

ORIGINAL RESEARCH ARTICLE

Maintaining continuity of essential reproductive, maternal, neonatal, child and adolescent health services during the COVID-19 pandemic in Francophone West Africa

DOI: 10.29063/ajrh2021/v25i2.7

Yves Mongbo^{1*}, Issiaka Sombié¹, Blami Dao², Ermel AK Johnson¹, Léopold Ouédraogo³, Fatim Tall³, Chilanga Asmani³, Kofi Busia¹, Nanlop Ogbureke¹, Marguerite Ndour⁴, Isidore Y Sinkondo⁴

West African Health Organization; Bobo-Dioulasso, Burkina Faso¹; Jhpiego, 1045 Boulevard Ratag-Rima, Gounghin Sud, Ouagadougou, Burkina Faso²; World Health Organization, Africa Regional Office³; Integrated FP / MNCH / Nutrition Project, IntraHealth International | Because Health Workers Save Lives Ouagadougou, Burkina Faso⁴

*For Correspondence: Email: ymongbo@wahooas.org; Phone: +226 74 10 62 62

Abstract

The study aimed to analyse the challenges and solutions for maintaining the continuity of essential health services during the COVID-19 pandemic in Francophone West Africa. A cross-sectional study involving the managers of Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) and vaccination programmes in Francophone West Africa was designed. The challenges that limited the supply and use of RMNCAH services included: lack of standardized guides and procedures for appropriate care, limited knowledge of health workers on the new coronavirus disease, lack of diagnostic materials and kits, ineffective organization of services, anxieties of health workers and populations, and postponement of immunisation mass campaigns. The solutions proposed to address these challenges, included better organization of services to respect the physical distance, provision of adapted guides and care procedures, enhanced communication, training of health workers, effective use of social media and information and communication technologies. This study showed that the managers of RMNCAH programmes are aware of the challenges that could limit the supply and use of essential services during the COVID-19 pandemic. (*Afr J Reprod Health 2021; 25[2]: 76-85*).

Keywords: Maintenance; essential services; RMNCAH; COVID-19; Francophone West Africa

Résumé

L'étude visait à analyser les défis et les solutions pour maintenir la continuité des services de santé essentiels pendant la pandémie COVID-19 en Afrique de l'Ouest francophone. Une étude transversale impliquant les responsables des programmes de santé reproductive, maternelle, néonatale, infantile et des adolescents (SRMNIA) et de vaccination en Afrique de l'Ouest francophone a été conçue. Les défis qui ont limité l'offre et l'utilisation des services de SRMNIA comprenaient : le manque de guides et de procédures standardisés pour des soins appropriés, les connaissances limitées des travailleurs de la santé sur la nouvelle maladie à coronavirus, le manque de matériel et de kits de diagnostic, l'organisation inefficace des services, l'anxiété des travailleurs de la santé et des populations, et le report des campagnes de vaccination de masse. Les solutions proposées pour faire face à ces défis, comprenaient une meilleure organisation des services pour respecter la distance physique, la fourniture de guides et de procédures de soins adaptés, une communication renforcée, la formation des travailleurs de la santé, l'utilisation efficace des médias sociaux et des technologies de l'information et de la communication. Cette étude a montré que les responsables des programmes du SRMNIA sont conscients des défis qui pourraient limiter l'offre et l'utilisation des services essentiels pendant la pandémie COVID-19. (*Afr J Reprod Health 2021; 25[2]: 76-85*).

Mots-clés: Maintien, services essentiels, SRMNIA, COVID-19, Afrique de l'Ouest francophone

Introduction

Epidemics lead to a reduction in the supply and use of essential health services, including reproductive, maternal, neonatal, child, adolescent health and immunisation services¹⁻⁸. With the outbreak of the

new coronavirus in late December 2019, and declared as a global health emergency in January 2020 and a pandemic in March 2020, studies are now showing that this disease too, could reduce the supply and use of essential health services⁹⁻¹⁴. In West Africa, studies project that the impact of the

COVID-19 pandemic will reduce the supply and use of RMNCAH services in several countries including Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, Niger and Senegal¹⁵⁻²². One of the implications of this disease for the health systems is hospital-acquired infection transmission among some health workers, which in some cases, has led to deaths among workers²³. This creates many psychological problems for health workers^{24,25}, including the fear of being infected in addition to the long or short-term reduction of health workers, usually responsible for providing essential services. This could result in a reduction in the supply of essential health services. The most affected services seem to be those of RMNCAH care, as well as non-communicable diseases (diabetes, hypertension), which are contributing factors that worsen the progression of the COVID - 19. Consequently, the World Health Organisation (WHO) and other partner institutions have developed guides to help countries organize the continuous supply of essential health services during the pandemic^{26,27}.

The managers of RMNCAH programmes and health workers must be encouraged to effectively and efficiently own and use the WHO's "Operational guidance for maintaining essential health services during an outbreak" (Interim guidance, 25 March 2020) during the COVID-19 pandemic and the other international directives to combat COVID-19. In preparation for a technical dissemination of the guide to managers of RMNCAH programmes in francophone West Africa, several international health institutions conducted a rapid assessment of RMNCAH and immunisation managers. These assessments helped to better understand the challenges they encountered in the organisation and provision of essential health services and above all, to identify the solutions they proposed to reduce the effect of the pandemic on these services. The present work sums up the assessment results that will help to better set up support and monitoring systems for countries to re-organize their health services during the pandemic.

Methods

Study design

A cross-sectional study involving the managers of RMNCAH and immunisation programmes in nine Francophone countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, Niger, Senegal, Togo,) in West Africa was conducted. The participants were the managers of Expanded Programme on Immunisation (EPI), or Reproductive and Family Health (RFH) / Maternal, Newborn, Child and Adolescent Health (MNCAH) Division at the Ministries of Health of the nine francophone West African countries.

Inclusion criteria

The inclusion criteria of the study was being manager of EPI or RFH/MNCAH Division at the Ministry of Health of the nine francophone countries in West Africa.

Sample size

All the managers occupying the three positions mentioned above in the nine French-speaking countries i.e. 18 participants were included in the study.

Data collection techniques and tools

A questionnaire was developed based on the six axes of the WHO first interim guidance of 25 March for the maintenance of essential services during the COVID-19 pandemic (establishment of patients flow, supply of essential RMNCAH services, redefinition of priorities in the supply of services including the private sector, establishment or adaptation of simplified care mechanisms, evaluation and monitoring in the continuous supply of services and availability of products of vital importance); and one additional axis on the availability of human resources was introduced. In total, the questionnaire contained 7 questions related to the 7 axes.

Respondents were given 8 days to complete and return the questionnaire. The information collected by the questionnaire included for each of the seven axes the challenges and proposed solutions to address these challenges. The questionnaire was sent by e-mail in April 2020 by the first author to all the 18 managers of RMNCAH and vaccination programmes of the nine francophone countries in West Africa. A recall message was sent regularly. In total four reminders were sent.

Data analysis

The collected data were entered in excel sheet per axe. A manual thematic grouping of challenges and proposed solutions was realized. The first results have been presented during a regional webinar where the participants included the countries EPI and RMNCAH programmes managers, representatives of technical and financial partners, Non-Governmental Organisation (NGO), professional associations and civil society. The questions and discussion permit to validate the data.

Results

Twelve out of the 18 managers of RMNCAH and immunisation programmes completed and returned the questionnaire. Among these, it was noted that 8 were managers of reproductive, maternal and child health programs, while 4 were managers of vaccination programmes. Among the 12 officials who completed the questionnaire, only 8 declared that they were members of the national coordination team for the fight against COVID-19, three stated that they were not members and one did not make any comment on the issue. Of the 12, there were 10 men and 2 women.

Table 1 presents all challenges and solutions proposed stratified by the WHO guide axes. The first results of this study were presented during a webinar on 23rd April 2020 for managers of RMNCAH programmes, representatives of technical and financial partners, NGOs, professional associations and civil society.

We identified the following challenges and solutions based on the WHO guide axes.

Establishing patients' flow

The main challenges with patient flow concerned a lack of standardized procedures and insufficient facilities. The lack of standardized procedures also created challenges for health worker knowledge platforms, knowing how to triage COVID-19 and identify patients. Managers reported that the lack of facilities made it difficult to isolate patients and maintain appropriate physical distancing. Managers recommended several easy to implement solutions to help alleviate these challenges. Re-organization of the space within facilities could allow for isolation rooms and proper physical distancing measures. Managers also reported that standardized procedures could help health workers know how and when to treat patients and support a triaging system.

Provision of essential RMNCAH services

In the continued provision of essential RMNCAH services, study participants noted several challenges including lack of a framework, misinformation about availability of services, community and provider fears, and non-compliance with physical distancing at health centers and during mass vaccination campaigns. Respondents recommended provision of personal protective equipment for health workers; regular disinfection of health centers; reorganization of service delivery including postponing several non-essential activities; and increased use of telemedicine, digital health and social media platforms to overcome these challenges.

Priorities in the supply of services and care mechanisms

Study participants noted the challenge of defining the priorities in service provision and adapting protocols for COVID-19. Definition of service priorities, communication about those priorities and

Table 1: Challenges and solutions for maintaining essential services during the COVID-19 pandemic in Francophone West Africa

Challenges	Suggested solutions
Establishment of an efficient patients' flow (including screening, sorting and targeted referral of COVID-19 and non-COVID-19 cases) within health centers	
Adequate knowledge of personnel on COVID-19 (case definition, etc.)	Train all staff of health centers on the reorganization of services to better understand the case definition of COVID-19 Strengthen the skills of service providers on COVID-19
Inadequate technical platform / Adequate working environment	Reinforce the technical platform with medico-technical equipment (delivery box, newborn reaction equipment, insertion and removal equipment for intra-uterine devices (IUDs), blood pressure monitor, weighing scale; BB weight, height gauge, pulse oximeter, etc.) Provide technical platform / Reorganization of the working environment
Non availability of triage system in health centers	Reorganise services by defining a route of patients in health establishments Systematically search for suspected cases on the basis of a standard questionnaire
Non availability of infection prevention and control equipment	Equip health centers with sufficient prevention materials to ensure the protection of health personnel and users of these services
Limited screening tests	Provide health centers with sufficient quantities of COVID-19 tests and screening kits
Non availability of guidelines	Provide directives from the Ministry of Health on the continuity of preventive and curative care in all health districts with service organizations to help reduce the circulation of the virus.
Provide essential FP services	
Create a safe environment for the health workers and users	Make available protective and qualitative devices for healthcare personnel in due time Disinfect the rooms regularly (reception, consultation, hospitalization, delivery, operating, administration rooms)
Continued supply of services	Equip health centers with weighing equipment (scales and rods) Train staff on appointment management to avoid congestion during peak hours Teleconsultation: professionals and learned societies from several specialties got organized very early to offer to patients distance consultations and orientations (WhatsApp groups), eHealth, mHealth Support the implementation of the "strengthening the continuity of maternal, neonatal and child health services Project during the COVID-19 pandemic"
Rumours and misinformation Postponement / slowdown of activities	Reinforce communication with the population on keeping the essential services Keep preventive services working to prevent grouping
Risk of reduced supply of essential care	Organize essential services as soon as security conditions are met
Fear of the stigmatization of services and families affected by COVID-19	Educate and raise people awareness and commitment
Decrease in the use of immunization services	Reinforce advanced and mobile strategies (the districts received funds in March 2020 for the implementation of the strategies advanced by the managers of health centers for the months of April, May and June)
Vaccination rumours that revolve around the COVID-19 hence the refusal of routine vaccination	Undertake Public Awareness campaigns
Respond to the major concerns of the population	Undertake Public Awareness campaigns
Continued supply of essential health services	Wide dissemination of WHO technical guidelines on vaccination
Availability of services in certain proportions,	Teleconsultation: to be preferred, when relevant
Compliance with barrier measures (one meter distance between patients)	Provide health centers with additional benches and tents Embark on advocacy campaigns

Challenges	Suggested solutions
Availability of financial resources in time to take into account the new redefined priorities since these do not appear in the annual work plans and all the new funds are intended for the response to COVID-19	Reallocate financial resources Ensure flexibility in TFP funding Simplify procedures for obtaining new funding or redirect funds to take into account new priorities and implement related activities
Continued availability of ambulances in all areas for referrals and evacuations for childbirth or other obstetric emergencies	Provide ambulance services or the evacuate emergency cases
Centralized COVID-19 case management	Decentralize COVID-19 case management centers
Redefinition of priorities in the supply of services including with the private sector	
Definition of a list of essential services for each area	Development of a memorandum defining the essential services to prioritize and maintain Develop plans to translate these priorities
Establishment (or adaptation) of simplified care mechanisms	
Availability (reproduction and dissemination) of the national document "conduct in obstetric gynaecology, neonatology during the pandemic of coronavirus infection" in all health centers	Develop simplified protocols taking into account the context of COVID-19
Approval of new prevention and treatment protocols integrating COVID-19 into the service offer	Training of all health personnel on new prevention and care protocols integrating COVID-19 into the service offer. Make these documents available to service providers. Reproduce and distribute the national document "How to cope with obstetric gynaecology, neonatology during the pandemic of coronavirus infection" in all health centers
Monitoring and Evaluation of the continuity of essential services	
Means (prevention, financial) for the continuity of the evaluation and monitoring of the supply of essential health services	Organize supervision and support missions to health centers with a large influx of childbirth, CPN and vaccination Provide financial support to carry out monitoring / supervision for the provision of continuous essential health services; Ensure effective functioning of monitoring and evaluation units and the health centers
Insufficient data monitoring process	Establish a digital system for monitoring the implementation of RMNCAH activities
Supply of vital medicines and products	
Anticipating shortages	Organize the sessions of the national health product supply committees (NHPSC) to define the best strategies that contextualises the current pandemic Readjust the ordering of RH/FP products Use cargo flights to transport products of vital importance Ensure rigorous inventory management, supply to end users and rational prescription of products at different levels to avoid shortages. Strengthen security stocks and seek emergency funds to remedy the situation
Existence of stock shortages	Support the units responsible for the management of drugs and other essential health products such as vaccines, reagents, blood, essential consumables and inputs and ambulances, for mothers, new-borns and children Establish in each health district, an emergency management system involving all the actors concerned (the DCM, the heads of service at the EPS level and health center, the nurse station heads, midwives, drivers, relays and the Bajenu Gox) Organize the districts into areas of intervention for ambulances for efficiency (less than 2 hours of time) Inform the populations about the existence of the system Situation is shared with partners (UNICEF and Gavi)
Availability of personnel required for the service offer	
Health workers' availability (insufficient number, contamination)	Ensure availability of adequate personnel in health facilities: reposting, recruitment, assignment, skills enhancement, etc. Reinforce staff (speed up the process of posting new recruited agents and professionals at the end of training)

Challenges	Suggested solutions
Motivation of the personnel	Create a special system of motivation (material and moral) for health personnel
Unequal distribution of care providers at the level of health centers	Equip health structures with sufficient prevention materials to ensure the protection of health personnel and users
Adequate staff turnover	Reorganise health centers by emphasizing the training of health providers on COVID-19;
Insufficient training and information for staff on COVID-19 in relation to continuity of services and its protection	Ensure strict compliance with barrier measures and new patient management protocols incorporating COVID-19

the provision of simplified algorithms and protocols were recommended solutions.

Evaluation and monitoring

The biggest challenge to evaluation and monitoring during the pandemic was lack of resources. In addition to increased resources, the respondents recommended use of digital tools for data collection among the solutions.

Availability of vitally important products

The majority of study respondents noted that availability of vitally important products was a particular challenge. They identified several solutions that included better management of existing stocks, reorganization of supply plans and use of innovations such as cargo flights during pandemics.

Availability of human resources

Among the human resource challenges were the insufficient number of available staff reported by all study participants, potential cases of contamination of health care workers, poor distribution and low motivation of health care workers as well as lack of information among providers on COVID-19. Respondents recommended increased recruitment and better distribution of health care workers during the pandemic as well as provision of PPE and creative mechanisms to improve motivation.

Discussion

Main results and implications for health services

This work has shown that some managers of essential health programmes were not members of

the national teams coordinating the response to the COVID-19 pandemic in their countries. It was found that the managers of RMNCAH and immunization programs had knowledge of the challenges that could limit the continuation of essential health services during the pandemic and had proposed solutions for mitigating them. The analysis of the responses also showed that countries' COVID-19 response teams did not always include managers of essential health services and other sectors²⁸. This absence could diminish its importance in the national discourse, and therefore its prioritization, although the guide specifically indicates it as a requirement. Advocacy and awareness-raising targeting political decision-makers are necessary for the integration of an essential services coordinator within national response teams, which will allow the organization of essential care to be taken into account as a dimension of an integrated response of countries to the COVID-19 pandemic²⁹.

The challenges reported, such as the cessation of certain activities, have been reported³⁰, notably in Italy where in Lombardy at the beginning of the epidemic the activities of routine immunization services were suspended from February 24 to April 14, 2020³⁰. This Italian experience showed the importance of identifying children who have missed their vaccination for them to catch up as soon as activities resumed. In South Africa, the same challenges reported by health workers in maternal and child health services were also reported in tuberculosis and HIV care services³². Also, the solutions suggested by health workers, notably better organization of services, training of health workers, increase in the numbers of health workers, promotion of the testing for COVID-19, development of guides, provision of personal protective equipment, introduction of

information technology among others, were those which were proposed by the authors in South Africa for maintaining health services for the treatment of tuberculosis and HIV³².

The solutions proposed are in line with the WHO guide, but as to whether or not they were being implemented was not asked. Asking this question would have shown whether or not the managers were capable of leading in adapting delivery of essential services to new situations. This leadership is an important element because in the face of epidemics with scarce resources, the tendency is for countries to focus only on epidemics or pandemics, to provide the needed urgent responses. Usually the managers, who are members of the response teams, will be able to influence decisions at the highest level to ensure the continuity of essential health services during the pandemic. These managers would then be able to use the guide to develop plans for adoption within response teams to benefit from funds and especially Personal Protective Equipment (PPE) and infection-prevention and control materials. This is because as part of the response to epidemics and pandemics, the highest decision makers must engage with them to develop coherent and unified responses and then communicate them to citizens. To play their role effectively, they must take ownership of the guide and disseminate them among their colleagues in the response teams.

To succeed in their mission, the technical and financial partners, NGOs, professional health organizations and patient associations should also help them to develop plans with suitable choices, applicable in their context, to have them adopted within the response teams and help mobilize funds for their implementation. The study of the potential impact of the COVID-9 pandemic on the supply and use of essential health services published in Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, Niger and Senegal¹⁵⁻²², will have to be carried out in other countries for awareness raising and advocacy with decision-makers. In addition, the partners should provide support for the organization of training course on the COVID-19 disease and on the IPC for the personnel in charge of reproductive, maternal neonatal child and

adolescent health (RMNCAH) services, as it reinforces the self-confidence of the health workers as it has been shown, limit their stress and the risk of hospital-acquired infections³³; especially since an approach has been published to reduce hand recontamination at the level of a triage service³⁴.

Lessons learnt

This study provided lessons for ensuring the maintenance of essential health care services during epidemics, natural disasters and other shocks exogenous to the health system. For example, it was found that the current organization of essential health care services was not optimal for ensuring the provision of care in a pandemic context of the magnitude of COVID-19. In addition, it is important to build the capacity of health personnel on the management of essential health care services in times of health crises or natural disasters. This requires the development and availability of clear, validated guides and protocols to ensure the maintenance of essential health care services while ensuring the safety and security of health center users. The guide shared in this study have enabled countries such as Burkina Faso, Guinea and Senegal to develop their national plans for maintaining essential health care services. Finally, the systematic involvement of a focal point for essential health care services in the national coordinating committee is crucial as it could ensure that measures for maintaining these services are taken into account in the national plan for responding to health emergencies, epidemics and natural disasters. Moreover, it is vitally important to advocate making it possible.

Short and medium term outlooks

This study provided lessons for ensuring the maintenance of essential health care services during epidemics, natural disasters and other shocks exogenous to the health system. The lessons learned from this study and the interventions carried out to maintain essential health care services during epidemics deserve to be strengthened and sustained. The prospects following this study are both programmatic and strategic. If they are not

