	9 021 694 656,00	0,27	1 054 646 707,00	28,79
2003	358 888 331 816,00	5,82	20 877 426 916,00	2,41	8 646 408 095,00	38,81
2004	665 347 988 813,00	5,69	37 845 011 108,00	2,24	14 916 730 438,00	27,77
2005	956 229 554 186,00	4,97	47 495 306 077,00	2,48	23 740 389 439,00	21,27
2006	2 176 922 260 474,00	4,42	96 171 680 163,00	4,02	87 509 410 311,00	9,04
2007	2 503 887 060 119,00	3,68	92 149 784 126,00	2,34	58 672 356 110,00	22,44
2008	2 544 768 949 743,00	6,68	169 919 092 280,00	3,17	80 609 979 271,00	11,54
2009	3 176 126 800 001,00	8,38	266 295 532 120,00	4,88	154 839 907 342,00	18,73
2010	3 092 272 166 646,00	5,02	155 265 840 845,00	2,9	89 672 452 187,00	18,73
2011	4 172 417 663 145,00	5,02	209 431 229 725,00	3,28	137 047 492 134,00	25,76
2012	4 501 106 290 500,00	5.14	231 307 058 854,00	3.42	153 723 760 293,00	21.28
2013	6 635 567 190 477, 00	5.56	369 156 757 565,00	2.48	164 862 267 253,00	10.79

Source: MINFIN. *República de Angola - Ministério das Finanças*. 2013; Available from: http://www.minfin.gv.ao/docs/dspOrcaPass.htm
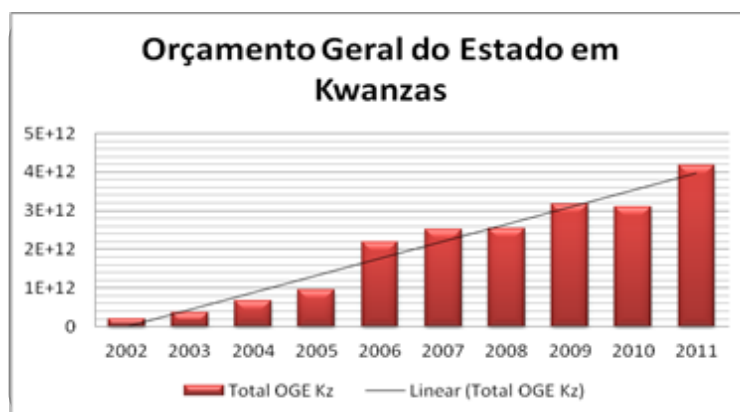
Graph 1 State Budget in 2002-2011 Kwanza [22]

Graph 2 Percentage of State Budget Aimed at Health from 2002 to 2011 [22]

When analysing and comparing health financing over the years, it is clear that for the first years, spending was mostly related to public health and personnel. In 2006, there was a hospital investment boom, specifically related to the reconstruction of infrastructure destroyed by almost 30 years of conflict. After 2006, the capital intended for hospitals included both outpatient and emergency services, however these have been separated since 2007. Thereafter, the hospital budget has been divided to cover personnel, maintenance and goods and services. To note, this provision does not take into account revenue production units (there are no references on how and where provisioning is based), it appears to only concentrate on spending for local needs and political pressures [22].

The distribution of GSB to the provinces has varied and resulted from political and social pressures, and the increase of their respective population with a higher requirement of health services [19]. The budgeted funds are transferred monthly to the Provincial Governments and then to the respective hospitals, which are responsible for the management of payables and receivables. There is an absence of a hospital management philosophy based on increasing productivity and improving the quality of services, rather, it is focused on the payment of current expenses (fixed and variable costs).

1.3. Angola Trends in Maternal Health

In a country whose national fertility rate was 6.7 children/woman in 2009 [5] and is estimated to currently be 5.66 children/woman. It is urgent to understand the conditions that determine maternal care [8] as it is well documented that high fertility rates increase the risk of maternal death, especially if unmet needs for family planning are present [1, 2, 23].

The Countdown Report for 2013 [1] refers that no data are available regarding postnatal care (PNC) coverage in Angola. Concerning antenatal care (ANC) only 32% (data from 1996) of women had access to at least 4 visits, 80% were seen at least once during pregnancy, and only 47% had a skilled birth attendant (SBA) at delivery. The causes of maternal deaths are unknown and are estimated to be the same as for the rest of Sub-Saharan Africa [1].

Angola is among the countries that most contributes to the high mortality rates observed worldwide. The MMR in 2010 was 450/100,000 live births. The proportion of deaths among women of reproductive age attributed to maternal causes is estimated to be 13.1%, indicating the high burden of maternal mortality on the country [2].

Table 4 MMR for Angola 1990 – 2010 by quinquennial

YEAR	1990	1995	2000	2005	2010	Average Annual Decline %
MMR	1200	1200	890	650	450	4.7

Source: WHO - Trends in maternal mortality 1990–2010, 2010 [2]

Although, in the first decade (1990 – 2000) only a 2.6% annual decrease was observed, in the second (2000 – 2010) a 6.7% decrease occurred, which means the country is "making progress" with an annual average decrease of 4.7% but still far from achieving the MDG 5 target [1]. If Angola wants to stay on track towards the MDG 5 MMR of 290 deaths/100,000 live births, a 37% decrease on the current MMR is necessary by 2015.

Programs such as the distribution of delivery kits, training of traditional birth attendants, increasing the number of professionals, and increasing health units prepared for prenatal, intrapartum and postpartum care have contributed to the observed effect [24]. Despite the implementation of these measures, it is still observed that approximately 57.7% of births occur at home, without the assistance of professionals and technicians [6]. Regarding the births, which occur in health facilities, no systematic information is available that would allow for their characterization and thus allowing for collaborative, replicable and sustainable strategies.

Another issue, which has been addressed both in the Countdown and WHO reports [1, 2], is that the available data on maternal health and mortality are scarce; therefore, it is difficult to accurately evaluation progress and trends. The proportion of AIDS related, indirect maternal deaths is unknown [1, 2, 25], although the country has an HIV program.

The lifetime risk for maternal death in Angolan women is estimated to be the same as that for Sub-Saharan Africa, 1 in 39 women [2]. This corresponds to the highest lifetime risk for maternal death in the world and is five times higher than the risk observed in developed countries, 1 in 180 women.

2. Maternal Continuum of Care

2. Maternal Continuum of Care

Maternal mortality ratio is 16/100,000 live births in developed countries compared to 240/100,000 live births in developing countries [25]. The latter are responsible for 99% of maternal mortality worldwide, 85% occurring in Sub-Saharan Africa and Asia, 56% and 29%, respectively [2, 25]. The majority of maternal deaths occur within the first week after delivery, thus there is a crucial need for quality maternal care and universal access to reproductive health services.

In 2000, 189 United Nations´ member states signed The Millennium Declaration. Several promises were made that include the improvement of maternal health and universal access to reproductive health by 2015 – the MDG 5. This aims to improve maternal health and is composed by two time-bound targets by which progress can be measured: target A – to reduce maternal mortality by three quarters by 2015 and target B - to achieve universal access to reproductive health care [26].

In September 2010, as a result of a joint think tank compiled by the United Nations (UN), with regards to the MDGs, a conclusive reinforcement was made regarding the urgent necessity to reduce maternal mortality. Consequently, a global strategy was launched that aims to save 16 million lives by 2015 [2, 3].

There are several key factors which contribute to high maternal mortality rates, these include: poverty, distance to health facilities and lack of information, inadequate services and cultural practices [2]. Although mortality reduction strategies are well documented and their efficacy proven, several difficulties continue to be observed in their implementation [27].

There is a need for research at the sub-national and country level, which will allow for the description and understanding of the social, cultural and economical aspects that influence the use of health services and quality of care [1, 28]. Understanding what maternal health involves and what care should be provided is urgent so that concerted strategies are drawn and MDG 5 target is achieved.

2.1. Maternal Care

Maternal care is defined by WHO and the Partnership for Maternal, Newborn and Child Health (PMNCH) [3] as the set of interventions that support the "continuum of care" for women during reproductive age.
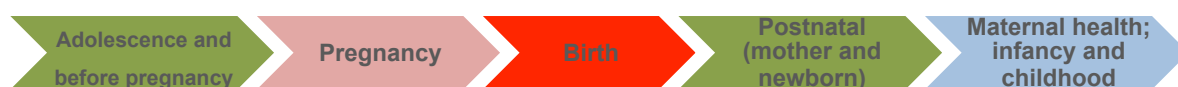
Figure 4 Continuum of Care for Women during Reproductive Age
Source: Adapted from Kerber, K, et al. - Continuum of care for maternal, newborn, and child health: from slogan to service delivery, 2007

Continuum of care is the baseline concept of maternal health and has two main frameworks. The first reflects the necessity to provide care along the lifecycle, and the second is that care has to include the different settings where care is provided: home, community, health centre and hospital [4, 27, 29]. "An effective continuum is especially important for maternal survival, since timely linkage to referral-level obstetric care is necessary to reduce maternal mortality" [4].

Although WHO and the PMNCH [30] have defined a recommended package of interventions along the continuum care, a lack of information is still present with regards to the reality in the field. This is especially the case with countries where the progress towards the MDG 5 has been classified as slow, this is, where the observed annual average decrease in maternal mortality ratio has been inferior to 5.5% [1, 2], as seen in many African countries.

Three stages define the continuum of care: antenatal, intrapartum and postpartum care.

2.1.1. Antenatal Care

Antenatal (ANC) care is the first step in the continuum. It prepares women for birth and parenthood. Its purpose is to prevent, detect, alleviate, or manage the three types of health problems occurring during pregnancy: pregnancy related, pre-existing conditions that worsen during pregnancy and effects of unhealthy habits [4]. It aims to establish a linkage between women and health systems, promote healthy behaviours and parenting skills, prevent obstetric complications during pregnancy and manage pre-existing conditions [31]. It also intends to impact on adequate spacing between pregnancies through the establishment of a linkage with postnatal care and proper family planning, skilled attendance at birth, and breastfeeding [30, 31].

The current ANC clinical guidelines, as per the WHO, recommend a focused ANC instead of the former high-risk approach. The latter classified women as low or high-risk for the development of complications according to the presence of risk factors [30, 31] and involved a higher number of visits. Instead, the focused ANC approach promotes at least four health care visits during pregnancy, and defines a set of core interventions for each one of those moments [31]. An early contact is recommended, as this will be beneficial to a positive pregnancy outcome, especially if comorbidities are present.

The focused ANC is centred on a visit package that is integrated with: malaria prevention, this includes intermittent preventive treatment in pregnancy and insecticide-treated bed nets; tetanus immunization and prevention of maternal to child transmission of HIV [4].

To guarantee a proper ANC, community, primary and referral levels of care, as well as family and the local community should be included, as they are vehicles to promote healthy behaviours. Further, it is of crucial interest to record every visit and to ensure that women keep their records as this increases commitment to future follow-ups [30, 31].

A series of factors have been established as being the most influential towards the use of ANC within developing countries, they are as follows: maternal education, husband's education, marital status, availability and cost of services, household income, women's employment, media exposure and history of obstetric complications [32-35]. Several studies [32, 35] across different countdown countries have been conducted, and these issues have been addressed. They concluded that the search for ANC services is higher among educated, urban and wealthier socio-economic status women and households within 5 km of a health centre.

According to the 2012 World Health Report [36], globally, 81% of women had at least one antenatal contact during pregnancy. But when we consider the recommended minimum of 4 or more contacts, the proportion drops to 55%. This raises the question of inequalities, especially when comparing access between rural and urban areas, poorer or wealthier women and educational level, with median proportions of coverage range from 44 to 82% [36]. If we look at the African region, less than 50% [36] of women have guaranteed the proper ANC this is, four visits during pregnancy.

Some controversy still arises from the effect of ANC on maternal mortality [37] as when compared to other health packages, such as intrapartum and postpartum, since fewer lives are saved, but "the benefits of ANC are greater than mortality reduction alone, given the relatively low cost, this package is among the most cost effective of any public health package" [31].

Another issue which has been raised in the last years is that although the available evidence shows the efficacy of single interventions and the effectiveness of 4 or more contacts as a means to distribute those interventions to most women, the quality of ANC has been classified as poor towards the prevention, diagnosis, and treatment of complications [37] specially within undeveloped settings where the lack of qualified personal, health facilities distance and cultural constraints pose a challenge [4].

2.1.2. Intrapartum Care

Intrapartum care (IPC) seeks to assure that women are assisted by skilled birth attendants (SBA) and have access to minimum critical obstetrical interventions aimed at preventing life loss due to direct preventable death causes. The number and training of SBA, as well as their behaviour towards the intrapartum period, equipment and material availability are considered key factors of the success of IPC measure implementation [38, 39].

Evidence based interventions [37, 39] at childbirth that can save women and children include: skilled birth attendance (i.e. doctors, nurses and midwives, both basic and comprehensive emergency obstetric care, surveillance or contact for at least 24 hours after birth, improved linkage of home and health facility, companion of the women's choice at birth, and where there are no SBAs, support for clean childbirth practices and essential newborn care (drying the baby, warmth, cleanliness and early exclusive breastfeeding) at home.

Around 90% of all pregnant women will experience an uneventful pregnancy, labour and delivery [39] especially in developed countries. However, in Africa, 15% of all pregnant women have childbirth complications that require emergency obstetric care (EmOC) [38, 39] and should be overseen by a SBA, which is only guaranteed to an average of 66% of all births with ranges that go from 45% in Sub Saharan Africa, to 84% in the Northern Africa [1, 40]. Kerber et al. (2007) refer that surveys from more than 20 African countries showed that less than a third of pregnant women who suffered a life threatening complication (haemorrhage, eclampsia, obstructed labour, sepsis, or unsafe abortion) received the necessary emergency obstetric care [4]. The fact is that the timing of death is clustered around labour, delivery and the immediate postpartum period [27, 37] so the provision of adequate and timely emergency obstetric care is critical at this stage of maternal care, and should be provided by SBA if a health system wants to address maternal mortality [37].

The provision of specialized care across the health system helps save lives and decreases the burden of morbidity by complications related to childbirth, and also impacts the infant mortality ratios [37, 39, 41]. One of the measures that allows us to see the progression that has been made worldwide is the availability of caesarean section. According to WHO guidelines, a range of 5 to 15% of all childbirths should occur through caesarean section [41]. Globally, access to caesarean section was 12% in 2006 (8.5% if China excluded), while in 51 Countdown countries the average was 7% with a range from 0 to 44% and only half of those countries were above the 5% minimum (data from 2000), showing restricted access to care and human resources [42-44].

Despite this, in the past decade an increase of SBA has been seen, as the interventions set to achieve the MDG 5 target have focused on ANC and assurance of SBA, but still 50% of births do not receive any kind of skilled attendance, and inequities are seen, especially between rural and urban areas, and the richest or poorest quintiles [45]. Further, a lack of trained professionals (i.e. physicians, nurses and midwives) is evident as the minimum threshold of 23-health professionals/10,000 population is only assured for 22% of the 68 countdown countries [9].

2.2.3. Postpartum Care

Postpartum care (PPC), also known as postnatal care (PNC), refers to a set of interventions that aim to maintain and promote the health of women and newborns, as well as to develop an environment where support to family and community are present, covering health and social needs. The concept of partnership with the women is critical to guarantee individualized care that meets mother and newborn needs [35, 46].

Postpartum period "is a time where both women and children are at increased risk of ill-health and death" [45, 46]. More than half of maternal deaths and 40% of neonatal deaths occur during labour or the first two days after childbirth [1, 46], thus making this a critical moment to intervene. But the fact is that "(…) there is no accurate information about availability, timing and coverage for PPC in developing countries, a key requirement for improving processes in maternal and neonatal health (MNH) care [45]" and to define the interventions to meet regional and national needs.

The postpartum period is defined as the first six weeks after childbirth [46, 47] and it is comprised of three moments:

• Immediate postnatal period: first 24 hours after birth;
• Early postnatal period: from day two until day seven after birth;
• Late postnatal period: from day eight after partum until the forty-second day [46].

Today, there is a general acceptance that the postpartum period should be more than the originally defined 42 days, as the full recovery of women after childbirth can take up to a year; this puts women at increased risk of mortality and morbidity [48]. "Lack of care in this time period may result in death and disability as well as missed opportunities to promote healthy behaviours, affecting women, newborns and children" [47].

Only in the past century, as a result of the high rates of maternal and infant mortality observed in developed countries, has a core of postpartum care been defined, albeit it has remained static until recently. The core interventions have focused on routine observation and examination of vaginal blood loss, uterine involution, blood pressure and body temperature, as the signs and symptoms of the major death causes in women after childbirth [47]. This has led to a limited development of other competencies in the area by health professionals across the world but especially in developing countries [46, 47].

Guidelines in PPC appeared formally for the first time around 1998 with WHO publishing PPC of the Mother and Newborn: A Practical Guide. In 2003, in line with new developments and research, a follow-up and update was made, that specifically directed interventions to primary care, increasing the scope of action by health professionals. In 2010, WHO published the PPC guidelines [47] which defined the what, when, how and why of PPC. Clear concepts and time frames are now defined for the "supply" of PPC but a call of attention has

been made that reinforces the necessity of adapted measures to the different contexts, where packages fulfil the basic and essential components of PPC. Additionally, it integrates measures that answer to local needs.

Timing of PPC provision is essential. The current guidelines refer that a minimum of 3 visits should be provided to the women during this time, one for each postnatal period [35, 46]. In fact, when we look at the immediate postpartum period, most guidelines refer that women should stay under the observation of a SBA or should be assessed at home before that timeline if discharged earlier [35, 47]. The identification of the key moments for PPC depends on the recognition of the clustering of adverse events and risks that surround it [1, 2, 4]. Despite this, there is still a lack of information on the incidence and severity of the medical conditions that put women at risk during the postnatal period in developing countries [1, 2, 4].

Promotion of healthy behaviours for mothers, newborns and children; early detection and referral of complications, specially those life threatening known as the "killers"; access to Basic and Comprehensive Emergency Obstetric Care (EmOC and CemOC); information on safe abortion; extra visits for preterm newborns; prevention of maternal to child transmission of HIV including appropriate feeding and family planning are critical in PNC in order to save lives [46]. A lack of effective PPC contributes to frequent, poorly spaced pregnancies [47] thus increasing the risk of morbidity and mortality. Consequently, an emphasis has been put on the identification, intervention and referral of critical health problems known as "the killers" and the necessity of access to family planning in an early stage of the postnatal period.

To reiterate, knowledge is limited on the determinants o the use of PPC services, "thus the need to collect information and describe regional and national contexts so that strategies are adjusted to the settings and answer to women's, professionals and service's needs, and impact the maternal health" [35].

The World Health Report 2013 [28] points to the need for research at different levels that supports evidence based practice and allows the Countdown Initiative and the world to understand what needs to be done. Areas such as PPC are lacking information in developing countries; specifically, Sub-Saharan Africa, as more than half of the world´s maternal deaths occur in this region [1].

We intend to describe maternal health care and coverage in the Province of Cabinda, so that we can:

- Describe the maternal care structure at the province/district level;
- Assess the maternal care available and its utilization;
- Describe antenatal care, skilled birth attendance, and postpartum care;
- Explore the extent of community participation in health care by describing the types of services delivered at the community level and the quality and coverage of such services;

- Assess the possibility of introducing interventions and potentially develop strategies to improve maternal health at the facility level.

These findings will be presented in a format to allow, when feasible, the comparison of the situation at this district with other countries in Sub-Saharan Africa, as well as with the Countdown Initiative countries.

3. Information Sources and Definitions

3. Information Sources and Definitions

3.1. Methods

A retrospective observational study was undertaken during 2013 (January to July) for the description of maternal care in the province of Cabinda.

To get permission for the study and access to the necessary data to conduct this study, a set of contacts and actions were taken with the provincial health secretary (PHS), the head of health services for the entire province.

3.2. Main Data Sources

The available data describing the health status of the Angolan population are limited. There has not been a recent Demographic and Health Survey (DHS) conducted in the country. The latest reliable national source for health indicators was the population welfare integrated survey (PWIS) [5, 6] completed in in 2008-2009, with data published in 2011. The previous PWIS was conducted in 2001 and the National Institute of Statistics (NIS) is organizing a DHS for 2014 [49]. Several international reports were assessed whenever national reports were not available.

For Cabinda, we accessed reports by the health units of the province, which were aggregated in the Annual Activities Report for Cabinda Health Secretary 2012 [7].

Table 5 Sources of information used for data collection

Data	Information Sources	
	Secondary Sources	**Year**
National Data	• MICS/IBEP • Projecção da População 2009-2015, INEA • Estatísticas Sociais 2010, 2012, • Several International reports (Countdown Report to 2015; Health Life Expectancy for 187 countries; World Bank Database online; Unicef online country info; The World Fact book)	2008-9 2012-13 2010 Several years
District Data	• Annual Activities Report for the Province Health Secretary 2012 • 2012 Statistical Report for several health units (Provincial Hospital of Cabinda; Maternal-Child Dispensary; Municipal Hospital of Cabinda (Chinga); 1st of May Hospital (maternity); Municipal Hospital of Buco Zau; Regional Hospital Alzira da Fonseca; Municipal Hospital of Belize; Cabinda Health Centres and Posts; 28 of August Hospital; Municipal Hospital of Cacongo; Health Centres and Posts of Belize)	2012 2012

A framework that allowed the description of the relevant maternal care areas was designed and adapted from the MOMI project [45, 50] to collect data, intending to describe

the continuum for maternal care [3, 4], in the province under study, accounting for health services, interventions available, and people involved in the provision of care at all levels. Extraction of data at the national level was conducted to describe morbidity and mortality. At the province level, healthcare services description; maternal services availability; resources and timing of care provision; referral systems; workforce description; maternal mortality rate and its indicators, as well as burden of disease.

3.3. Data analysis

Description data pertaining to the study characteristics is presented, synthetizing the features of the main areas defined in the framework for this study.

Data was gathered and proportions of the core indicators were estimated using the population estimation for the province provided by the National Institute of Statistics of Angola (INEA) for 2012. The maternal mortality for the province was estimated using as a proxy the maternal mortality presented by the maternity health unit of the province, 1st of May Hospital, the only one with maternal deaths reported.

3.4. Definitions

3.4.1. Maternal Mortality

WHO, in accordance with the International Classification of Diseases 10 (ICD – 10), defines maternal mortality as the "death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" [48].

In 1990, the 43rd World Health Assembly recommended that countries consider the inclusion of questions regarding current pregnancy and pregnancy within 1 year preceding death, on death certificates, to promote improvement the quality and collection of maternal mortality data [51]. Thus, WHO and ICD-10 consider two concepts:

Pregnancy-related death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Late maternal death: The death of a woman from direct or indirect obstetric causes, more than 42 days, but less than 1 year after termination of pregnancy.

ICD-10 defines "death during pregnancy, childbirth and the "puerperium" as any death temporal to pregnancy, childbirth or the postpartum period, even if it is due to accidental or incidental causes (formerly referred to as "pregnancy-related death")". This alternative definition allows measurement of deaths that are related to pregnancy, even though they do

not strictly conform to the standard concept of "maternal death", particularly, in settings where accurate information about causes of death based on medical certificates is unavailable [2]. This is in line with some studies [27] conducted in India and Bangladesh, which suggest that contextual conditions, such as pregnancy, increase the number of murders, suicides and accidents among pregnant women, and should be recorded as maternal deaths.

3.4.2. Maternal Mortality Statistical Measures

The most used maternal mortality statistical measures include [2]:

Maternal Mortality Ratio (MMR) – Number of maternal deaths during a given period per 100,000 live births during the same time period

Maternal Mortality Rate (MM Rate) – Number of maternal deaths in a given period per 100,000 women of reproductive age during the same time period

Adult lifetime risk of maternal death – The probability that a 15-year-old women will die eventually from a maternal cause

The proportion of maternal deaths among deaths of women of reproductive age (PM) – The number of maternal deaths in a given time period divided by the total deaths among women aged 15-49 years.

3.4.3. Core Indicators of Maternal Health

"Countdown to 2015 was established in 2005 as a multi-disciplinary, multi-institutional collaboration, to track coverage levels for health interventions proven to reduce maternal, newborn and child mortality [1]" especially, in countries with low to middle income (i.e. the countdown countries) [1, 23, 26]. A set of indicators was defined by the Countdown Committee but, as those countries often lack adequate and quality data, the United Nations, WHO and other partners agreed to a set of basic indicators that allow stakeholders to monitor progression and analyse the changes needed to achieve MDG 5 targets [23].

There are six basic indicators in the measure of maternal health [23, 26]. One of them is MMR, which is relatively insensitive to changes, especially if short periods are considered. The other indicators are more sensitive to changes and use timely data, thus allowing the perception of almost real time changes; they are as per definition [23]:

Met need for contraception – Percentage of women aged 15-49 years who are married or in union and who have met their need for family planning, i.e. who do not want any more children or want to wait at least two years before having a baby, and are using contraception;

Antenatal coverage – Proportion of women aged 15-49 with a live birth who received antenatal care by a skilled health provider at least four times during pregnancy;

Skilled birth attendant coverage – Percentage of live births attended by skilled health personnel;

Postnatal care for mothers – Percentage of mothers who received postnatal care visit within two days of childbirth;

Antiretroviral prophylaxis among HIV-positive pregnant women – Percentage of women doing ART to prevent vertical transmission of HIV, and antiretroviral therapy for women who are treatment eligible.

3.4.5. Causes of Maternal Death

Causes of maternal death are defined as direct or indirect [2, 48]:

Direct maternal deaths are those resulting from obstetric complications of the pregnant state (pregnancy, delivery and postpartum), interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above;

Indirect maternal deaths are those resulting from previously existing diseases, or from diseases that developed during pregnancy and that were not due to direct obstetric causes but aggravated by physiological effects of pregnancy.

4. Data Findings

4. Data Findings

4.1. National Context: Main social and health indicators

The statistics describing the country and province situation were obtained based on official national data and when those were not available on international publications always quoted.

4.1.1. Mortality and Morbidity

Malaria incidence in Angola (2010) was 20,353/100,000 population [25, 52]. The PWIS [5] reports that 18% of households in the country own insecticide-treated mosquito nets (ITN), and a lower percentage, 14%, is observed in rural areas. ITN use among children under-five years of age is estimated to be 16% but this value increases to 75% when we refer to children less than one year. Malaria mortality rate was estimated at 128/100,000 population (2006).

Adult HIV prevalence was 2.1%, in 2011, and among young women (15-24 years) 1.6% [53]. The proportion of people that has sufficient knowledge to prevent HIV transmission is 23% [5, 6]. The prevalence of tuberculosis, in 2008, was 190/100,000 population. Overall, communicable diseases represent 74% of the burden of diseases (2004) [25].

The female mortality rate for the country, in 2010, was estimated to be 347/1,000 female adults (15-60 years) [25]. The MMR, in 2010, was estimated to be 450/100,000 live births [1, 2], and in all available publications this was the reported estimate.

Table 6 Health and economic indicators for Angola

Indicators	Years		
	2008 - 9	2010	2013
Maternal mortality ratio (/100,000 live births)	na	450 [2]	
Neonatal mortality rate (/1,000 live births)	na	43 [2]	
Infant mortality rate (/1,000 live births)	116 [1]	98 [2]	
Under-five mortality rate (/1,000 live births)	194 [1]	161 [2]	
Life expectancy [3/4]	48 [1]		
Male	47 [1]	47 [3]/58 [4]	47 [3]
Female	49 [1]	50 [3]/64 [4]	51 [3]
Health life expectancy [4]			
Male	na	50	na
Female	na	54	na
GNI per capita [5]	3,270	3,870	4,580
Gini index [5]	43		58.6 [6]
Hospital Beds (/1 000 population) [7]	0.61	0.8	na

1   Source: 2012 Annual Activities Report for Cabinda Health Secretary and *INE Angola data for 2010*
2   Source: WHO and UNICEF, *Accountability for Maternal, Newborn & Child Survival: The 2013 Update*, 2013: Geneva.
3   Source: INEA and D.d.E.D.e. Sociais, *Projecção Da Populaçao 2009-2015.* , 2012, INEA - Instituto Nacional de Estatística de Angola: Luanda
4   Source: Solomon, J.A., et al., *Healthy life expectancy for 187 countries, 1990-2010: a systematic analysis for the Global Burden Disease Study 2010.* Lancet, 2012. **380**(9859): p. 2144-62
5   Source: World Bank Database online http://data.worldbank.org/indicator/NY.GNP.PCAP.CD/countries/AO-ZF-XT?display=graph accessed on the 2nd of October 2013
6   Source: Unicef http://www.unicef.org/infobycountry/angola_502.html accessed on the 2nd of October 2013
7   Anuário de Estatísticas Sociais 2010, 2012, data from the Relatório Estatístico do Gabinete de Estudos, Planeamento e Estatística do Ministério da Saude de 2007 a 2010: The World Fact book, data refer to 2005 online on https://www.cia.gov/library/publications/the-worldfactbook/fields/2227.html#ao accessed 2nd October 2013

4.1.2. Health Services Coverage

PWIS (2008-9)[5] estimates that 69% of pregnant women had at least one ANC visit and 47% had the four recommended. Almost two thirds of those visits were performed by a qualified health professional (i.e. a doctor, nurse or midwives). Women in urban areas had ANC more often than those in rural areas, 82% and 52%, respectively. Further, wealthier women had more antenatal visits compared to poorer women, as 55% of the latter did not have any consults during pregnancy.

Eighteen per cent (18%) of pregnant women report having used ITN while 29% used other types of mosquito nets. Approximately 45% of pregnant women did preventive therapy for malaria, but the effective implementation of intermittent preventive treatment in pregnancy (IPTp) with SP (Sulfadoxine and Pyrimethamine)/Fansidar was of 16% [5].

Skilled birth attendance was assured for 49% deliveries, while traditional attendants or community health workers accounted for 10%. In rural areas, this coverage is below the 24%, and in urban areas were 73% of all births. Only 42.3% of births occurred in health facilities and the remaining at home [5, 6]. The proportions of rural and urban home delivery were 85 and 32%, respectively. The proportion of wealthy women that attend health units for delivery is five times higher than for the poor ones [5].

Caesarean section access is considered a key indicator to evaluate women's access to maternal health care, and according to WHO should range between 5 and 15%. The rate of caesarean section in the country, in 2010, was 10.1%, however, no data is available at the provincial level [52]. PPC availability in the country is not known, independently of the sources consulted.

Table 7 Utilization of Maternal Health Service, Angola

Maternal Health Services Coverage	Source	
	National Report	International Report
Birth with skilled birth attendant (%)	49 [1]	49 [3]
Caesarean section (%)	10.1 [2]	na
Postpartum care (%)		
First 2 days	na	na
First 7 days	na	na
Antenatal care at least 1 visit (%)	69 [1]	80 [4]
Antenatal care at least 4 visits (%)	47 [1]	47 [3]

1. INEA, *Inquérito Integrado sobre o Bem-Estar da População | IBEP - Relatório Analítico - Vol. I*, 2011, INEA: Luanda
2. INEA, *Anuário de Estatísticas Sociais 2010*, 2012, Instituto Nacional de Estatística de Angola: Luanda
3. WHO – Angola Health Profile online at http://www.who.int/gho/countries/ago.pdf
4. WHO and UNICEF, *Accountability for Maternal, Newborn & Child Survival: The 2013 Update*, 2013: Geneva
na – not available

4.2. Site–Specific Maternal Health Characteristics

4.2.1. Health Facilities and Catchment Population

Four districts compose the province: Cabinda, Buco Zau, Cacongo, and Belize. Three types of health units serve these: hospitals, health centres with or without inpatient area, and health posts (Table 8).

Table 8 Distribution of Health Units by Type in the Province Districts

Districts	Hospitals (n)	Health Centres with inpatient area (n)	Health Centres without inpatient area (n)	Health Posts (n)	Total
Cabinda	6	7	4	33	50
Buco Zau	2	2	--	19	23
Cacongo	1	1	1	21	24
Belize	1	1	--	18	20
Total (n)	10	11	5	91	**117**

Source: CPHS, *2012 Annual Activities Report for the Province Health Units*, 2013, Cabinda Provincial Health Secretary: Cabinda

The largest concentration of specialized care is found in the Cabinda district, where the majority (80%) of the population lives. A total of six hospitals serve Cabinda district one each of: maternity, infectious diseases hospital, provincial hospital with several specialties, maternal-infant dispensary, ophthalmological and cardiology hospital, and municipal hospital. Although all four districts have municipal hospitals, the majority of the care is provided in health centres or posts. The population preferably uses the latter unless geographical proximity is favourable. When differentiated care is necessary, the patients are referred to the specialized care units in Cabinda district.

As presented in Table 9, the total catchment population covered by these health facilities, for 2012, was 407,836 people [8]. The female population represents 50.9% of the total population and women between 15-49 years old represent 22.9% [8]. According to the individual reports provided by the health units, there are 461 hospital beds available in the province, from which 79 (17.1%) are obstetrical [7].

Table 9 Health facilities and demographic characteristics of the catchment population in Cabinda Province for 2012

	Province
Health Facilities (n)	117 [1]
Hospital Beds (n)	461 [1]
Hospital Beds (/1000 population)	1.13*
Catchment population 2012	407,836 [2]
Female Population (%)*	50.9 [2]
WCBA (%)*	22.9 [2]
Children under 5 (%)*	19.4 [2]
Infants (%)*	4.5 [3]

1.   Source: CPHS, *2012 Anual Activities Report for the Province Health Units.*, 2013, Cabinda Provincial Health Secretary: Cabinda
2.   Source: INEA and D.d.E.D.e. Sociais, *Projecção Da Populaçao 2009-2015.* , 2012, INEA - Instituto Nacional de Estatística de Angola: Luanda
3.   Source: INEA, *Inquérito Integrado Sobre o Bem-Estar da População/IBEP:Relatório de Tabelas Vol. II*, 2011, INEA: Luanda.
* - Estimated by the authors based on the population estimates for 2009 – 2015 referring to the year 2012
Na – not available; WCBA – women of childbearing age

4.2.2. Maternal Health Services

The services provided by the health facilities across the province include ANC, IPC, abortion, immunization programs for children and adults, especially groups at risk such as pregnant women, family planning, and child care clinics. We could not quantify the percentage of units in the province that provided the services because some of the units have aggregated results. That is, health centres in Cabinda district give the total number of interventions for the group and not individualized, and the remaining units do not specify the number of women seen and proportion of intervention provision.

Table 10 Available reported services by health units

Health Units	Hosp. Beds	Obst. Beds	Services Provided							
			Outpt. Cons	Family Planning	ANC	IPC	PPC	Abortion	Immun	Child care
Provincial Hospital de Cabinda	162	0	√							√
Mat-Inf Dispensary	0	0	√	√	√				√	√
Municipal Hospital Cabinda	40	5	√		√	√			√	√
1 May Hospital	75	56	√	√	√	√		√	√	√
Health Centres and Posts of Cabinda			√	√	√	√				√
28 of August	11	0	√							
Infectious diseases Hospital										
Buco Zau Hospital	55	6	√		√	√				√
Alzira Fonseca Hospital	63	8	√		√	√				√
Municipal Hospital do Belize	31	4	√		√	√		√		√
Health Centres and Posts of Belize			√		√	√			√	√
Cacongo	24									√

Source: CPHS, *2012 Annual Activities Report for the Province Health Units.*, 2013, Cabinda Provincial Health Secretary: Cabinda
Hosp beds: hospital beds, Obst. Beds: obstetrical beds; Outpat Cons: Outpatient Consults; ANC: antenatal; IPC: intrapartum; PPC: postpartum care; Immun.: Immunization

4.2.2.1. Family planning

Family planning was only recorded in Cabinda district and accounts for a total of 7,342 consults. Table 11 presents the consults distribution according to contraceptive method chosen for 2012 as per the annual report of Reproductive Health [7]. A total of 7,510 consults was made and of those, 30 complications were related to the contraceptive methods, 11 to the pill and 19 to the birth control shot, but no other types of complications were mentioned.

Table 11 Number of Family Planning Visits Distribution According to Contraceptive Method Chosen for 2012.

