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Disruptions in Health Services Delivery in Kenya and Cameroon Due to Infection Prevention and Control Limitations in the Context of COVID-19:

A Pilot Study



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Pediatric AIDS Foundation**
Fighting for an AIDS-free generation

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Acronyms and abbreviations

ANC	Antenatal Care
CDC	United States Centers for Disease Control and Prevention
COVID-19	Coronavirus Disease 2019
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
FP	Family Planning
HCW	Health Care Worker
HIV	Human Immunodeficiency Virus
IPC	Infection Prevention and Control
IPC-FP	Infection Prevention and Control Focal Point
LMIC	Low- and Middle-Income Countries
MOH	Ministry of Health
NCD	Non-communicable Disease
NGO	Non-Governmental Organization
ODK	Open Data Kit (software)
OPD	Outpatient Department
PPE	Personal Protective Equipment
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SOPs	Standard Operating Procedures
STATA	Statistics and Data (data management and statistical software)
TB	Tuberculosis
WHO	World Health Organization

Executive Summary

Introduction

The SARS-CoV-2 pandemic is disrupting health services worldwide though the reasons behind the disruptions are not fully known. Infection prevention and control (IPC) strives to ensure that healthcare workers (HCWs) and patients are not exposed to or acquire infectious diseases during healthcare. At the beginning of the pandemic, there were multiple reports of HCWs and patients being exposed to COVID-19 in healthcare facilities, due to lack of IPC, resulting in serious illness or death and also in disruptions to healthcare services. Identifying gaps in IPC implementation that have led to the disruption of health care, including resources, personnel, or policies, will be critical in developing more effective IPC protocols and trainings, and facilitating access to supplies and/or trained professionals.

Objectives

To determine the amount, types, and duration of health service disruptions in health facilities in Cameroon and Kenya from March 2020 – February 2021; and the extent to which gaps or limitations in IPC led to health service reductions and/or changes in facility attendance trends in key service delivery areas in the context of the SARS-CoV-2 pandemic.

Methods

This study consisted of a desk review of country SARS-CoV-2-related policies and procedures (including for IPC), cross-sectional surveys of potential health service disruptions in selected health facilities, and an analysis of routine service attendance trends over time in the selected facilities. In each country (Cameroon and Kenya), three regions/counties with high COVID-19 prevalence were selected. Hospitals included in the study were purposively selected. A supplemental random selection of lower-level health facilities was also included. A total of 60 health facilities per country (20 per region/county) were surveyed.

Results

Nearly all health facilities experienced service disruptions across all health service delivery areas. Disruptions were associated with limited patient volumes, service staff reductions, and services suspended or reduced. Non-communicable disease and antenatal care service attendances were particularly disrupted by the coronavirus pandemic in Cameroon. The severity of the disruptions was low-to-moderate in Kenya, while in Cameroon, they tended to be more severe. Severity was associated with reduced staffing and reduction in the scope of services. IPC-directives were often focused on social (physical) distancing and the suspension of services. The implementation of the distancing was the most common IPC reason for service disruption across all health facilities. However, outbreaks of COVID-19 illness among patients and staff, and staff shortages due to the illness or fear of illness, contributed significantly to service disruptions. This was due to the lack of available staff, the time taken to disinfect health facilities, and the need to triage services.

Conclusion

Health services were disrupted in nearly all health facilities because of COVID-19. The disruption affected all major areas of health service delivery. Investment in IPC resources, personnel, policies, education, and infrastructure is key to reducing and mitigating the impact of the SARS-CoV-2 pandemic on health services. Protection of health staff through vaccination, availability of PPE, screening, isolation of infected staff, and training, should be prioritized. Plans should be developed for a rapid response to COVID-19-like emergencies, with rapid deployment of human, fiscal and material resources, and an emphasis on resilient systems.

Introduction

Infection prevention and control (IPC) processes and procedures (including environmental cleaning and disinfection, monitoring the adherence of health care personnel to IPC best practices, and ensuring injection safety) within health care facilities are critical to prevent excessive morbidity and mortality associated with hospital-acquired infections, antimicrobial resistance, and the increasing threats posed by epidemics/pandemics. These IPC processes and procedures are often limited or lacking in low-and middle-income countries (LMIC) without strong health care infrastructure and resources. Suboptimal implementation of IPC may lead to health care service disruptions, such as, service suspension, ward and facility closures, and reduction of service hours. IPC measures are modifiable; national and regional services, and health care facilities all have a role in implementation of these measures. The current SARS-CoV-2 pandemic presents significant challenges in health services delivery globally, with particular concern in LMIC settings where national services may not have the capacity to scale up IPC measures rapidly at the health care facility level to mitigate the spread of SARS-CoV-2 or other pathogens to patients and health care workers and manage those who are infected. This could lead to decisions to reduce or change the provision of health services that may jeopardize essential medical care such as HIV treatment and prevention, childhood immunizations, antenatal care (ANC), and other key services. For example, a 2020 WHO survey of 105 countries found that 32% reported disruptions in HIV treatment services, one in six reported severe disruptions of routine immunization services, and over 50% of countries reported partial disruptions of ANC services (WHO August 2020)¹.

For this report, we defined health service disruptions to include those associated with changes in policies and procedures undertaken by the health facilities in response to COVID-19, related to health service delivery that result in reduced availability of these services. These may include closing facilities or wards, reducing days and/or times of services, or canceling scheduled activities such as elective surgeries, immunization outreach, and family planning (FP) services. Other disruptions may include transferring patients to different health facilities or community services delivery sites, changing patient triage flow that reduces care delivery, or changes in staffing coverage. During the SARS-CoV-2 pandemic, staffing coverage disruptions may have occurred due to COVID-19-related illness, redeployment of staff to the COVID-19 response, or concern about infection risk. Decisions to alter the provision of health services may be driven by limitations in IPC supplies, protocols and/or trained staff. For example, insufficient personal protective equipment (PPE) for health care workers (HCWs) could result in reduced days/times for services, cancellation of elective surgeries, or shortage of HCWs. In addition, national SARS-CoV-2 mitigation strategies such as travel restrictions, home or institutional quarantine, and administrative limitations in non-essential services may also affect the ability of health care facilities to deliver services and the ability of patients to access services.

Given the SARS-CoV-2 pandemic, and the likelihood of other epidemics and pandemics in the future, it is critical to identify gaps in health systems, including IPC structures and capacity, that contribute to the reduction of essential health care services in LMIC. Data on the amount, types, and duration of service disruptions during the SARS-CoV-2 pandemic, the extent to which IPC limitations or commitment in terms of resources, personnel, or policies may be contributing to these service disruptions, and the numbers and types of patients who are affected by these changes and are not accessing care are largely unknown. Identifying gaps in the implementation of IPC is critical, particularly if these gaps have led to the disruption of essential and non-essential health care so that more effective IPC protocols and trainings can be developed and access to supplies or trained professionals can be facilitated.

Information of IPC gaps can be used to enhance IPC preparedness and response through setting priorities for country support for improved IPC protocols and standard operating procedures (SOPs), training, IPC supplies, or other needed areas. The information may also be used to strengthen IPC during non-pandemic times.

¹ Pulse survey on continuity of essential health services during the COVID-19 pandemic. Interim Report. 27 August 2020. World Health Organization. (https://www.who.int/publications/i/item/WHO-2019-nCoV-EHS_continuity-survey-2020.1)

Study Objectives

Main objective

To assess the extent to which health services were modified or disrupted due to the COVID-19 epidemic, the types and duration of disruptions, and extent these disruptions were linked to IPC limitations or gaps, between March 2020 and February 2021 in selected geographical regions of Kenya and Cameroon.

Specific objectives:

1. To determine the percentage of health services modified or disrupted due to the COVID-19 pandemic, and to describe the types and duration of these disruptions within participating health facilities.
2. To describe the frequency of service disruptions reported to be driven by IPC limitations or commitments versus non-IPC-related reasons.
3. To describe the specific types of service disruptions reported to be driven by IPC limitations or commitments in terms of policies, resources, or supplies, IPC training, PPE availability, staff availability, SARS-CoV-2 exposure procedures, and others.
4. To estimate the potential contribution of IPC-related service disruptions on facility attendance across different service delivery points such as outpatient (OPD), inpatient, ANC, facility deliveries, childhood immunization clinic, HIV clinic, tuberculosis (TB) clinic and other non-communicable disease (NCD) clinics (diabetes, hypertension, etc.).
5. To describe the national policies and procedures related to the SARS-CoV-2 pandemic response, including IPC health facility guidance.

Study setting

This study was conducted in Kenya and Cameroon, countries representative of the East and Central African regions. In East Africa, Kenya, had the highest rate of recorded COVID-19 cases, 33,389, 64/100,000 population, as at the time of country selection, August 27, 2020. (Kenya Ministry of Health, <https://www.health.go.ke/covid-19/>). Similarly, Cameroon had the highest rate of recorded COVID-19 cases in Central Africa, 18,973, 71/100,000 population, as of August 27, 2020, (Cameroon Ministry of Health, <http://covid-19-africa.sen.ovh/index.php?confirmed=ok&isnc=1>).

In each country, three counties/regions were selected based on the prevalence of COVID-19 cases and logistical reasons. In Kenya, the selected counties of Nairobi, Kiambu and Machakos recorded cumulative confirmed COVID-19 cases of 20,122 (458/100,000 population), 2,621 (108/100,000 population) and 1,298 (91/100,000 population), respectively, as of September 17, 2020.

In Cameroon, the regions selected; Centre, Littoral and Ouest, recorded 9,556 (257/100,000 population), 4,125 (123/100,000 population), and 1,156 (65/100,000 population) cumulative COVID-19 cases respectively by August 19, 2020, having the highest rates of COVID-19 in the country.

Methods

Study design

This is a descriptive, cross-sectional study consisting of surveys in selected health facilities; an analysis of routine service attendance trends over time in the selected facilities; and a review of country COVID-19-related policies and procedures (including for IPC).

To estimate the prevalence of service disruptions, a quantitative survey was undertaken in selected health facilities in Cameroon and Kenya through phone or in-person interviews with facility directors/administrators using a structured questionnaire, (see sampling section below for description of how facilities were selected). Information collected

included dates and types of disruption, and any reduction in the delivery of health services (such as facility or hospital ward closures), suspension of services, decreased hours of operation, changes in staffing or patient processes, and shifts in patient services to other facilities or community venues, (see text box for definitions of disruptions). Data were also collected on the decisions for these disruptions/changes, and whether or not they were IPC-related. The WHO IPC guidelines (WHO 2019², 2020³) and other materials informed the development of the survey questionnaire. Interview data were captured on tablets using the Open Data Kit (ODK) database platform, transmitted through a secure Virtual Private Network (VPN), and stored in a secure Microsoft SQL server database. Data entry forms were programmed with internal consistency and logic checks. Trained interviewers carried out the interviews; all interviewers were health care professionals. Data collection was undertaken from April to July 2021.

In health facilities that reported IPC-related service disruptions, IPC focal points were interviewed to obtain more information focusing on specific IPC policies, procedures, resources, and supplies associated with the service disruptions. IPC focal points (IPC-FP) were individuals in each facility whose role was to oversee IPC at that facility. Using a structured questionnaire, the IPC-FP were asked about, for example, actions taken in response to cases of COVID-19 among staff and patients, availability of PPE and other commodities, and other changes made to the delivery of services in their facility. See questions on IPC-related reasons for service disruption below.

Definitions of disruptions:

Limiting patient volume: *“Did your facility elect to limit patient volumes receiving services since February 2020 due to COVID-19?”*

Service staff reduced: *“Were the number of staff providing a healthcare service reduced since February 2020 due to COVID-19?”*

Service suspension: *“Were any services stopped or no longer offered since February 2020 due to COVID-19?”*

Service scope reduced: *“Was the breadth of a healthcare service narrowed since February 2020 due to COVID-19?”*

Service hours reduced: *“Were the hours that a healthcare service is delivered reduced since February 2020 due to COVID-19?”*

Inpatient ward closures: *“Were any inpatient wards ever closed since February 2020 due to COVID-19?”*

Facility closure: *“Was the facility ever closed since February 2020 due to COVID-19?”*

IPC-related reason for service disruption	Questions related to service disruptions
Service disrupted as per national/regional/district MOH IPC-related directives.	<ul style="list-style-type: none"> actions taken to mitigate the disruption
Health personnel shortages due to COVID-19 illness or fear of illness	<ul style="list-style-type: none"> ways in which health personnel could have been exposed to COVID-19 in the facility staff cadres that had experienced shortages for this reason whether staff deployed from other units to keep services running as normal within the same facility, whether staff deployed to other health facilities, to keep services there running as normal planned actions to reduce staff absences due to COVID-19 illness or exposures

² World Health Organization. Minimum requirements for infection prevention and control, Geneva 2019.

³ World Health Organization. Infection prevention and control during health care when coronavirus (COVID-19) is suspected or confirmed. Geneva, June 2020.

Lack of PPE	<ul style="list-style-type: none"> • availability of different types of PPE • use of an inventory • use of a calculator to estimate “burn” rates • PPE ordering process • main supplier of PPE • strategies to conserve PPE
Shortages of IPC-related equipment or supplies other than PPE (e.g., sterilization equipment, disinfectants, water, waste disposal, barriers)	<ul style="list-style-type: none"> • availability of various types of equipment and supplies
Lack of hand washing stations	<ul style="list-style-type: none"> • availability of hand washing station components
Inability to identify and isolate patients and staff for COVID-19	<ul style="list-style-type: none"> • patient and staff screening, triaging, and testing procedures for COVID-19 • reasons for not screening triaging and testing • actions taken for patients and staff testing COVID-19 positive
Additional time needed to implement IPC procedures	<ul style="list-style-type: none"> • details on specific procedures implemented • reasons for needing additional time
Implementation of social distancing requirements to reduce the risk of infection	<ul style="list-style-type: none"> • types of social distancing implemented • actions taken to mitigate the disruption
Facility was unable to implement social distancing requirements to reduce the risk of infection	<ul style="list-style-type: none"> • reasons for inability to implement distancing measures • actions taken to mitigate disruption

In addition to the facility director, IPC-FP were also interviewed on service disruptions to ensure accuracy of reported IPC-related service disruptions. In some smaller health facilities, there was no specific individual providing IPC oversight, with this function being undertaken by the facility director. In this situation, the facility director was interviewed also on the IPC focal point questionnaire.

To estimate the potential contribution of IPC-related service disruptions on facility attendance across the various service points, we extracted the aggregate patient attendance data for the surveyed health facilities from the national DHIS2 systems for the periods March 2019-February 2020, and March 2020-February 2021. These data were disaggregated by selected service areas such as ANC, OPD, inpatient, maternity, HIV, TB, surgery, and NCD.

For the policy and procedure review, written policies/procedures/guidance were collated relating to country-wide activities implemented in response to the COVID-19 pandemic for both health service and community-mitigation activities (such as travel restrictions, mask requirements). National policies/procedures related to IPC in health facilities were also compiled. Documents reviewed included central government statutory instruments and directives regulating community-mitigating measures such as curfew hours, bans on gathering, travel restrictions etc., and central and local government regulations and directives regulating health facility operations, such as sanitization of health facilities and other IPC procedures, suspension of services, provision of social distancing activities etc. The recommendations and policies were documented using a standard form.

Sampling

Study facilities were selected through modified stratified sampling of health facilities in the preselected counties and regions in Kenya and Cameroon. The strata consisted of the type of facility: primary, secondary and tertiary health centers. In Kenya, primary level facilities consisted of dispensaries, secondary level, health centers, and tertiary level, hospitals. In Cameroon, health centers, district hospitals and central hospitals were primary, secondary, and tertiary level facilities. As the focus was on hospitals, hospitals were purposely selected, and a random selection of lower-

level facilities (at secondary and primary care levels in Kenya, and at primary care level only in Cameroon) was made. Public, faith-based and parastatal facilities were eligible for inclusion. Academic, private, and non-government health facilities were excluded as access to data might not have been feasible in these essentially private health facilities. Appendix 1 lists the selected facilities.

Sample size

For this pilot study, a sample of 60 health facilities per country, 20 from each region/county was proposed. A sample size of 60 has a minimum precision of $\pm 13.0\%$ when 50% of the facilities experienced disruption of services. This level of precision, however, referred only to service disruption from all causes, not specifically IPC-related.

Analysis

The type, frequency, and duration of overall service and IPC-related disruptions were described using proportions, percentages, medians (with interquartile ranges), and means (with standard deviations, where appropriate). The reasons for and mitigating actions taken for IPC-related disruptions were similarly described. The potential contribution of IPC-related service disruptions on facility attendance across different service delivery points such as outpatient (OPD), ANC, childhood immunization clinic, HIV clinic, tuberculosis (TB) clinic and other non-communicable disease (NCD) clinics (diabetes, hypertension, etc.), was graphically displayed by time and in relation to the waves of COVID-19 infection. For the policy/procedure review, regulations on, for example, travel/movement limitations, limitations on people gathering, mask wearing, sanitizing activities, establishment closures etc., were described by time. Similarly, the guidance/regulations on IPC at health facilities, spacing, sanitizing, services suspended or reduced, etc., were described by time.

For the policy/procedure review, regulations on, for example, travel/movement limitations, limitations on people gathering, mask wearing, sanitizing activities, establishment closures etc., were described by time. Similarly, the guidance/regulations on IPC at health facilities, spacing, sanitizing, services suspended or reduced, etc., were described by time. The type, frequency, and duration of overall service and IPC-related disruptions were described using proportions, percentages, medians (with interquartile ranges), and means (with standard deviations, where appropriate). The reasons for and mitigating actions taken for IPC-related disruptions were similarly described.

Ethical considerations

The study was reviewed and approved by Amref Health Africa-Ethics and Scientific Research Committee in Kenya, the Cameroon National Ethics Committee, the US Centers for Disease Control and Prevention, and the US-based Advarra Institutional Review Board. No incentives were given to participants of the study or to the health facilities that submitted data.

Results

A total of 118 health facilities provided complete data for the survey: 59 facilities each in Cameroon and Kenya. Table 1 presents the health facilities with complete data by level of care for Cameroon and Kenya.

Table 1: Health facilities surveyed by level of care, Kenya and Cameroon

	Kenya N (%)	Cameroon N (%)	Total N (%)
Level of care			
Tertiary	36 (61)	9 (15)	45 (38)
Secondary	16 (27)	29 (49)	45 (38)
Primary	7 (12)	21 (36)	28 (24)
Total	59 (50)	59 (50)	124 (100)

Among the 59 Kenya health facilities, government facilities accounted for 48 (81%) of the facilities, while there were 11 (19%) faith-based facilities. All of the health facilities provided outpatient services, and maternity services were available in 45 (76%) facilities. Of the health facilities providing in-patient services, 30 (83%) had medical wards; 22 (61%) had emergency surgical services; 22 (61%) had non-emergency surgical services, and 12 (33%) other services. About 85% (50) of all facilities provided community outreach services.

Of the Cameroonian health facilities, 38 (64%) were hospitals and 21 (36%) health centers. Nearly all (57; 96%) were government facilities, with one of the remaining two being faith-based facilities. All facilities offered outpatient services, and maternity services were provided in 55 (93%) of all facilities. Medical wards were available in 56 (95%) of facilities, emergency surgical services in 45 (76%) facilities, and non-emergency surgical services in 40 (68%) of facilities. About 73% (43) of facilities offered community outreach services

Type of disruption

Nearly all health facilities reported service disruptions; 59/59 (100%) in Kenya, 51/59 (86%) in Cameroon. Most health facilities in both countries reported disruption due to limiting patient volumes, Kenya, 57 (98%), Cameroon, 44 (75%). Service staff reductions was the next most common type of disruption reported in both countries, 33 (57%) in Kenya, 19 (32%) in Cameroon. Service-specific disruptions ranged from 36% (reduced hours) to 53% (service suspension) in Kenya; but these were less common in Cameroon (5%-19%). Ward closures and facility closures were rare events in both countries, ward closures, 9% (4) in Kenya, 9% (5) in Cameroon, three facility closures in Kenya and two in Cameroon. Table 2 presents these findings.

Table 2: Type, severity, and duration of essential health services disruption; Kenya and Cameroon, 2020-2021

Service disruption (definitions in <i>italics</i>)	Kenya			Cameroon		
	Number of health facilities reporting disruption (n=58*)	Severity of disruption (percentage of service(s) affected, %)	Weeks of disruption (median, IQR)	Number of health facilities reporting disruption (n=59)	Severity of disruption (percentage of service(s) affected, %)	Weeks of disruption (median, IQR)
Limiting patient volume <i>“Did your facility elect to limit patient volumes receiving services since February 2020 due to COVID-19?”</i>	57 (98%)	≥75%: 1 (2%) 50-74%: 6 (10%) 25-49%: 33 (58%) 5-24%: 14 (25%) 0-4%: 0 (0%) Missing: 3 (5%)	25 (14-37)	44 (75%)	≥75%: 3 (7%) 50-74%: 13 (30%) 25-49%: 19 (43%) 5-24%: 7 (16%) 0-4%: 2 (4%)	32 (19-42)

<p>Service staff reduced</p> <p><i>“Were the number of staff providing a healthcare service reduced since February 2020 due to COVID-19?”</i></p>	33 (57%)	<p>≥75%: 0 (0%)</p> <p>50-74%: 1 (3%)</p> <p>25-49%: 9 (27%)</p> <p>5-24%: 17 (52%)</p> <p>0-4%: 5 (15%)</p> <p>Missing: 2 (6%)</p>	22 (13-42)	19 (32%)	<p>≥75%: 0 (0%)</p> <p>50-74%: 2 (11%)</p> <p>25-49%: 2 (11%)</p> <p>5-24%: 7 (36%)</p> <p>0-4%: 8 (42%)</p>	12 (5-40)
<p>Service suspension</p> <p><i>“Were any services stopped or no longer offered since February 2020 due to COVID-19?”</i></p>	31 (53%)		15 (10-21)	10 (17%)		21 (11-38)
<p>Service scope reduced</p> <p><i>“Was the breadth of a healthcare service narrowed since February 2020 due to COVID-19?”</i></p>	29 (50%)	<p>≥75%: 3 (10%)</p> <p>50-74%: 3 (10%)</p> <p>25-49%: 8 (28%)</p> <p>5-24%: 10 (35%)</p> <p>0-4%: 5 (17%)</p>	18 (10-29)	11 (19%)	<p>≥75%: 1 (9%)</p> <p>50-74%: 1 (9%)</p> <p>25-49%: 3 (27%)</p> <p>5-24%: 1 (9%)</p> <p>0-4%: 5 (46%)</p>	23 (3-50)
<p>Service hours reduced</p> <p><i>“Were the hours that a healthcare service is delivered reduced since February 2020 due to COVID-19?”</i></p>	21 (36%)	<p>≥75%: 0 (0%)</p> <p>50-74%: 1 (5%)</p> <p>25-49%: 14 (67%)</p> <p>5-24%: 4 (19%)</p> <p>0-4%: 0 (0%)</p> <p>Missing: 2 (9%)</p>	17 (14-25)	3 (5%)	<p>≥75%: 1 (33%)</p> <p>50-74%: 0 (0%)</p> <p>25-49%: 1 (33%)</p> <p>5-24%: 1 (33%)</p> <p>0-4%: 0 (0%)</p>	15 (6-24)

Inpatient ward closures “Were any inpatient wards ever closed since February 2020 due to COVID-19?”	4 (9%) [#]		7 (0-15)	5 (9%) [^]		0 (0-4)
Facility closure “Was the facility ever closed since February 2020 due to COVID-19?”	3 (5%)		15 (1-53)	2 (3%)		1 (0-2)

[#]Denotes n=58 due to exclusion of 1 facility in Kenya that closed for the duration of the period of interest after conversion to COVID-19 facility.

[^]Missing data from 3 health facilities, [#]Missing data on 2, ^{*}Missing data on 1

Severity of service disruptions

Table 2 presents the severity of service disruptions by type of service disruption. In Kenya, service scope was the most severely affected type of disruption, with 21% of health facilities (n=6/29) reporting that 50% or more of services were disrupted. The next severe disruption was limiting patient volume, with 12% (n=7/57) indicating that this affected over 50% of services.

In Cameroon, 36% (n=16/44) of health facilities reported that limiting patient volume was the service more severely disrupted, (>50% of services disrupted). While only three facilities reported disruption due to service hours being reduced, one facility reported 50% or more services affected, with in fact ≥75 services affected. Severe disruption due to a reduction in service scope and in-service staff was reported in 2/11 (18%) and in 2/19 facilities (11%), respectively.

Duration of disruption

In Kenya, the duration of disruption ranged from 7 (IQR: 0-15) weeks for inpatient ward closures to 25 (IQR: 14-37) weeks for limiting patient volumes accessing services (see Table 2). In Cameroon, the duration of disruption ranged from 0 (IQR: 0-4) weeks for inpatient ward closures to 32 (IQR:19-42) weeks for limiting patient volumes.

Type of disruption by essential services

Tables 3 and 4 present the types of service disruptions by service point in Kenya and Cameroon.

Table 3: Frequency of essential services disruption among health facilities by type of disruption, Kenya

Service Point	Type of Disruption					
	<i>Service suspended</i>	<i>Service scope reduced</i>	<i>Service staff reduced</i>	<i>Service hours reduced</i>	<i>Limiting patient volumes</i>	<i>Inpatient ward closure(s)</i>
	(n, %)	(n, %)	(n, %)	(n, %)	(n, %)	(n, %)
Outpatient services						
1. Antenatal care (n=56)	2 (4%)	6 (11%)	22 (39%)	14 (25%)	46 (82%)	--
2. Postnatal care (n=56)	1 (2%)	2 (4%)	15 (27%)	7 (13%)	35 (63%)	--
3. Family planning and contraception (n=49)	3 (6%)	6 (12%)	16 (33%)	7 (14%)	41 (84%)	--
4. Routine immunization (n=56)	2 (4%)	6 (11%)	15 (27%)	8 (14%)	40 (71%)	--

5. Under five clinic (n=56)	9 (16%)	11 (20%)	18 (32%)	9 (16%)	50 (89%)	--
6. HIV prevention, diagnosis, and treatment (n=55)	2 (4%)	4 (7%)	10 (18%)	5 (9%)	32 (58%)	--
7. TB case detection and treatment (n=52)	2 (4%)	5 (10%)	7 (14%)	7 (14%)	30 (58%)	--
8. Cancer screening, diagnosis, and treatment (n=37)	1 (3%)	2 (5%)	5 (14%)	2 (5%)	17 (46%)	--
9. Non-communicable disease services (n=53)	13 (25%)	10 (19%)	9 (17%)	7 (13%)	43 (81%)	--
10. Acute care services (n=50)	3 (6%)	5 (10%)	6 (12%)	5 (10%)	26 (52%)	--
11. Mental health services (n=30)	1 (3%)	3 (10%)	3 (10%)	3 (10%)	12 (40%)	--
12. Rehabilitation services (n=33)	2 (6%)	4 (12%)	5 (15%)	3 (9%)	17 (52%)	--
13. 24-hour emergency care/casualty services (n=41)	1 (2%)	6 (15%)	14 (34%)	2 (5%)	26 (63%)	--
14. Other outpatient service (n=34)	12 (35%)	11 (32%)	7 (21%)	5 (15%)	20 (59%)	--
15. Nutrition (n=49)	2 (4%)	2 (4%)	7 (14%)	2 (4%)	20 (41%)	--
Inpatient services						
16. Maternity ward (n=45)	2 (4%)	4 (9%)	16 (36%)	(2%)	22 (49%)	1 (2%)
17. Medical wards (n=30)	2 (7%)	4 (13%)	10 (33%)	2 (7%)	21 (70%)	3 (10%)
18. Mental health wards (n=5)	0 (0%)	1 (20%)	2 (40%)	1 (20%)	3 (60%)	0 (0%)
19. Emergency/non-elective surgeries (n=22)	3 (14%)	3 (14%)	7 (32%)	2 (9%)	11 (50%)	2 (8%)
20. