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REVIEW ARTICLE

Maternal and new-born health policy indicators for low-resourced countries: The example of Liberia

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Abstract

Aim: Over the past two decades, two catastrophic events caused a steep decline in health services in Liberia: the long-lasting civil war (1989-2003) and the weak response of the health system to the Ebola Viral Disease (EVD) outbreak (2013-2015). In early 2015 The Liberian Government reacted and developed a strategic health policy framework. This paper reviews that framework with a focus on maternal and newborn health.

Methods: The study is designed as a narrative review executed during the second half of 2017 in Monrovia. It takes advantage of triangulation, derived from recent international and national documents, relevant literature, and available information from primary and secondary sources and databases.

Results: In 2015 the severely compromised health system infrastructure included lack of functional refrigerators, low availability of vaccines and child immunization guidelines, high stock-out rates, and an absence of the cold chain minimum requirements in 46% of health facilities. The public health workforce on payroll during 2014/15 included only 117 physicians. Skilled birth attendance as an indicator of maternal health services performance was 61%. Presently, approximately 4.5 women die each day in Liberia due to complications of pregnancy, delivery, and during the post-partum period, equalling about 1,100 women per 100,000 live births. Of particular note is the adolescent birth rate of 147 per 1000 women aged 15-19 years, three times higher than the world average of 44. Additionally, with a neonatal mortality rate of 19.2 neonatal deaths per 1,000 live births, Liberia stands higher than the world average as well. The high mortality rates are caused by multiple factors, including a delay in recognition of complications and the need for medical care, the time it takes to reach a health facility due to a lack of suitable roads and transportation, and a delay in receiving competent care in the health facilities.

Conclusions: The fact that performance is above average for some indicators and far below for other points to unexplained discrepancies and a mismatch of international and national definitions or validity of data. Therefore, it is recommended to concentrate on the core of tracer indicators adopted at the global level for Universal Health Coverage and the Sustainable Development Goals to enable a permanent update of relevant information for policymaking and adjustment. At present all health policy documents miss a thorough application of the SMART objectives (Specific, Measurable, Attainable, Relevant and Timely), notably missing in most documents are realistic and detailed budgeting and obligatory timelines for set targets.

Keywords: health system, Liberia, maternal and newborn health, maternal mortality, policies, strategies.

Introduction

The Liberian population is comprised of the descendants of the immigration from the United States in the early 19th century and of 17 major tribal affiliations. Half of the population lives in urban areas (1), the majority being Christians, a minority of about one-tenth are Muslims. The civil war from 1989 to 2003 generated a death toll of about 18% of the population of 4.5 million and nearly one million displaced persons (2). Living standards dropped considerably also as a consequence of the weak response of the health system to the subsequent outbreak of Ebola Viral Disease (EVD) 2013-2015 (3). Accordingly resources for health services missed the so-called Abuja target of 15% (4) by 2.6 percentage points. A restart and overhaul of the health system became mandatory.

Health system oriented towards women and children obtained particular attention of the Liberian government (5). The "Global Strategy for Women's, Children's and Adolescents' Health" (2016-2030) (6) in the context of the Agenda for Sustainable Development (7) identify 9 areas for 'Reproductive, Maternal, New-born, Children, and Adolescent Health' (RMNCAH) policies, calling on governmental initiatives and country leadership, financing for health, health system resilience, individual potential, community engagement, multi-sector action, humanitarian and fragile settings, research and innovation, and accountability for results, resources and rights. Similarly, Universal Health Coverage identifies availability, accessibility, acceptability, and quality of services (8). These target areas for RMNCAH are of similar priority for almost all countries in the Economic Community of West African States (ECOWAS) as recently analyzed (9).

Our narrative review investigates maternal and new-born health policies. Also, review addresses the basic components of reproductive health specific for Liberia as an example for other low-resourced countries especially in West-Africa: fertility (actual bearing of live offspring), safe motherhood (pregnancy and delivery without risk for own life and child's life), family planning, prevention of unwanted pregnancies and abortions, as well as characteristic diseases for women in their reproductive age.

Methods

We make use of a combination of quantitative and qualitative methodologies. A participatory process involving governmental stakeholders through several interviews was particularly helpful and supportive in ensuring that issues were explored across sectors to provide a holistic understanding of the situation. Also, the paper takes advantage of triangulation based on national and international sources and publications as well as on data and documents of the Government of Liberia predominantly the Ministry of Health and the Liberia Institute of Statistics and Geo-Information Services. We employ further the current methodology proposed by the Maternal Mortality Estimation Inter-Agency Group (MMEIG) (10).

The main framework of analysis is following steps of the policy cycle (11) as necessary, moving towards universal health coverage. All actual policy documents are analyzed looking at 1) agenda-setting with problem definition and situation analysis, 2) policy formulation with goals and objectives, 3) implementation by government action and 4) monitoring/evaluation with revised agenda setting.

Results

1) Review of health policy documents related to Maternal & New-born Health (MNH)

The key documents in this context are the "Investment Plan for Building a Resilient Health System 2015-2021" (12)in line with the "National Health and Social Welfare Policy and Plan 2011–2021" (13). Also, recently the Ministry of Health (MoH) in cooperation with national and international partners drafted and endorsed a document, the "Investment Case for Reproductive, Maternal, Neonatal, Child and Adolescent Health 2016-2020" (14) aiming to support high impact intervention for improving MNH (Maternal and New-born Health). We have retrieved in total 28 policy documents, which all involve maternal and new-born health, either as a general or specific priority health problem under concern and in need for accelerated action (Table 1), as maternal mortality in Liberia is among the highest worldwide being 1,072/100,000 live-births during the seven years preceding the 2013 LDHS (15). According to the 2007 LDHS, maternal mortality was even slightly less than today being 994/100,000 (16). Approximately 4.5 women die each day in Liberia due to complications of pregnancy, delivery, and during the postpartum period (17), equalling about 11 women for every 1,000 live births.

Table 1. Liberian policy documents embracing MNH

No	Title of the Policy Document	Time Frame	Source (Internet pages or references)
1	National Health and Social Welfare Policy and Plan • National Health and Social Welfare Policy • National Health and Social Welfare Plan	2011-2021	http://moh.gov.lr/category/policies/
2	National Health and Social Welfare Financing Policy and Plan	2011-2021	http://moh.gov.lr/category/policies/
3	National Human Resources Policy and Plan for Health and Social Welfare	2011-2021	http://moh.gov.lr/category/policies/
4	National Health and Social Welfare Decentralization Policy and Strategy	2011-2021	Not online
5	Investment Plan for Building a Resilient Health System	2015-2021	http://moh.gov.lr/cabinet-endorses-investment-plan-for-building-a-resilient-health-system/
6	Investment Case for Reproductive, Maternal, New-Born, Child, and Adolescent Health	2016-2020	http://www.globalfinancingfacility.org/sites/gff_new/files/documents/Liberia%20RMNCAH%20Investment%20Case%202016%20-%202020.pdf
7	Liberia community health road map	2014-2017	Not online
8	Revised National Community Health Services Strategic Plan	2016-2021	Not online
9	National Policy and Strategic Plan on Health Promotion	2016-2021	http://www.afro.who.int/en/liberia/liberia-publications.html
10	National HIV & AIDS Strategic Plan	2015-2020	http://www.nacliberia.org/doc/Liberia%20NSP%202015-2020%20Final%20_Authorized_%20OK.pdf
11	National Malaria Control Program. Malaria Communication Strategy	2016-2020	http://www.thehealthcompass.org/sites/default/files/project_examples/Liberia%20NMCS%202016-2020.pdf
12	National Leprosy and Tuberculosis Strategic	2014-2018	http://www.lcm.org.lr/doc/TB%20and%20Lepr

	Plan		osy%20Strategic%20Plan%202014-2018%20consolidated%20(1)%20(1).pdf
13	The National Traditional Medicine Policy and Strategy (2015-2019)	2015-2019	http://moh.gov.lr/category/policies/
14	Strategic Plan for Integrated Case Management of Neglected Tropical Diseases (NTDs)	2016-2020	Not online
15	Consolidated Operational Plan (FY 2016/17)	2016-2017	http://moh.gov.lr/wp-content/uploads/2017/04/Operational-Plan_FY-17_-martin.pdf and: http://www.seejph.com/public/books/Consolidated_Operational_Plan_2016-17.pdf
16	Joint Annual Health Sector Review Report 2016.	2016	http://www.seejph.com/public/books/Joint_Annual_Health_Sector_Review_Report_2016.pdf
17	Family Planning 2020 Commitment	2011-2020	http://ec2-54-210-230-186.compute-1.amazonaws.com/wp-content/uploads/2016/10/Govt.-of-Liberia-FP2020-Commitment-2012.pdf
18	National Gender Policy 2010-2020	2010-2020	http://www.africanchildforum.org/clr/policy%20per%20country/liberia/liberia_gender_2009_en.pdf
19	National Therapeutic Guidelines for Liberia and Essential Medicine List	2011-ongoing	https://www.medbox.org/countries/national-therapeutic-guidelines-for-liberia-and-essential-medicines-list/preview?q=
20	Essential Package of Health Services (EPHS)	2011-ongoing	http://apps.who.int/medicinedocs/documents/s19420en/s19420en.pdf
21	Road Map for Accelerating the Reduction of Maternal and New-born Morbidity and Mortality in Liberia (2011-2015)(18)	2011-2015	Ministry of Health and Social Welfare, Republic of Liberia. Roadmap for Accelerating the Reduction of Maternal and New-born Mortality 2011-2015 (an updated version of the original publication in 2007). Monrovia, Liberia: Ministry of Health, 2011.
22	Accelerated Action Plan to Reduce Maternal and Neonatal Mortality 2012-2016 (19)	2012-2016	Ministry of Health and Social Welfare, Family Health Division. Accelerated Action Plan to Reduce Maternal and Neonatal Mortality. Monrovia, Liberia: Ministry of Health and Social Welfare, 2012 July.
23	The National Roadmap for maternal mortality reduction “the Reach Every Pregnant Woman (REP) Strategy”	2007	http://apps.who.int/pmnch/media/events/2013/liberia_mnh_roadmap.pdf
24	National Strategy for Child Survival in Liberia	2008-2011	http://liberiamohsw.org/Policies%20&%20Plans/National%20Strategy%20for%20Child%20Survival.pdf
25	National Sexual & Reproductive Health Policy	2010	http://liberiamohsw.org/Policies%20&%20Plans/National%20Sexual%20&%20Reproductive%20Health%20Policy.pdf
26	Poverty Reduction Strategy	2008	http://www.emansion.gov.lr/doc/Final%20PRS.pdf
27	National Policy and Strategic Plan on Integrated Vector Management	2012-2017	http://pdf.usaid.gov/pdf_docs/PA00J21W.pdf
28	Liberia Health System Assessment (20)	2015	Ministry of Health, Republic of Liberia. Liberia Health System Assessment. Monrovia, Liberia: Ministry of Health, 2015.

The most recent situation analysis is presented in the "Liberia Service Availability and Readiness Assessment and Quality of Care report (SARA and QOC)" (21), while the most recent documents covering MNH policy implementation are the "Joint Annual Health Sector Review Report 2016" (22) and the "Consolidated Operational Plan (FY 2016/17)" (23).

The most important of the documents listed in table 1 is the Investment Plan (number 5) for the period 2015-2021 making use of the more recent data of the DHS 2013. The political decision-maker drafting it employed the MDG targets and indicators (24) but not yet the more recent SDG indicators (25). The method of stating targets is not explained, in spite of the recommendation to tailor targets towards local context and embrace a more realistic approach. As an example, Liberian policymakers envisioned a goal to reduce maternal mortality by three quarters between 1990 and 2015 as set in MDG-5. That would be equal to - looking at the upper bound level in 1990 (figure 1 below) – 1,980 maternal deaths to be reduced to 495 per 100,000 live-births in 2015, which is at the same time close to the national target of 497 maternal deaths per 100,000 live-births set as a desirable goal only for 2021. Due to such weaknesses and inconsistencies, it may be assumed that the selection of Liberian objectives and targets in these documents often have been set at random. Such assumption is mirrored in the recent MGDs assessments (26) that criticize too ambitious MDGs, which do not take into account infrastructure and health system capacity in general, which is a strong request of the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030) (27-29).

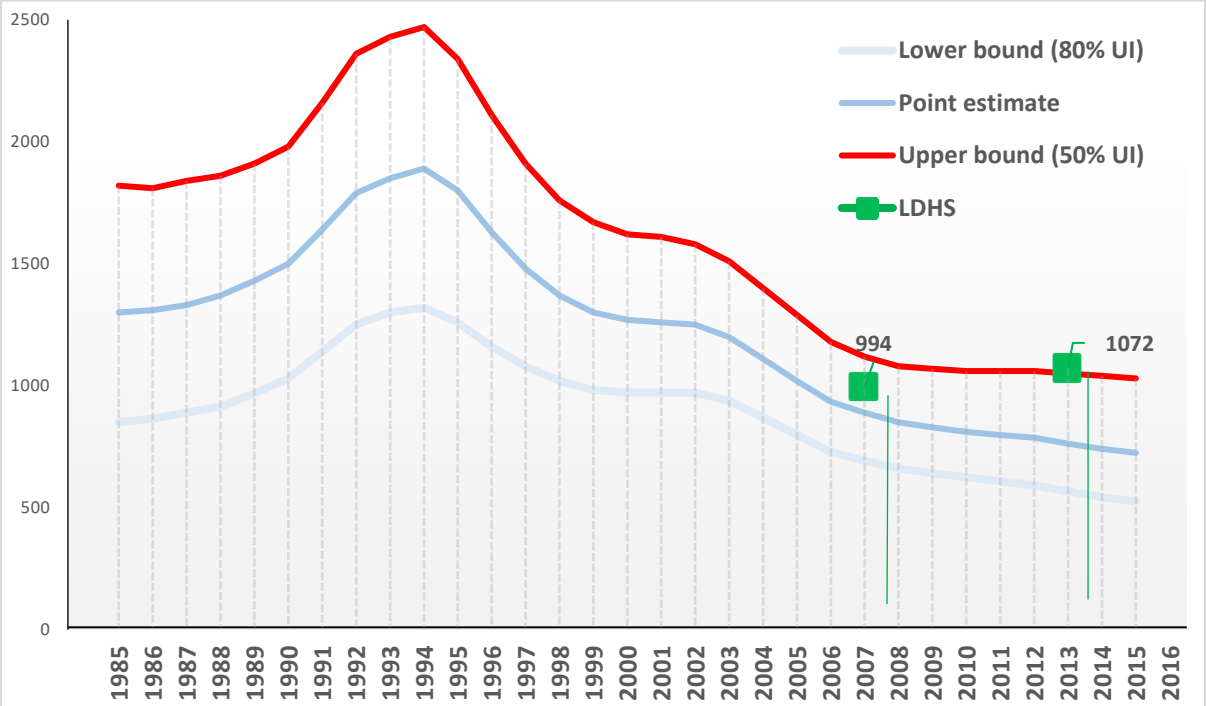
To enhance increased investment into health systems of resource-limited countries, IHP+ has been transformed into the International Health Partnership for Universal Health Coverage (UHC) 2030, based on the 2005 Paris Declaration on Aid Effectiveness and the 2011 Busan Partnership Agreement(30).During the first meeting of the UHC-2030 working group in March 2017 (31), the main focus was on low and middle-income countries facing many threats to their health systems including decrease in the external financial support. Liberia potentially faces similar threats in the near future but joined IHP+ only in March 2016, however, a significant amount of donor support (about 75%) (32) remains off-budget with various parallel implementation arrangements. Nevertheless, progress is visible in spite of the recent Ebola crisis (2014/15), mainly due to the efforts of the Liberian government to implement an Essential Package of Health Services (EPHS) - since 2011 (33,34).

2) Analysis of Maternal and Neonatal mortality

Looking at time trends, from 1985 to 2015 (Figure 1), the period of the first civil war (1989-1996) was when maternal mortality experienced a peak. In 1994 mortality ratios were 1,890 deaths per 100,000 live-births (with the upper bound of 2,470 and a lower bound of 1,320). After a significant recovery, the second civil war (1999-2003) again caused a negligence to MNH and retardation of improvement. Today Liberian reproductive women have a 3 times higher chance than the average global population of women to experience premature death due to complications during pregnancy, delivery, and the postpartum period. Between 2000 and 2015, the global maternal mortality ratio, or a number of maternal deaths per 100,000 live births, declined by 37 percent - to an estimated ratio of 216 per 100,000 live births in 2015. In Liberia maternal

mortality in the same period declined by 43% from 1,270 to an estimated ratio of 725 per 100,000 live births in 2015, indicating considerable improvement since the civil wars ended, although still higher than the global average. The national data based on the DHSs published in 2008 and 2013 represent maternal mortality during the 7 preceding years. The main reason for differences is insufficient death statistics in Liberia, with many failing to register the majority of causes of deaths in the population. The Liberian MoH information summarises: "The Liberian Public Health Law of 1976 mandates the MoH to register all deaths within 24 hours. As a result of inadequate access, the coverage of registration has always been below 5% annually. Death certificates are usually processed in Liberia with the intent to obtain insurance benefits, to settle inheritance issues and not as a requirement for burial and documentation of the cause of death." (35).As an example: in 2013, only 659 deaths were registered according to the rules.

Figure 1. Maternal Mortality Ratio in Liberia (9,15)



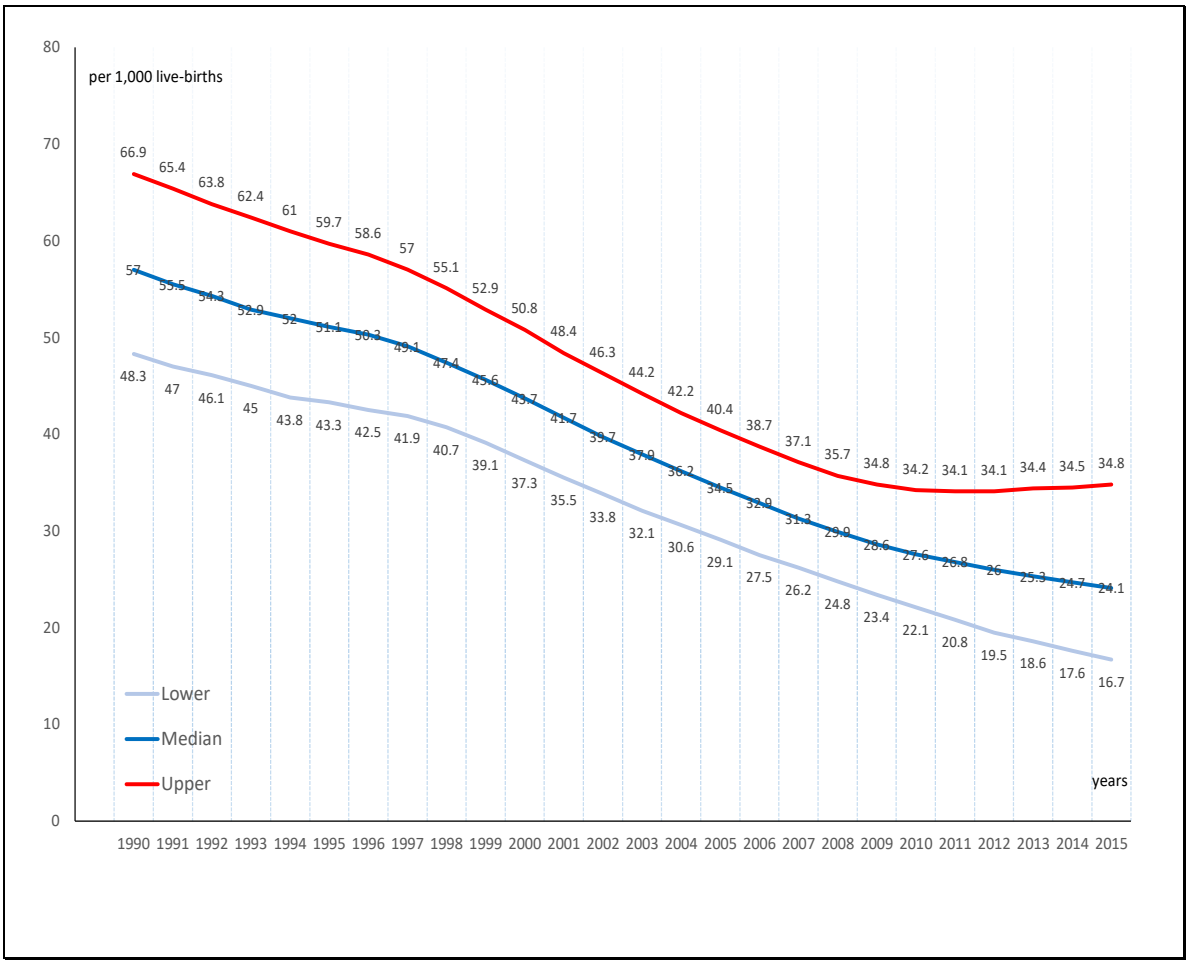
Data on maternal mortality presented in Figure 1 are obtained from databases maintained by the WHO, UNDP, UNICEF, and World Bank Group.

Some of the earlier policy documents stated several reasons for high maternal mortality rates mainly related to the insufficient quantity and quality of the Liberian human resources for health and health facilities' performance (36). Some of the problems cited were an inadequate number of skilled human resources for health in general and of experienced,skilled birth attendants specifically also inadequate emergency obstetric and new-born care services, inadequate referral mechanisms, inadequate essential drugs, equipment, and supplies were cited. The major non health factors include a lack of clearly defined community referral, lack of health financing mechanisms, and socio-cultural

inequities. There are significant delays which also contribute to maternal and new-born mortality: delays in recognition of danger signs and making the decision to seek health care, delays in reaching a health facility via an insufficient road system (37), and delays in receiving care at the health facility. Consequentially, the leading causes of maternal deaths are haemorrhage (25%) and hypertension (16%) followed by sepsis and abortion (each 10%).

The next important indicator of MNH in the SDG framework is neonatal mortality. With 24.1 neonates' deaths up to 28 days per 1,000 live-births, Liberia is still above the world average (19.2 per 1,000 live-births). However, the historical decrease in neonatal mortality is significant (Figure 2). The main causes of neonatal deaths are preterm birth complications (10%) and intrapartum related events: asphyxia (9%), and sepsis (8%).

Figure 2. Neonatal Mortality Rate in Liberia (15,38)



Legend: Lower, Median and Upper refer to the lower, median and upper bound of a 90% uncertainty interval.

Despite these results, policymakers should carefully consider whether the relatively low neonatal mortality could be due to the insufficient Liberian deaths registration (potential entrap of under-registration).

The framework for SDG monitoring includes 27 indicators for monitoring of

SDG-3 ("Ensure healthy lives and promote well-being for all at all ages"), out of which a group of 16 indicatorsis directly related to health status (39). Though all indirectly are relevant for MNH, a particularly important indicator, within SDG-3, is the adolescent birth rate per 1,000 women aged 15-19 years. The main rationale for the recognition of this indicator is: "Preventing unintended pregnancy and reducing adolescent childbearing through universal access to sexual and reproductive health-care services are critical to further advances in the health of women, children, and adolescents. Childbearing in adolescence has steadily declined in almost all regions, but wide disparities persist: in 2015, the birth rate among adolescent girls aged 15 to 19 ranged from 7 births per 1,000 girls in Eastern Asia to 102 births per 1,000 girls in sub-Saharan Africa" (40). In Liberia, this rate was even higher in 2015 and also higher than in ECOWAS and the African region. With 147 adolescent girls per 1,000 aged 15-19 years who gave birth to a baby, Liberian female population is at 3 times higher risk in this regard than the world average (44.1 per 1,000) (41).

3) Status of health services

The second group of relevant indicators for the situation analysis of MNH in relation to SDG-3 is related to health system strengthening. These indicators refer to health system structure, quality, and effectiveness of performance, which holds a prominent place in the situation analyses of many Liberian health policy documents. The Investment Plan for Building a Resilient Health System (2015-2021) has been marked already as one of the best health policy documents in Liberia. Following this report (3), the public health workforce on payroll, during 2014/15, included only 117 physicians, 436 physician assistants, 2,137 nurses (RN/LPN), and 659 midwives (1.2 per 10,000 population). Also 2,856 Trained Traditional Midwives (TTM) are listed. TTMs belong to the corpus of 8,052 community health volunteers (based on the 2013 mapping exercise). Today, health workers' density varies significantly between counties in Liberia, the lowest being in Nimba and the highest in Bomi. Though improvement in quantity is visible from 2010 to 2015, still numbers are far below the levels proposed by WHO to avoid critical shortage: 23 health workers per 10,000 are considered as necessary to secure essential maternal and child health services to the entire population (42).The Roadmap for scaling up human resources for improved health service delivery in the African region 2012-2025 has determined the same threshold (43).

Skilled health professionals' density is 25 per 10,000 globally, but in Liberia almost nine times less (2.9 per 10,000). The difference stems partly from different definitions of a skilled health professional, and consequently, different counting in WHO and national statistics. For international comparison, WHO includes as skilled health professionals only the following: nurses, midwives and physicians (44). There Liberia with 2.9/1.000 is the fourth to last place in the ECOWAS community and much below its nationally calculated average of 6.4/1.000 of skilled health professionals.

Maternal health services performance assessed by the proportion of births attended by skilled health personnel in Liberia at 61% is better than the ECOWAS average of 57% and the average of the African region. According to these statistics, Liberia still performs at a lower level than the global average where 3 out of 4 births (73%) were assisted by skilled health-care personnel in 2015. Performance is above average for some

indicators and far below for others (e.g., maternal vs. neo-natal mortality), the disparity points to unexplained discrepancies and mismatch of international and national definitions or validity of data. For example a comparison of maternal and neonatal mortality throughout historical periods in Liberia is misleading: researchers and authors of LDHS-2013 (page 285) (45) have rightfully warned that comparison is possible only with LDHS-2007, due to the fact that methods of estimates were significantly changed in 2007 and cannot serve for comparison with previous surveys – LSDH-1999/2000. Furthermore, the interpretation of indicators does not account for the fact that LDHS provides direct estimates of maternal mortality for *the seven years preceding each survey*.

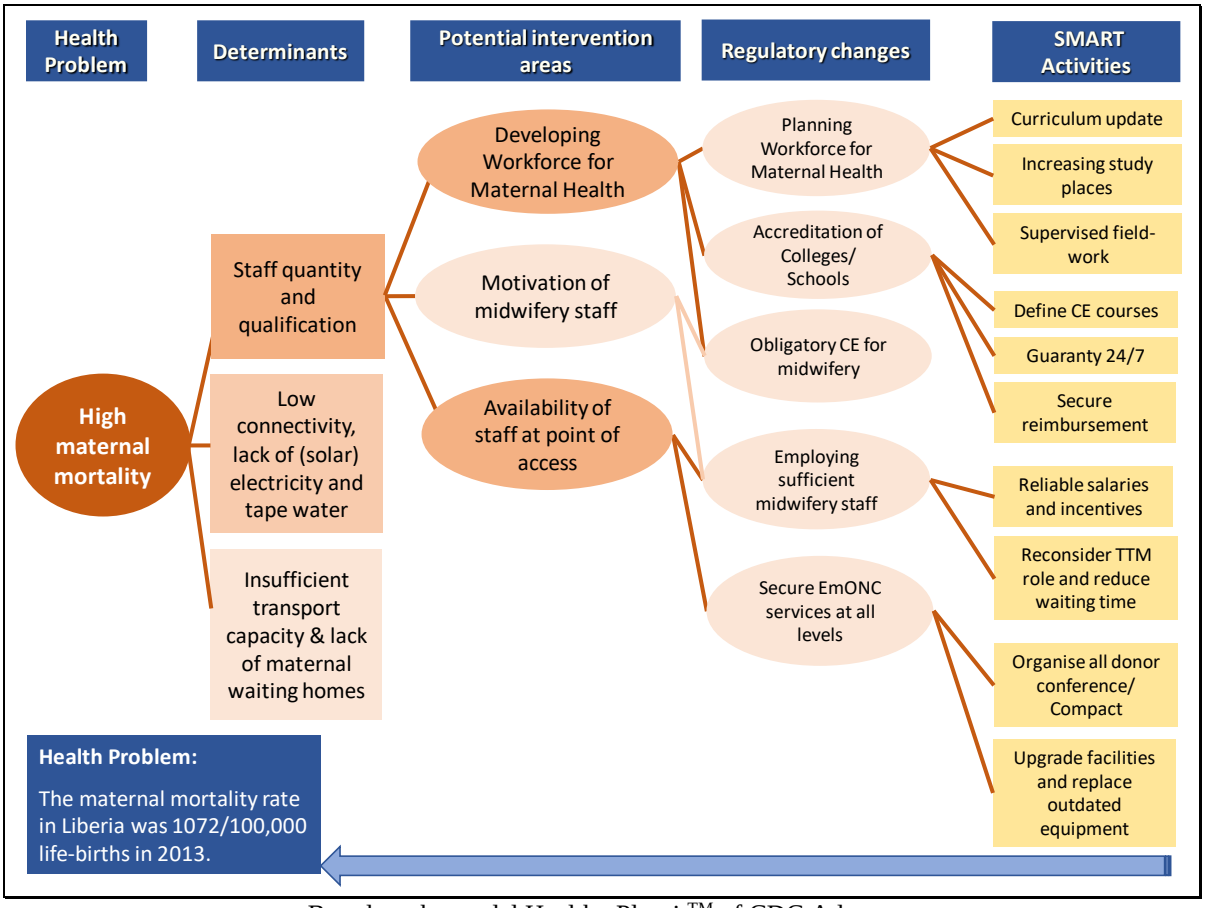
Finally, a tracer indicator, relevant for MNH and SDG-3, may serve to describe the status of the Liberian health system and its infrastructure best: "Infants receiving three doses of hepatitis B vaccine". In Liberia, only 50% of children received the vaccination in 2014 (46) (ECOWAS average 78%). Such situation is well explained in a national situation analysis (47) as a consequence of the EVD crisis (with declines not only of immunizations but also all other MNH services). The recent SARA report (48) clarifies the situation by severely compromised health system infrastructure: lack of functional refrigerators, low availability of vaccines and child immunization guidelines, high stock-out rates, and absence of the cold chain minimum requirements in even 46% health facilities. 13% are also without direct access to water, 43% without incinerator, and 45% without regular electricity.