Contraceptive Method	Consults
Pill	5919
Birth control shot	1531
Intrauterine Device (IUD)	18
Condom	0
Emergency contraception	42
Total	7510

Source: Reproductive Health Report for 2012 in CPHS, *2012 Annual Activities Report for the Province Health Units.*, 2013, Cabinda Provincial Health Secretary: Cabinda

4.2.2.2. Antenatal Care

A total of 68,325 ANC visits (Table 12) were done in 2012, 34.6% were first consults and 65.4% follow up consults. However, the number of women seen was not reported. If the number of deliveries at Cabinda district (30,265) is used and the number of ANC are

accounted for in the district, we estimated that women would have had at least 2.3 appointments throughout the pregnancy.

Table 12 Distribution of family planning and ANC across the health units in the province

Health Units	Outpatient Consults	Family Planning	Antenatal Care Consult		
			First	Follow-up	Total
Provincial Hospital of Cabinda	33022		0	0	0
Materno-child Dispensary	31424	1333	1244	3071	4315
Municipal Hospital Cabinda	34319		1827	3891	5718
1 Maio Hospital - maternity	15907	3160	3398	6245	9643
Health Centres & Health Posts Cabinda	257099	2849	15808	28050	43858
28 of Agosto of Hospital	6319				
Buco Zau Hospital	8417		649	1663	2312
Alzira Fonseca Hospital	16038		94	286	380
Municipal Hospital of Belize	15943		630	1404	2034
Health Centres & Health Posts Belize	23888				65
Total (n)	442376	7342	23650	44610	68325

Source: Reproductive Health Report for 2012 in CPHS, *2012 Anual Activities Report for the Province Health Units.* 2013, Cabinda Provincial Health Secretary: Cabinda

A malaria program is included in ANC for pregnant women. During 2012, a total of 16,745 pregnant women were reported to have a first pregnancy consultation and 36.9% did the first intermittent preventive treatment (IPTp), 24% the second dose and only 1.5% completed the third dose (Table 13).

Table 13 Pregnant women on intermittent preventive treatment during 2012

Malaria Prevention	N (%)
Pregnant women with 1st consultation	16,745 (100)
1st dose of IPTp (n)	6,179 (36.9)
2nd dose of IPTp (n)	4,020 (24)
3rd Dose of Pit (n)	259 (1.5)

Source: Reproductive Health Report for 2012 in CPHS, *2012 Annual Activities Report for the Province Health Units.* 2013, Cabinda Provincial Health Secretary: Cabinda
IPTp - intermittent preventive treatment in pregnancy

Cabinda has a prevention program for HIV/AIDS, which includes testing, counselling and follow-up of new cases. Screening, in 2012, was performed in 64,259 people, with 1,516 positive cases. From a total of 24,358 pregnant women screened, 445 positive cases were identified [7], meaning that 29.3% of all HIV positive cases were among pregnant women. From the total of 1516 positive cases, only 491 integrated in the ARV treatment program, 349 women (319 between 15-49 years) and 142 men. No data were available for the total number of pregnant women under the program of vertical transmission prevention (PVTP).

There were two hundred births on women doing VTP in the province, from those 185 were done in health units and 15 at home. Only 5 of those had a delivery by caesarean section [7].

4.2.2.3. Intrapartum Care

During 2012, 32,943 deliveries were reported, 96.6% were done by SBA, and 3.4% by a traditional birth attendant (TBA) or other person. Also, 98.7% were live births and 1.3% stillbirths (Table 14). A higher proportion of stillbirths were reported with SBA compared to TBA, 2.3% vs. 0.1%, respectively.

Table 14 Distribution of deliveries according to birth attendant

Birth attendant classification	Live births	Stillbirths	Total births (n)	Total births (%)
Skilled Birth Attendant	31417	421	31838	96.6
Traditional Birth Attendant	1104	1	1105	3.4
Total	32521	422	32943	100

Source: Reproductive Health Report for 2012 in CPHS, *2012 Annual Activities Report for the Province Health Units.* 2013, Cabinda Provincial Health Secretary: Cabinda

Thirteen health units that reported 30,265 births, 95.6% were vaginal, 4.3% caesarean section and 0.1% mechanical. Only two units, Maternity Unit in Cabinda district and Alzira Fonseca Hospital in Buco Zau district, seem to have caesarean sections available. There was no mention of the type of EmOc (basic or comprehensive) provided to the women, in either report at the province level.

Table 15 Birth distribution by health unit and delivery type

Health Units	Delivery Type (n)			
	Vaginal	Caesarean section	Assisted	Total
Municipal Hospital Cabinda	1980	0	0	1980
1st May Hospital	14099	1293	19	15411
Health Centres and Posts of Cabinda	11863	0	4	11867
Buco Zau Hospital	505	0	0	505
Alzira Fonseca Hospital	48	4	0	52
Municipal Hospital of Belize	372	0	0	372
Health Centres and Posts of Belize	78	0	0	78
Total	28945	1297	23	30265
	95.6 (%)	4.3 (%)	0.1 (%)	

Source: Reproductive Health Report for 2012 in CPHS, *2012 Annual Activities Report for the Province Health Units.* 2013, Cabinda Provincial Health Secretary: Cabinda

From interviews with the health provincial secretary, I found that oxytocin, suturing of perineum and vitamin A are reported as being provided to women in labour or during the PPC period but no other details on the proportion of women covered are found in reports.

Abortion is available at 1st of May Maternity in Cabinda district and the Municipal Hospital of Belize, a total of 1439 and 77, respectively, were conducted. No specification on the follow-up for those women was recorded [7].

4.2.2.4. Postpartum Care

Although there is no reference of the availability of PPC for women, the Follow-up Antenatal Care Notebook (Appendix A), which pregnant women use to record their appointments during pregnancy, labour and postpartum, mentions it and indicates that the first PPC appointment should occur on the 6th day after birth.

As per the Antenatal Care Notebook, the following interventions are the core of the PPC consults in Cabinda: health state after delivery, check uterine involution, characteristics of the lochia, check tetanus immunization status (number of doses) of the woman, family planning information, specifically, contraceptive methods, breastfeeding promotion as well as status, and child immunization provision. The proportion of women receiving PPC is not recorded in any of the provincial´s or individual health units´ reports.

4.2.3. Health Facilities and Community-Based Services

Some villages – "*bualas*" – have a tribal authority system, the "Soba", that in cooperation with the Provincial Health Care System provide healthcare in mobile units or in their own homes. There are a total of 25 mobile health units distributed throughout the four districts. No reference to the type of care provided is mentioned in any of the reports available [7].

4.2.4. Referral Systems

The population is transferred between institutions by ambulance if they are available in the health unit or using their personal transportation. Since 2011, the province has the pre-hospital system provided by the National Institute of Emergency of Angola (INEMA). The proportion of units with ambulances is not mentioned in any of the reports and there was a reference to the use by employees of their own vehicles to ensure health care in certain areas.

4.2.5. Human Resources for Health

The density of skilled health workers, in the province, was below the internationally recommended of 23/10,000 population [9] at 5.57/10,000 population. The density of health

workers was calculated dividing the total number of workers of a cadre by total catchment population they served for 2012. Overall, specialist doctors present higher density than general practitioners, midwives or nurses. The number of obstetric doctors for the whole province is 17, with a density of 0.42/10,000 population, if all catchment populations are considered and 1.82/10,000 if women at childbearing age (15-49 years) are used as a denominator [8]. Health care provision in the province relied mostly on auxiliary and nurse technicians.

Table 16 Distribution of human resources for 2012

Workforce for Cabinda Province 2012				
Human Resources* at Cabinda Province	Nationals	Foreign	Total	Prof. Dens/ 10 000 pop.
Physicians				
Specialists	10	85*	95	2.33
General Practitioners	35	12	47	1.15
Midwifes	--	3	3	0.07
Nurses	72	10	82	2.01
Aux. Nurses	477	--	477	11.7
Nurse Technician	779	--	779	19.1
Mid-level Workers	361	5	366	8.97

Source: CPHS, *2012 Annual Activities Report for the Province Health Units.* 2013, Cabinda Provincial Health Secretary: Cabinda
*International Standard Classification of Occupations (ISCO, 2008 revision) in WHO. *Classification of health workforce statistics.* 2013; Available from: www.who.int/hrh/statistics/workforce_statistics. [54]

Although training is provided for malaria and HIV prevention, there is no mention of specific training on maternal health. The Provincial Hospital of Cabinda made available a pedagogic department responsible for the training of its professionals but no information was provided on the subjects and training program. The province also has a Health School and Medical School since the end of 2011.

4.3. Maternal Mortality in the Province

Only the 1st of May Maternity reported maternal deaths. A total of 35 maternal deaths per 14,937 live births were reported, this means the MMR estimated for that health unit was 234.3/100,000 live births.

Table 17 Distribution of births by number of live and stillbirths in 2012

Health units	Stillbirths	Live births (n)		Total
		Live	Dead	
Municipal Hospital Cabinda	25	1955	0	1980
1st May Hospital	474	14808	129	15411
Health Centres and Posts of Cabinda	398	11373	96	11867
Buco Zau Hospital	10	498	0	508
Alzira Fonseca Hospital	1	52	0	53
Municipal Hospital of Belize	6	366	0	372
Health Centres and Posts Belize	2	75	1	78
Total	916	29353		30269

Source: CPHS, *2012 Annual Activities Report for the Province Health Units*, 2013, Cabinda Provincial Health Secretary: Cabinda

Neonatal mortality, an indicator of the quality of IPC and PPC, as well as childcare, was 7.7/1,000 live births for the province (we used the data provided by the health units). Only the provincial maternity, 1st May Hospital, provided detailed information on the number and timing of neonatal deaths (Table 18). A total of 14,937 live births occurred in that unit with a neonatal mortality rate of 8.6/1,000 live births and an early neonatal mortality of 4/1,000 live births.

Table 18 Neonatal deaths per live days for the year 2012 at Cabinda maternity 1st of May

Neonatal deaths by days of birth	Deaths (n)
<1 day	0
1 day	9
2 - 3 days	23
4 - 6 days	28
7 or more days	69
Total	129

Source: CPHS, *2012 Annual Activities Report for the Province Health Units*, 2013, Cabinda Provincial Health Secretary: Cabinda

4.3.1. Causes of Maternal Mortality

The major causes of death at the Maternity of Cabinda district, used as a proxy for the province causes of maternal death, are presented in Table 19. Infections and haemorrhage represent more than 65% deaths, although hypertensive disorders also have a considerable proportion of attributed deaths (20%). The main diagnostics referred within infections include: septic shock due to abortions, malaria and pneumonia.

Table 19 Major Causes of maternal deaths at Cabinda district maternity in 2012

Major causes of maternal death	Deaths (n)	Proportion (%)
Infections	13	37.1
Haemorrhage	10	28.6
Hypertensive disorders	7	20
Others	5	14.3
Total	35	100

Source: CPHS, *2012 Annual Activities Report for the Province Health Units*, 2013, Cabinda Provincial Health Secretary: Cabinda

Table 20 shows that only 3 pregnant women were reported to have died due to malaria in 2012. This was reported as a primary cause of death in the death certificate. When we analyse the maternity list of causes for all 35 maternal deaths (Table 19), malaria is among one of the most frequents but not as the primary cause and this seems to influence the data presented.

Table 20 Mortality by malaria among pregnant women 2009-12

Years	Dead Pregnant Women by Malaria
2009	2
2010	1
2011	na
2012	3

Source: Reproductive Health Report for 2012 in CPHS, *2012 Annual Activities Report for the Province Health Units*, 2013, Cabinda Provincial Health Secretary: Cabinda
na: not available

HIV related maternal deaths are not mentioned on any reports available.

5. Maternal Care in Context

5. Maternal Care in Context

As presented in this study, despite improvements to some health indicators, there has been an increase in the overall life expectancy and healthy life expectancy in the last few years [24, 25]. However, there is still an epidemiological pattern that places Angola among the countries with the highest mortality rates, especially among children and women [11]. The country has one of the lowest female healthy life expectancy, positioned at the 178th place among 187 countries [55], and this seems to be related to maternal health. Although the prevalence of HIV and TB is lower than that of the Sub-Saharan region, the under-five mortality is higher [24, 25]. However, not much is known about women's health, namely reproductive health [24].

Table 21 presents economic and reproductive indicators among some of the countries of the Community of Portuguese Language Countries (CPLP). Angola presents a higher MMR, as well as neonatal, infant, under-five mortality and a lower life expectancy. Only Mozambique presents a higher MMR although the remainder indicators are lower than those of Angola. We observe that the overall reproductive health coverage in Angola is below the presented by other countries.

Table 21 Health, economic and reproductive indicators for the CPLP countries

Indicators	Angola	Brazil	Mozambique	Portugal
Maternal mortality ratio (/100 000 live births)	450 [2]	56	490	8
Neonatal mortality rate (/1 000 live births)	43 [2]	10	34	2.2
Infant mortality rate (/1 000 live births)	98 [2]	14	72	3.4
Under-five mortality rate (/1 000 live births)	161 [2]	16	103	na
Life expectancy[3 / 4]				
Male	47 [3]/58 [4]	70.5[4]	50[4]	76.3[4]
Female	50 [3] / 64 [4]	77.7[4]	54.9[4]	82.3[4]
Health life expectancy[4]				
Male	50	61.1	42.9	66.4
Female	54	66.6	46.1	70.7
GNI per capita [5]	4,580	11,630	510	20,580
Gini index[5]	58.6 [6]	54.7	45.6	38.5
Hospital Beds (/1,000 population) [7]	0,8	2.3	0.7	3.4
Reproductive Health Indicators[8]				
Unmet need for family planning	na	6	na	
Contraceptive use	na	80	12	87
Antenatal Visits				
1 ANC visit	68	97	91	
4 ANC visits	47	90	90	
Skilled birth attendance	49	99	54	
Births by Caesarean	10.1	52	na	32.1
Postnatal visits (first two days after birth)	na	na	na	

1   Source: 2012 Annual Activities Report for Cabinda Health Secretary and *INE Angola data for 2010*
2   Source: WHO and UNICEF, *Accountability for Maternal, Newborn & Child Survival: The 2013 Update*, 2013: Geneva.
3   Source: INEA and D.d.E.D.e. Sociais, *Projecção Da População 2009-2015.* , 2012, INEA - Instituto Nacional de Estatística de Angola: Luanda
4   Source: Solomon, J.A., et al., *Healthy life expectancy for 187 countries, and 1990-2010: a systematic analysis for the Global Burden Disease Study 2010.* Lancet, 2012. **380**(9859): p. 2144-62
5   Source: World Bank Database online http://data.worldbank.org/indicator/NY.GNP.PCAP.CD/countries/AO-ZF-XT?display=graph accessed on October 2013
6   Source: Unicef http://www.unicef.org/infobycountry/angola_502.html accessed on the of October 2013
7   Anuário de Estatísticas Sociais 2010, 2012, data from the Relatório Estatístico do Gabinete de Estudos, Planeamento e Estatério do Ministério da Saude de 2007 a 2010: The World Fact book, data refer to 2005 online on https://www.cia.gov/library/publications/the-worldfactbook/fields/2227.html#ao accessed October 2013World Health Statistics 2013
8   WHO, *World Health Statistics 2013.* 2013: Geneva [56]

To our knowledge, this study presents the first description of perinatal data in Cabinda and reports information on the maternal services available in the province, the coverage of those services, utilization constraints and the potential to introduce measures that answer to local needs. Some limitations regarding the ability to accurately determine the number of pregnant women, during 2012, did not allow to measure and estimate some indicators of maternal health. Despite this, the services available and possible constraints to its use at the different levels are discussed.

The initial methodology chosen was to collect data through a structured questionnaire that included five domains: available maternal services (core interventions), workforce of the health units, community services and workforce, referral system for maternal care, and services costs for the women. This questionnaire had as a reference a multicentre study conducted in Sub-Saharan Africa, the *MOMI: Missed Opportunities in Maternal and Infant Health*, which aims to reinforce the postpartum healthcare through the investigation of health services at the district level of the participating countries (Burkina Faso, Malawi, Mozambique and Kenya) [45, 50].

In November 2012, a first contact was made with the PHS that led to the actions and outcomes and to the final data collection as present in Table 22:

Table 22 Timeline of actions and outcome for study design implementation and data collection

Date	Actions	Outcome
Middle of November 2012	Contact provincial health authorities to assess the possibility of conducting a study in the province health units	Met the PHS; Presented the study design to PHS, and provincial public health responsible; Submitted the formal request to undertake study at the province; Booked new meeting to present study design and data collection instrument to the authorities and unit responsible
Beginning of December 2012	Presentation of study design to the PHS and to the provincial head of public health; Collection of information about the distribution and number of units at the province; Selection of study district; Submission of questionnaire for analysis by the PHS and ethical commission	Permission to undertake the study at the Cabinda district with 45 health units involved; Booking of future meeting with health units' managers for formal presentation of study, and data collection instrument.

Date	Actions	Outcome
10th January 2013	First meeting with health units managers; Presentation of study design and data collection instrument; Distribution of data collection instrument; Definition of data collection timeline	Defined a time for the units managers to get familiar with data collection instrument and to start; Defined that the researcher will be involved in the data collection in cooperation with the HUR; Booked next appointments for beginning of March 2013
7th of February 2013	Contact with PHS to book the start of data collection	PHS requested a new meeting for March with the HUR due to the loss of the data collection instrument and the request to explain the concepts and definitions on the document and under study
7th of March 2013	Contact with PHS to confirm the meeting with HUR and the provision of new data collection instruments	Meeting postpone by PHS because the majority of the HUR were away on meetings and training at Luanda; Wait for feedback and new meeting rebooking by PHS
Late March 2013	Contact to rebook the meeting with HUR and define start date for data collection	No contact was possible by email, telephone or in person; PHS was away of country for a month
4th of April	Contact to rebook the meeting with HUR and define start date for data collection	Meeting booked for the beginning of May
2nd of May 2013	Meeting with the HUR; Discussion of concepts on data collection instrument; Booking date for data collection	Booked data collection for the third week of May; Definition with PHS and HUR of strategy for data collection
3rd week of May 2013	Visit to health units to collect data with HUR	Observational visit to five health units; The unit responsible weren't available during that week as they were in Luanda at a conference; Researcher wasn't able to collect the data from the available databases; Logistically impossible to stay more time at the province; Asked the PHS to supply data from units from the last year; Stopped the primary data collection
End of May	Request to PHS secondary data sources for the health units in the province for the last available time, preferably if possible previous year	Access to the 2012 Annual Activities Report of the Health Secretary of Cabinda Province was granted; Access to the individualized activities reports for 2012 of the health units that submitted it No feedback on the questionnaires from any of the health units responsible

The decision to stop the primary data collection was made based on the following: logistically impossible for the researcher to support a longer stay in Cabinda due to high costs of housing and travelling, data sources at the unit health level were not organized and required more time to collect data locally, and the majority of the health unit managers were not available for data collection whenever contacts or visits were made.

Additionally, due to a lack of systematized data access, we decided to continue the study using secondary data sources, some of which were made available by the Provincial Health

Secretary, after requested. Secondary data sources are those used by researchers, which were collected for other purposes. Availability, completeness and cost effective access are some of the advantages of secondary data sources in the study of population-based health care research. However, the origin and utilization of these sources entails some limitations that can systematically affect the findings [57]. Analysis of definitions used, measurement error, source bias, reliability and the time span of the secondary data should be evaluated when used and, whenever possible, other secondary data sources should be consulted in order to confirm and cross reference [58, 59]. In settings where data collection presents several constraints, a first step is to conduct research that can use secondary data sources available. Ideally, the combination of primary and secondary sources should be used [57].

In 2012, concerning ANC, we found that 68,325 appointments were conducted, 34.6% first consults and the rest were follow-ups, but the number of women seen was not mentioned and this did not allow us to estimate the coverage of ANC services. This seems to be related to the fact that no formal system for recording ANC appointments is in place at the health unit level and women are the ones who keep their own record (Appendix. A). This was seen when observational visits to study sites were made. Despite an observed increase of 55% in the number of health units (55 to 117) in the last years in the province, this does not allow to extrapolate that an increase in the coverage level of ANC happened. However, one could expect that the availability of services and proximity to households would increase its overall use [4, 32, 34].

Intermittent Preventive Treatment in pregnancy (IPTp) for malaria, one of the core interventions for ANC, was found to be present at Cabinda health units. In 2012, only 36.9% of pregnant women (16,745) did the first treatment dose, 24% the second and 1.5% did the completed 3 doses. This is in line with previous findings [5, 6] for the province that stated that 29.2% of pregnant women did 2 or more doses of IPTp [6], thus showing that in the last five years there has not been an increase in the coverage of IPTp and supporting the lack of investment (training, sensitization, workforce awareness, resources) to this level has seen in other Sub-Saharan countries [60]. The study by Eijk et. al. (2013) analysing the use of IPTp and ITN among countries of the Sub-Saharan Africa in 2010, found that a coverage increase of IPTp, from 13.1% to 21.2% (n=14 countries), and the use of ITN from 17.9% to 41.6% (n=24 countries), was observed. Despite this, a fall by 10% was seen in some of those countries for IPTp and ITN use. Further, high disbursement of funds for malaria control and a long time interval since adoption of the relevant policy were associated with the highest coverage of IPTp [60].

Voluntary HIV screening and sensitization campaigns across all age groups were implemented during 2012. 15.7% of the total population of Cabinda province was tested for HIV in 2012, and a prevalence of 2.3% was found, which is similar to that of the country, and

lower than the prevalence for the Sub-Saharan region [24]. It was noticed that women volunteer more often for screening than men, which precludes a higher proportion of positive cases among the female gender. Further, a third of all new cases of HIV was diagnosed in pregnant women [7]. This seems to related to cultural beliefs and acceptance of practices such as polygamy, sub-valorisation of sexually transmitted diseases (STD), cultural prejudices about the use of condoms, among others [5]

Although 1,516 HIV cases were identified during the 2012 voluntary screening, only 491 (32.4%) entered antiretroviral (ARV) treatment. This may be explained by the lack of sensitization campaigns, follow-up of new cases and correct counselling, as pointed out by the health provincial secretary of Cabinda [7]. Women enrolled in the vertical transmission program are an example of the latter; around 7.5% [7] still give birth at home. This shows that information about the risks for mother and baby, and the importance of a birth at a centre with EmOc are not fully understood and birth planning is not well integrated.

A survey [5] conducted in Cabinda (2008-09), showed that 17.4% of pregnant women refer not having any antenatal consult, while the remainder had at least one ANC appointment. Although, more than 80% of women had one ANC, only 62.2% had the recommended 4 ANC appointments. This may be associated to the late start of ANC that characterizes this population. Approximately 65.6% referred having their first ANC appointment after the 4th month of the pregnancy and only 3.6% started in the 1st month of pregnancy [5]. Comparing these results with the mean coverage of 57% of four or more ANC appointments observed in Countdown countries [1]. Cabinda district seems to be slightly above but has not made any changes in the last few years towards increasing ANC coverage. This is observed when we estimated the average number of prenatal visits for 2012 per delivery, where each woman would have had at least 2.3 appointments during pregnancy thus meaning that some still do not have any visits if approximately only 60%, as in 2009, still have the four recommended.

The lack of systematized recording methods limits the possibility of Angola and the province, to accurately evaluate the progress towards the achievement of the MDG 5 [1, 28, 42]. Also, it does not permit the local health authorities to identify the critical areas in which reinforcement of training, materials, infrastructures are needed and to draw projects to improve the coverage and quality of ANC care, in order to fulfil the commitments to MDG [28, 42]. In fact, it was not possible with the available data to assess if any progress has been made or accurately describe the ANC provided at the province level. Integration of the MDG 5 targets into the assessment of reproductive services quality and availability is critical if the province and Angola, want to assess the efficacy of available interventions and programs. Although a high level of coverage was observed for at least one ANC in 2008-9, the

continuity (at least four visits) seems to not be present, and cultural constraints and workforce availability should be addressed in future studies [4, 31, 34, 42].

A previous study [5] conducted nationally concluded that home deliveries in the province account for almost 20% of all births which makes us question the constraints for the services utilization [41]. We tried to assess if changes occurred from 2009 to 2012, but the reports reviewed did not allow us to determine the proportion of women with home births. However, from the Reproductive Health Report (RHR) one can deduce that a decrease happened. This can be a biased assumption, as only 60% of all children in Cabinda [5, 6] have a birth record, and women with home deliveries, are assisted by TBA or others (family or neighbours) that do not have formal connections to the health departments. Moreover, and according to an interview with PHS, 200 TBAs have formal relationships with the health units, thus meaning that only those will report births at home. In line with these findings, the 3.4% of home births, found in this study reflects an underreporting of what is happening in the community and, that a need to stimulate the record of those births is necessary if we want to capture the real scenario of births in the province. Despite this, Cabinda, unlike other Sub-Saharan countries [43, 44], has a higher proportion of SBA at childbirth. Nonetheless, one can question the quality of that care [41] as there is no program for delivery of EmCo by nurses or other health professional cadres, and the ratio doctors, midwives and nurses is lower than that of the population demand and international guidelines [41, 61]. Overall, SBA is still not universal at Cabinda district, but its coverage is higher than that of the country. SBA is a measure of the availability and quality of services as the presence of a SBA at birth is beneficial to women and children's health [44, 62].

One can also relate the occurrence of home births to cultural constraints that go from maternal, social, facility and macro-level factors [44]. Moyers and Mustafa (2013) state that countries with higher percentages of government spending in health and expenditure per capita, seem to be associated with higher proportion of SBA [43]. Angola has increased spending on health but this has been mainly concentrated in the reconstruction of infrastructures, and may have affected the potential progression for the achievement of universal SBA in the country as well as at the provincial level.

Another finding concerning SBA, in 2012, was that only two units performed caesarean sections, the 1st of May Maternity in the Cabinda district and Alzira Fonseca Hospital in the Belize district, with proportions of 8.4% and 7.7% of all births attended, respectively. This raises the question of inequalities across the province on the access to comprehensive EmCo. This is shown in the province proportion of caesarean section of 4.3%, which is below the WHO recommended minimum of 5% [9, 42]. If compared to the country caesarean section rate of 10.1% [52], Cabinda clearly shows that there are not only inequalities within the province but also across provinces in the country. This highlights that differences in

access to comprehensive EmCo go beyond the availability of health units and can be related to a lack of skilled health workers [42].

The health ministry states that the lack of skilled human resources has been a problem in trying to ensure healthcare staffing and quality [21]. When analysing the distribution of health care workers in the country, it becomes clear that health care personnel are scarce and concentrated in large cities, 85% of physicians in Luanda and provincial capitals [21]. The evolution of provisioning of the country's human resources requires an increase in the number of institutions, which provide training for qualified professionals. Although this has been observed in the last three years, the results will take several years to have an impact on the workforce [63].

In 2010, the ratio of physician/population was 1/10,000, nursing professionals was (very few or no graduates from the country) 17.5/10,000, and the diagnostic and therapeutic technicians (mid-level workers) was 3/10,000 [21]. When compared with other countries of the Organization for Economic Cooperation and Development [64] where the physician´s density average is 3.1/10,000, Angola has a distinct lack of these health care professionals. Although the ratio of nurses in Angola is higher than the 8.6/10,000 average for OECD [64], it should be made clear that training in Angola is at the level of secondary and basic education and that only a few dozen graduates work in the country. The comparison of these data is biased since these reflect different realities and technical skills. If compared with the ratios of the average African region [56] 2.5 doctors and 9.1 nursing professionals per 10,000, we would say that, with regard to medical personnel the country has a clear need and although the number of nursing professionals is above the African average, this measure does not take into account differences in training and in professional classification [65].

In the province, we found that the provision of care by skilled health professionals presents a higher density of doctors, 3.5/10,000, with specialists at 2.3/10,000, than the rest of the country and the African region [21]. Despite this, and concerning reproductive health, the density of obstetricians is very low as well as of midwives and nurses, 0.08/10,000 and 2/10,000, respectively. These numbers are below the recommended minimum 23 doctors, midwives and nurses necessary to guarantee proper access to SBA and availability of comprehensive EmOc [9]. Auxiliary nurses and nurse technicians, with unspecific training to conduct the needed comprehensive interventions that SBA requires, provided the majority of care in the province. According to Kruk and Prescott (2012), an increase of 10% in health care workers per 1,000 increases the odds of a woman having a safe delivery by 8%, thus making a real impact in maternal morbidity and mortality [66].

In 2012, the maternal mortality ratio (MMR) in the province could only be estimated for one health unit as none of the others provided data on maternal deaths. The MMR for 1st of May Maternity was 234.3/100,000 live births. The MMR for the province is below the national

average, which may be due to an underreporting of deaths or, other factors that we are unaware of [1, 2]. When comparing these results with a study [45] conducted in four other Sub-Saharan countries (Burkina Faso, Kenya, Malawi and Mozambique) at the services level, we observe that Cabinda presents the highest MMR which suggests that despite the high number of health units, technical and social limitations that lead to poor performance in this indicator may be present [43].

Maternal deaths may be subdivided into two groups: direct and indirect obstetric deaths [51]. "Separation of indirect obstetric deaths from direct causes is important because of the implications for intervention strategies and is especially relevant where these background diseases kill many women of reproductive age, including pregnant" [27].

Mortality is only the tip of the iceberg [67, 68]. Complications during pregnancy, labour or delivery may bring about disabilities to women, which impact their ability to function and be an active and independent member of society. This is especially important considering what they represent for a country´s healthy life expectation has these are indicators of the underlying functioning of social structures and the effectiveness of health systems [12, 45].

The latest systematic review on causes of maternal deaths by WHO [67], points that 82% are due to direct causes, haemorrhage representing 34% of those. Indirect causes account for 18% worldwide and in African countries, infectious diseases such as HIV and malaria are major causes [45, 67]. In fact, countries like South Africa and Nigeria had mortality increases between 1990 and 2000, due to high HIV prevalence and only after diagnosing and treating those women during pregnancy, was a decrease in maternal mortality observed [69]. Access to effective maternal health care along the continuum of care is essential, especially in regions that contribute largely to the high burden of maternal mortality and morbidity such as Sub-Saharan Africa and Asia [1]. Another fact is that globally, the number of unsafe abortions performed has increased from 19.6 million in 2003 to 21.6 million in 2008 [67], putting more women at risk of death and other morbidities and showing that the specification of the death cause and the overall health state of women is essential in order to know and understand the true burden of maternal mortality and morbidity. "Data on the incidence and severity of these medical conditions in developing countries are scarce''[67].

As per the rest of the Sub-Saharan region [12, 67], Cabinda in 2012, presented as major maternal death causes, infections (37.1%) followed by haemorrhage (28.6%), and hypertensive disorders (20%). This raises again, the question on the quality of care available as these are all preventable direct death causes that should be addressed during pregnancy at ANC visits, during childbirth with SBA and access to comprehensive EmOc [4, 41, 67]. Further, questions that go beyond the availability of skilled health professionals should be raised such as, the availability of medicines essential to prevent or treat potentially life-threatening conditions. Medicines concerning mothers´ health are listed below, in Table 23.

However, there is often a restricted access to medication in resource limited settings [70]. As observed, a low availability of contraceptives seems to be present in the province. Consequently, what other essential medicines, as defined by WHO treatment guidelines are missing? Is there availability of those products? Are the death causes strictly related to the human resources? To answer these questions, more studies are necessary to address and understand the impact of those on the burden of maternal death. The MOMI study (2013) [45, 50], has already begun to address this subject, but not enough data has been collected to compare, and our study could not, as previously referred, capture the availability of medicines in the province.

Table 23 Priority medicines for mothers according to WHO treatment guidelines

Indication	Medicine
For mothers	
Postpartum haemorrhage:	
treatment	Oxytocin: 10 IU in 1-ml ampoule
	Sodium chloride: injectable solution 0.9% isotonic *or* Sodium lactate compound solution – injectable (Ringer's lactate)
prevention	Misoprostol: tablet 200 µg
Severe pre-eclampsia and eclampsia	Magnesium sulfate: injection 500 mg/ml in a 2-ml ampoule, 500 mg/ml in a 10-ml ampoule
	Calcium gluconate injection (for treatment of magnesium toxicity): 100 mg/ml in a 10-ml ampoule
Maternal sepsis:	
treatment of infection due to sepsis	Ampicillin: powder for injection 500 mg; 1 g (as a sodium salt) in vial
	Gentamicin: injection 10 mg; 40 mg/ml in a 2-ml vial
	Metronidazole: injection 500 mg in a 100-ml vial
treatment incomplete miscarriage	Misoprostol: tablet 200 µg
Chlamydia	Azithromycin: capsule 250 mg; 500 mg or oral liquid 200 mg/5 ml
Gonorrhoea	Cefixime: capsule 400 mg
Syphilis	Benzathine benzylpenicillin: powder for injection 900 mg benzylpenicillin in a 5-ml vial; 1.44 g benzylpenicillin in a 5-ml vial
Prevention of early labour	Betamethasone: injection 5.7 mg/ml as betamethasone sodium phosphate 3.9 mg (in solution) or betamethasone acetate 3 mg (in suspension) in an aqueous vehicle *or* Dexamethasone – injection 4 mg dexamethasone phosphate (as disodium salt) in 1-ml ampoule
	Nifedipine: immediate release capsule 10 mg

Source: Adapted from Hill, S.R., *Putting priorities first: medicines for maternal and child health.* Bulletin World Health Organization, 2012(90): p. 236-238

PPC, a core moment for the prevention of deaths among women, is not mentioned in any of the reports assessed for 2012. The lack of systematized reporting of interventions and women seen in this maternal care stage indicates the low relevance that is given to it by health workers and population alike. Women are normally discharged immediately (first or second day) after childbirth and are only seen on the 6th day after childbirth, if they return for their child's vaccination. The value and importance of this moment is only centred on the newborns´ health and although women are seen, they are often not asked about their health.

There is still a cultural belief that birth is a natural event with no need for medical care, and that women should be taken care of by their families, as per the local rituals. As showed in previous studies conducted in African countries [4], birth complications in Cabinda are

seen as a part of the events that surround birth and complications due to pregnancy or labour are only reported if they are life threatening, thus making women seek specialized medical care [4, 71]. The concept of an extended postpartum period is not mentioned, which is in line with previous evidence showing that after childbirth the number of women receiving any care drops considerably or is absent [45, 71].

The collection of data on health care in the country and province is difficult. Although most institutions have a system of data recording, they are inconsistent and there is a lack of surveillance departments and management. Although projects to improve the recording system are in development, none have been completed [24], and this does not allow for the proper evaluation of the coverage of maternal services as well as the quality of such care.

Several elements affect the functionality of health systems: human resources capacity, health facility infrastructure, supply systems, financial resources, government stewardship, district–level management and monitoring [4, 27, 34], and this study describes a part of the provincial problem, mainly related to the training of the workforce, poor reporting systems, and cultural constraints related to reproductive health.

Cabinda still presents an unacceptably high maternal mortality despite the availability of health units and workforce, and a reproductive health program in place [27, 37, 41]. Future studies should address those specific areas if efforts to scale up packages on maternal health are to happen, and if Angola wants to achieve MDG 5.

6. Conclusion

6. Conclusion

The real burden of maternal mortality is still not known in the Cabinda province of Angola. Despite efforts made by the Provincial Health Secretary and the Ministry of Health, to formally develop methods to record interventions and outcomes at health units, the majority still do not have these systematized. Consequently, it becomes difficult to efficiently measure progression made and changes still required in order to achieve MDG5. Finally, specialized health workers are not generally available for the provision of core interventions, which guarantee universal access to reproductive health.

In 2012, the province of Cabinda had a reported MMR of 234/100,00 live births. This may suggest that the province has already achieved the MDG5 set for Angola as a MMR of 290/100,000 live births. However, and considering the data available this cannot be assumed. That is, MMR is still high, despite availability of health units and health workers, particularly when compared to other districts in Sub-Saharan Africa.

Expenditure necessary if MDG 5 is to be achieved should address:

- Reinforcement of training for health workers, particularly aimed at reproductive health and core interventions [67];
- Definition of a framework to guarantee accesses to EmCo by SBA that goes beyond doctors and midwives if, universal access to SBA is to be achieved;
- Improvement, supervision and surveillance of recording systems along with their implementation to efficiently measure maternal health;
- Increased research focused on understanding the impact of social and maternal factors that constrain universal access to maternal care [28].

At this point in time, the MDG 5 target seems almost unattainable. However, if those committed to the project focus on the above measures, especially those adapted to the context and the resources, the realization of MDG5 target is still feasible.

7. References

7. References

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8. Appendix A - Follow-up Antenatal Care Notebook