represented, the managers of the different health programs related to essential health care should find a mechanism to have their needs taken into account in the national coordination and response plan of the COVID-19. This requires the advocacy from the different partners who support the countries in the fight against COVID-19. This could also be done through joint meetings of exchanges between the different persons in charge of essential services with the production of summary notes for the attention of the national committee for the fight against COVID-19. In addition, the technical and financial partners of the countries can draw the attention of the authorities to the need to take into account the needs for the maintenance and continuity of essential health care services during epidemics and natural disasters. The holding of information meetings and exchanges on field experiences in the maintenance of essential health care services can make it possible to reinforce the achievements, share best practices and update knowledge. This can be done through regular virtual meetings or even the establishment of a community of practice such as the one on postpartum family planning integrated with maternal and neonatal health and nutrition promoted by WHO, WAHO, JHPIEGO, INSPIRE, FP 2020 that played a role in supporting some countries (Burkina Faso, Guinea, Senegal) to develop the "Continuity Plan". In the long term, it would be important to involve the managers of essential health services programs in the coordinating committees for health emergency response. This will make it possible to sensitize epidemic management actors on the aspects of maintaining basic services and considering them in public health interventions during health emergencies. In another measure, the establishment of a collaborative framework bringing together public and private actors, communities and technical and financial partners on the organization of health services, their adaptation and maintenance during health emergencies and natural disasters will ensure good adherence to public health measures and the relaying of good information to communities. The integration of aspects of maintaining essential services during health

emergencies in the training of field epidemiologists supported by WAHO could be envisaged to some extent.

Limitations

Our study has limitations. Indeed, it concerned only the nine francophone countries of West Africa, while we know that the organization of services and the socio-cultural context may differ between francophone and Anglophone countries. As a result, we may have lacked elements that could further enrich our study. Similarly, six managers from these nine francophone countries did not respond to the questionnaire despite four reminders. This could have denied us the opportunity to consider the unique circumstances of these countries. Despite these limitations, the results obtained by our study are of sufficient interest, especially at this time of the pandemic in the region, concerning the measures and provisions necessary for an integrated global response promoting the continuity of essential RMNCAH services in the countries concerned.

Ethical approval

All participants were informed that the collected data could be the subject of scientific publication and have agreed on the issue. The questionnaires were anonymous without any personal identifiers. All responses to the study were saved in password-protected computer hard drives and can only be accessed by study researchers.

Conclusion

This study has highlighted the challenges faced by the managers of reproductive, maternal and child health programs in francophone countries in West Africa in maintaining the continuity of essential health services during the COVID-19 pandemic, as well as the solutions for mitigating these challenges. It showed that countries in the region have learned from the Ebola virus epidemic that occurred from 2014-2016. Above all, the study could help partners and other development agencies in providing appropriate and effective support to

countries with a view to having an integrated global strategy for maintaining the continuity of essential health services during the COVID-19 pandemic.

Competing interests

The authors declare no competing interest.

Acknowledgements

The authors thank the Directors of Maternal, Neonatal, Child and Adolescent Health programmes in Francophone countries in West Africa (Benin, Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, Niger, Senegal and Togo) for their contribution during the data collection.

Contribution of authors

YM and IS initiated and conceptualized the study. YM, IS and EJ collected and analysed the data. YM, IS and EJ wrote the first draft of the paper. BD, LO, FT, CA, KB, NO, MN and IYS reviewed and provided comments on the first draft of the paper. All the authors reviewed and approved the final manuscript.

References

1. Wilhelm JA and Helleringer S. Utilization of non-Ebola health care services during Ebola outbreaks: a systematic review and metaanalysis. *J Glob Health* 2019; 9: 010406. 7 WHO. Managing epidemics: key facts about major deadly diseases. May, 2018 <https://www.who.int/emergencies/diseases/managing-epidemics/en/> (accessed May 17, 2020).
2. Sochas L, Channon AA and Nam S. Counting indirect crisis-related deaths in the context of a low-resilience health system: the case of maternal and neonatal health during the Ebola epidemic in Sierra Leone. *Health Policy Plan* 2017; 32 (suppl 3): 32–39.
3. Elston JWT, Moosa AJ, Moses F, Walker G, Dotta N, Waldman RJ and Wright J. Impact of the Ebola outbreak on health systems and population health in Sierra Leone. *J Public Health (Oxf)* 2016; 38: 673–78.
4. Elston JWT, Cartwright C, Ndumbi P and Wright J. The health impact of the 2014-15 Ebola outbreak. *Public Health* 2017; 143: 60–70.
5. Chang HJ, Huang N, Lee CH, Hsu YJ, Hsieh CJ and Chou YJ. The impact of the SARS epidemic on the utilization of medical services: SARS and the fear of SARS. *Am J Public Health* 2004; 94: 562–64.
6. Rust G, Melbourne M, Truman BI, Daniels E, Fry-Johnson Y and Curtin T. Role of the primary care safety net in pandemic influenza. *Am J Public Health* 2009; 99 (suppl 2): S316–23.
7. Brolin Ribacke KJ, Saulnier DD, Eriksson A and von Schreeb J. Effects of the west Africa Ebola virus disease on health-care utilization—a systematic review. *Front Public Health* 2016; 4: 222.
8. Jones SA, Gopalakrishnan S, Ameh CA, White A and Broek NR. Women and babies are dying but not of Ebola': the effect of the Ebola virus epidemic on the availability, uptake and outcomes of maternal and newborn health services in Sierra Leone. *BMJ Global Health* 2016; 1: e000065. doi:10.1136/bmjgh-2016-000065)
9. Gilbert M, Pullano G, Pinotti F, Valdano E, Poletto C, Boëlle PY, D'Ortenzio E, Yazdanpanah Y, Eholie SP, Altmann M, Gutierrez B, Kraemer MUG, and Colizza V. Preparedness and vulnerability of African countries against importations of COVID-19: a modelling study. *Lancet* 2020; 395: 871–77.
10. Ji Y, Ma Z, Peppelenbosch MP and Pan Q. Potential association between COVID-19 mortality and health-care resource availability. *Lancet Glob Health* 2020; 8: e480.
11. Schwartz DA and Graham AL. Potential maternal and infant outcomes from coronavirus 2019-nCoV (SARS-CoV-2) infecting pregnant women: lessons from SARS, MERS, and other human coronavirus infections. *Viruses* 2020; 12: E194.
12. Marsh AD, Muzigaba M, Diaz T, Requejo J, Jackson D, Chou D, Cresswell JA, Guthold R, Moran AC, Strong KL, Banerjee A, and Soucat A. Effective coverage measurement in maternal, newborn, child, and adolescent health and nutrition: progress, future prospects, and implications for quality health systems. *Lancet Glob Health* 2020; 8: e730–36.
13. World Food Programme. COVID-19 will double number of people facing food crises unless swift action is taken. April 21, 2020. <https://www.wfp.org/news/COVID-19-will-double-number-people-facing-food-crises-unless-swift-action-taken> (accessed April 22, 2020).
14. Ismail S, Mounier-Jack S, Glassman A, Yadav P, Baker P and Kidou C. Maintaining Essential Services in the Time of COVID-19: Vaccination Delivery in Low- and Middle-Income Countries. <https://www.cgdev.org/blog/maintaining-essential-services-time-COVID-19-vaccination-delivery-low-and-middle-income> (Accessed May 17, 2020)
15. Préserver les services de santé essentiels pendant la pandémie Benin. https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Benin-COVID-Brief_GFF-FR.pdf (Accessed May 17, 2020)
16. Préserver les services de santé essentiels pendant la pandémie Burkina Faso. https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Burkina-Faso-COVID-Brief_GFF-FR.pdf (Accessed May 17, 2020)

- w/files/documents/Burkina-Faso-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
17. Préserver les services de santé essentiels pendant la pandémie Côte d'Ivoire. https://www.globalfinancingfacility.org/sites/gff_new/files/documents/CIV-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 18. Préserver les services de santé essentiels pendant la pandémie Guinée https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Guinea-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 19. Préserver les services de santé essentiels pendant la pandémie Mali https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Mali-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 20. Préserver les services de santé essentiels pendant la pandémie Mauritanie https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Mauritania-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 21. Préserver les services de santé essentiels pendant la pandémie Niger https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Niger-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 22. Préserver les services de santé essentiels pendant la pandémie Sénégal https://www.globalfinancingfacility.org/sites/gff_new/files/documents/Senegal-Covid-Brief_GFF-FR.pdf (Access May 17, 2020)
 23. Zheng L, Wang X, Zhou C, Liu Q, Li S, Sun Q, Wang M, Zhou Q and Wang W. Analysis of the infection status of the health care workers in Wuhan during the COVID-19 outbreak: A cross-sectional study. *Clin Infect Dis.* 2020 May 15. pii: ciaa588. doi: 10.1093/cid/ciaa588. [Epub ahead of print]
 24. Li G, Miao J, Wang H, Xu S, Sun W, Fan Y, Zhang C, Zhu S, Zhu Z and Wang W. Psychological impact on women health workers involved in COVID-19 outbreak in Wuhan: a cross-sectional study. *J Neurol Neurosurg Psychiatry.* 2020 May 4. pii: jnnp-2020-323134. doi: 10.1136/jnnp-2020-323134. [Epub ahead of print]
 25. Jin YH, Huang Q, Wang YY, Zeng XT, Luo LS, Pan ZY, Yuan YF, Chen ZM, Cheng ZS, Huang X, Wang N, Li BH, Zi H, Zhao MJ, Ma LL, Deng T, Wang Y and Wang XH. Perceived infection transmission routes, infection control practices, psychosocial changes, and management of COVID-19 infected healthcare workers in a tertiary acute care hospital in Wuhan: a cross-sectional survey. *Mil Med Res.* 2020 May 11;7(1):24. doi: 10.1186/s40779-020-00254-8.
 26. WHO. COVID-19: operational guidance for maintaining essential health services during an outbreak. <https://www.who.int/publications-detail/covid-19-operational-guidance-for-maintaining-essential-health-services-during-an-outbreak> (accessed May 17, 2020) .
 27. WHO. Guiding principles for immunization activities during the COVID-19 pandemic. Interim guidance. https://apps.who.int/iris/bitstream/handle/10665/331590/WHO-2019-nCoV-immunization_services-2020.1-eng.pdf (accessed May 17, 2020).
 28. Rajan D, Koch K, Rohrer K, Bajnoczki C, Socha A, Voss M, Nicod M, Ridde V and Koonin J. Governance of the COVID-19 response: a call for more inclusive and transparent decision-making. *BMJ Global Health* 2020; 5:e002655. doi:10.1136/bmjgh-2020-002655
 29. Forman R, Atunb R, McKeec M and Mossialosa M. 12 Lessons learned from the management of the coronavirus pandemic. *Health Policy* (2020), <https://doi.org/10.1016/j.healthpol.2020.05.008>
 30. Graham WJ, Afolabi B, Benova L, Campbell OMR, Filippi V, Nakimuli A, Penn-Kekana L, Sharma G, Okomo U, Valongueiro S, Waiswa P and Ronsmans C. Protecting hard-won gains for mothers and newborns in low-income and middle-income countries in the face of COVID-19: call for a service safety net. *BMJ Global Health* 2020;5: e002754. doi:10.1136/bmjgh-2020-002754
 31. Countries working to sustain population immunity to vaccine-preventable diseases during COVID-19 pandemic. <http://www.euro.who.int/en/countries/italy/news/news/2020/4/countries-working-to-sustain-population-immunity-to-vaccine-preventable-diseases-during-covid-19-pandemic> (accessed at 17/05/2020)
 32. Ongole JJ, Rossouw TM, Fourie PB, Stoltz AC, Hugo J and Marcus TS. Sustaining essential healthcare in Africa during the COVID-19 pandemic. *IJTLD* 2020. <http://dx.doi.org/10.5588/ijtld.20>.
 33. Semaan AT, Audet C, Huysmans E, Afolabi BB, Assarag B, Aduragbemi BT, Blencowe H, Caluwaerts S, Campbell OMR, Cavallaro FL, Chavane L, Day LT, Delamou A, Delvaux T, Graham W, Gon G, Kascak P, Matsui M, Moxon SG, Nakimuli A, Pembe AB, Radovich E, Akker TVD and Benova L. Voices from the frontline: findings from a thematic analysis of a rapid online global survey of maternal and newborn health professionals facing the COVID-19 pandemic. <https://www.medrxiv.org/content/10.1101/2020.05.08.20093393v1.full.pdf>
 34. Gon G, Dancer S, Dreifelbis R, Graham WJ and Kilpatrick C. Reducing hand recontamination of healthcare workers during COVID-19. *Infection Control & Hospital Epidemiology* (2020), 1–2. doi:10.1017/ice.2020.