Discussion

A main observation with regard to this policy analysis is that significant weaknesses of the national policy documents derive from missing links between objectives, realistic and measurable targets, activities with a quantifiable input, precise and controlled timelines for their implementation, and appropriate reliable budgetary allocation (49). An example of necessary links is given in figure 3.

Furthermore, Liberia (in spite of the country's low capacity) could use available opportunities to improve the insufficient registration of birth and death events. An immediate option is provided by the Multiple Indicator Cluster Survey (MICS), organized and funded by UNICEF. Preparation for the MICS 6 is ongoing in many countries (50), while Liberia implemented only the first round in 1995, with only three counties at the time (Montserrado, parts of Margibi and Bassa) though with 60% of the total Liberian population living in the same areas) (51). MICS is a valuable data source covering the reproductive health of women, health outcomes for children and adolescents, child mortality, education, water, and sanitation.

Figure 3. The complex linkage between a health problem, its determinants, areas of intervention, the regulatory framework and SMART activities



Based on the model Healthy Plan-it™ of CDC Atlanta.

A final evaluation will only be possible upon completion of all planned activities in 2021. Liberian MoH policymakers should consider more closely (during monitoring activities) the international developments, which received a final endorsement in 2017. The Universal Health Coverage (UHC) Indicators for the Sustainable Development Goals (SDGs) Monitoring Framework have been agreed on March 13, 2017 (52). The global indicator framework has been formally adopted by the United Nations General Assembly through the United Nations Economic and Social Council and will be instrumental for the national and international monitoring, evaluation,and comparison of achievements. Particularly relevant for Liberia is the SDG index, with tracer indicators that serve both for health workforce and health services' monitoring. The index comprises only 12 indicators and serves for both national and international comparisons. The latest examples of such utilization can be found in the Global strategy on human resources for health – Workforce 2030 and the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030).

Conclusions and recommendations

There are well-developed strategies in almost all health areas,but most of them are missing defined action plans with publicized targets following SMART principles, therefore correspondingly there

is a severe gap in implementation. Also, data used should be referenced, cross-checked, and critically evaluated regarding reliability and validity. It is recommended to go beyond simple presentation and analyze differences in outcomes for statistical significance, including multiple regressions to identify significant determinants of health outcomes. Analyses and the discussion of their results should always be compared to West African, African, and global parameters, not restricted to the national perspective. For intra-national comparisons, the same data sources have to be used as otherwise comparability and conclusions are jeopardized.

It is further recommended to initiate as soon as possible a process of developing new health policy documents in Liberia - for implementation after 2021 - by MoH stakeholders, involving inter-sectoral representation and independent expertise. A multidisciplinary team of health policymakers should analyze opportunities and strengths, based on existing National Development Plans (especially the Liberia Agenda for Transformation: Steps towards Liberia Rising 2030 (53)). The main intention is to have health policy documents fitting the local context and the new movement towards SDGs, strictly applying SMART principles, especially obligatory timelines and budgetary allocation as a key element of the SMART principle in realistic planning. Acknowledging the local context, already now a first step could be the revision of the national health and social welfare decentralization policy and strategy:

- Development of a roadmap 2030 for the SDGs, which will allow for implementation and monitoring after 2021 (providing transparency of fragmented implementation and a database of ongoing projects in counties) is one of the immediate tasks for the Liberian MoH.
- Strengthening of policy planning at the county level is also a priority in policy formulation, preferably by using one of the proven models for programme planning, such as Healthy Plan-it™ by CDC (Atlanta).
- Invited international expertise should be given full access to data, and Technical Assistance should have access (observer status) to policy meetings like the Health Sector Coordination Committee (HSCC) and the Pool-Fund meetings (as otherwise a lateral and vertical information exchange within the MoH is severely inhibited).

Derived from Liberian health policy documents, the situation analysis, and the literature review, the following areas may be prioritized regarding MNH services (54):

- Ensure timely, equitable, respectful, evidence-based, and safe maternal–perinatal health care, delivered through context-appropriate implementation strategies;
- Build linkages within and between maternal–perinatal and other health-care services to address the increasing diversity of the burden of poor maternal health;
- Increase the resilience and strength of health systems by optimizing the health workforce and improving facility capability;
- Guarantee sustainable financing for maternal–perinatal health; and
- Accelerate progress through evidence, advocacy, and accountability by:
  - developing improved metrics, and support implementation research to promote accountable, evidence-based maternal health care and

- translating evidence into action through effective advocacy and accountability for maternal health.

Finally, there is a significant opportunity for Liberia and all African countries to make use of the new WHO leadership and Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, who recently pointed out (55):
"Universal health coverage is ultimately a political choice. It is the responsibility of every country and national government to pursue it. Countries have unique needs, and tailored political negotiations will determine domestic resource mobilisation. WHO will catalyse proactive engagement and advocacy with global, regional, and national political structures and leaders including heads of state and national parliaments".

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References

1. LISGIS. Republic of Liberia 2008 Population and Housing Census. Analytic Report on Population Size and Composition. Monrovia, Liberia: Liberia Institute of Statistics and Geo-Information Services 2011. Available from: https://www.lisgis.net/pg_img/Population%20size%20210512.pdf (accessed: August 15, 2019).
2. Ministry of Health and Social Welfare, Republic of Liberia. National Health and Social Welfare Policy and Plan 2011-2021. Monrovia, Liberia: Ministry of Health and Social Welfare, 2010. Available from: http://moh.gov.lr/documents/policy/2019/national-health-policy-and-plan-2007-2011/ (accessed: August 15, 2019).
3. Ministry of Health, Republic of Liberia. Investment Plan for Building a Resilient Health System 2015 to 2021. Monrovia, Liberia: Ministry of Health; 2015.
4. WHO. Abuja Declaration. Abuja: Heads of State and Government of the Organization of African Unity and Federal Republic of Nigeria, 2001 Apr 27. Available from: http://www.un.org/ga/aids/pdf/abuja_declaration.pdf (accessed: August 15, 2019).
5. President of Liberia statement for the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030), page 68. Available from: http://www.who.int/life-course/partners/global-strategy/globalstrategyreport2016-2030-lowres.pdf?ua=1 (accessed: August 15, 2019).
6. Global Strategy for Women's, Children's and Adolescents' Health (2016-2030). Available from: http://www.who.int/life-course/partners/global-

strategy/globalstrategyreport2016-2030-lowres.pdf?ua=1 (accessed: August 15, 2019).
7. UN-DESA. Transforming our World: The 2030 Agenda for Sustainable Development. Available from: https://sustainabledevelopment.un.org/post2015/transformingourworld/publication (accessed: August 15, 2019).
8. Campbell J, Buchan J, Cometto G, David B, Dussault G, Fogstad H, et al. Human resources for health and universal health coverage: fostering equity and effective coverage. BullWorld HealthOrgan2013;91:853-63.
9. Bjegovic-Mikanovic V, Broniatowski R, Byepu S, Laaser U. A Gap Analysis of Mother, New-born, and Child Health in West Africa with Reference to the Sustainable Development Goals 2030. Afr J Reprod Health2018;22:123-34. DOI: 10.29063/ajrh2018/v22i4.13.
10. WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division (Maternal Mortality Estimation Inter-Agency Group (MMEIG)). Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Data files. Available from: http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2015/en/ (accessed:August 15, 2019).
11. Anderson G, Hussey PS. Influencing government policy: a framework. In: Guest C, Riccardi W, Kawachi I, Lang I. 3rd edition. Oxford Handbook of Public Health Practice. Oxford-New York: Oxford University Press; 2013.
12. Ministry of Health, Republic of Liberia. Investment Plan for Building a Resilient Health System 2015 to 2021. Monrovia, Liberia: Ministry of Health; 2015.
13. Ministry of Health and Social Welfare, Republic of Liberia. National Health and Social Welfare Policy and Plan 2011-2021. Monrovia, Liberia: Ministry of Health and Social Welfare; 2010.
14. Ministry of Health, Republic of Liberia. Investment Case for Reproductive, Maternal, Neonatal, Child and Adolescent Health 2016-2020. Monrovia, Liberia: Ministry of Health; 2016. Available from: http://www.globalfinancingfacility.org/sites/gff_new/files/documents/Liberia%20RMNCAH%20Investment%20Case%202016%20-%202020.pdf (accessed:August 15, 2019).
15. LISGIS, Ministry of Health and Social Welfare, National AIDS Control Program, ICF International. Liberia Demographic and Health Survey 2013. Monrovia, Liberia: Liberia Institute of Statistics and Geo-Information Services (LISGIS) and ICF International, 2014. Available from: https://dhsprogram.com/pubs/pdf/FR291/FR291.pdf (accessed: August 15, 2019).
16. LISGIS, Ministry of Health and Social Welfare, National AIDS Control Program, ICF International. Liberia Demographic and Health Survey 2007. Monrovia, Liberia: Liberia Institute of Statistics and Geo-Information Services (LISGIS) and ICF International, 2014. Available from: https://dhsprogram.com/pubs/pdf/fr201/fr201.pdf (accessed: August 15, 2019).
17. EPOS Health Management. The implementation of Maternal and New-born policies in the Republic of Liberia 2016/17. Deliverable 1111 part I/II. Monrovia, Liberia: Ministry of Health; 2016.
18. Ministry of Health and Social Welfare, Republic of Liberia. Roadmap for Accelerating the Reduction of Maternal and New-born Mortality 2011-2015

(updated version of the original publication in 2007). Monrovia, Liberia: Ministry of Health; 2011.
19. Ministry of Health and Social Welfare, Family Health Division. Accelerated Action Plan to Reduce Maternal and Neonatal Mortality. Monrovia, Liberia: Ministry of Health and Social Welfare; 2012.
20. Ministry of Health, Republic of Liberia. Liberia Health System Assessment. Monrovia, Liberia: Ministry of Health; 2015.
21. Ministry of Health. Liberia Service Availability and Readiness Assessment (SARA) and Quality of Care Report. Monrovia, Liberia: Ministry of Health; 2016.
22. Ministry of Health. Joint Annual Health Sector Review Report 2016. National Health Sector Investment Plan for Building a Resilient Health System. Monrovia, Liberia: Ministry of Health; 2016.
23. Ministry of Health, Republic of Liberia. Consolidated Operational Plan (FY 2016/17). Monrovia, Liberia: Ministry of Health; 2016.
24. UN. United Nations Millennium Declaration. New York: Millennium Summit of the United Nations; 2000. Available from: http://www.un.org/en/development/devagenda/millennium.shtml (accessed: August 15, 2019).
25. UN-DESA. Transforming our World: The 2030 Agenda for Sustainable Development. Available from: https://sustainabledevelopment.un.org/post2015/transformingourworld/publication (accessed:August 15, 2019).
26. Fehling M, Nelson BD, Venkatapuram S. Limitations of the Millennium Development Goals: a literature review. Glob Public Health 2013;8:1109-22. Available from: http://dx.doi.org/10.1080/17441692.2013.845676(accessed: August 15, 2019).
27. Global Strategy for Women's, Children's and Adolescents' Health (2016-2030). Available from: http://www.who.int/life-course/partners/global-strategy/globalstrategyreport2016-2030-lowres.pdf?ua=1 (accessed: August 15, 2019).
28. UN Development Group. Mainstreaming the 2030 Agenda for Sustainable Development. Reference Guide to UN Country Teams. 3rd revision. New York: United Nations Development Group 2017. Page 16. Available from: https://undg.org/wp-content/uploads/2017/03/UNDG-Mainstreaming-the-2030-Agenda-Reference-Guide-2017.pdf (accessed: August 15, 2019).
29. African Union. Africa Health Strategy 2016 – 2030. Available from: https://www.au.int/en/documents/30357/africa-health-strategy-2016-2030 (accessed: August 15, 2019).
30. International Health Partnership for UHC 2030. Available from: https://www.internationalhealthpartnership.net/en/ (accessed: August 15, 2019).
31. First meeting of UHC2030 working group on Sustainability, Transition from Aid and Health System Strengthening. Available from: https://www.internationalhealthpartnership.net/en/news-videos/article/first-meeting-of-uhc2030-working-group-on-sustainability-transition-from-aid-and-health-system-strengthening-401839/ (accessed: August 15, 2019).
32. International Health Partnership for UHC 2030. Available from: http://www.nationalplanningcycles.org/planning-cycle/LBR/ (accessed: August 15, 2019).
33. Kentoffio K, Kraemer JD, Griffiths T, Kenny A, Panjabi R, SechlerGA,et al.

Charting health system reconstruction in post-war Liberia: a comparison of rural vs. remote healthcare utilization. BMC Health Serv Res 2016;16:478. DOI**:** 10.1186/s12913-016-1709-7.
34. Shoman H, Karafillakis E, Rawaf S. The link between the West African Ebola outbreak and health systems in Guinea, Liberia and Sierra Leone: a systematic review. Glob Health2017;13:1. DOI: 10.1186/s12992-016-0224.
35. Ministry of Health, Republic of Liberia. Available from: http://moh.gov.lr/press-release/2019/moh-holds-two-day-medical-training/(accessed: August 15, 2019).
36. Ministry of Health and Social Welfare, Republic of Liberia.Roadmap for Accelerating the Reduction of Maternal and New-born Mortality 2011-2015 (updated version of the original publication in 2007). Monrovia, Liberia: Ministry of Health; 2011.
37. "Government has constructed throughout the country over 10,000 km of primary, secondary and feeder roads, 650 of which has been paved." (According to the Ministry of Public Works. Available from: http://mpw.gov.lr (accessed: August 15, 2019).
38. Estimates generated by the UN Inter-agency Group for Child Mortality Estimation (IGME) in 2015. Available from: https://data.unicef.org/topic/child-survival/neonatal-mortality/ (accessed: August 15, 2019).
39. UN Economic and Social Council, Statistical Commission. Report of the Inter-agency and Expert Group on Sustainable Development Goal Indicators: Revised list of global Sustainable Development Goal indicators; 15-49. Available from: https://unstats.un.org/unsd/statcom/48th-session/documents/2017-2-IAEG-SDGs-E.pdf (accessed: August 15, 2019).
40. UN Economic and Social Council. Progress towards Sustainable Development Goals. Report of the Secretary General. E/2016/75. Available from: http://undocs.org/E/2016/75(accessed: August 15, 2019).
41. World Fertility Data 2015. New York (NY): United Nations, Department of Economic and Social Affairs, Population Division; 2015. Available from: http://www.un.org/en/development/desa/population/publications/dataset/fertility/wfd2015.shtml (accessed: August 15, 2019).
42. WHO. Health Workforce. Available from: http://www.who.int/hrh/workforce_mdgs/en/ (accessed: August 15, 2019).
43. WHO, African Health Observatory. Road map for scaling up human resources for health for improved health service delivery in the African Region 2012–2025. Available from: https://www.aho.afro.who.int/en/ahm/issue/18/reports/road-map-scaling-human-resources-health-improved-health-service-delivery (accessed: August 15, 2019).
44. WHO. Health Workforce. Available from: http://www.who.int/gho/publications/world_health_statistics/2016/whs2016_AnnexA_HealthWorkforce.pdf (accessed: August 15, 2019).
45. Liberia Institute of Statistics and Geo-Information Services (LISGIS), Ministry of Health and Social Welfare [Liberia], National AIDS Control Program [Liberia], and ICF International. 2014. Liberia Demographic and Health Survey 2013. Monrovia, Liberia: Liberia Institute of Statistics and Geo-Information Services

(LISGIS) and ICF International, 2014. Available from: https://dhsprogram.com/pubs/pdf/FR291/FR291.pdf (accessed: August 15, 2019).
46. WHO/UNICEF coverage estimates 2014 revision. July 2015. Available from: http://www.who.int/immunization/monitoring_surveillance/routine/coverage/en/index4.html (accessed: August 15, 2019).
47. Ministry of Health, Republic of Liberia. Investment Plan for Building a Resilient Health System 2015 to 2021. Monrovia, Liberia: Ministry of Health; 2015.
48. Ministry of Health, Republic of Liberia. Liberia Service Availability and Readiness Assessment (SARA) and Quality of Care Report. Monrovia, Liberia: Ministry of Health; 2016.
49. University of California. SMART Goals: A How to Guide. Available from: https://www.ucop.edu/local-human-resources/_files/performance-appraisal/How%20to%20write%20SMART%20Goals%20v2.pdf(accessed: August 15, 2019)).
50. UNICEF. Statistics and Monitoring: Multiple Indicator Cluster Survey. Available from: https://www.unicef.org/statistics/index_24302.html (accessed: August 15, 2019).
51. Ministry of Planning and Economic Affairs, Ministry of Health and Social Affairs, UNICEF. Liberia Multiple-Indicator Cluster Survey 1995. Available from: https://mics-surveys-prod.s3.amazonaws.com/MICS1/West%20and%20Central%20Africa/Liberia/1995/Final/Liberia%201995%20MICS_English.pdf (accessed: August 15, 2019).
52. UN. SDG Monitoring and Reporting Toolkit for UN Country Teams. Available from: https://unstats.un.org/sdgs/unct-toolkit/(accessed: August 15, 2019)).
53. Ministry of Finance and Development Planning, Republic of Liberia. National Development Plan, Republic of Liberia Agenda for Transformation: Steps towards Liberia Rising 2030; 2016. https://www.mfdp.gov.lr/index.php/national-development-plan (accessed: August 15, 2019).
54. Koblinsky M, Moyer CA, Calvert C, Campbell J, Campbell OM, Feigl AB,at al. Quality maternity care for every woman, everywhere: a call to action. The Lancet 2016;388:2307-20.Available from: http://dx.doi.org/10.1016/S0140-6736(16)31333-2 (accessed: August 15, 2019).
55. WHO. All roads lead to universal health coverage. Available from: http://www.who.int/mediacentre/commentaries/2017/universal-health-coverage/en/ (accessed: August 15, 2019).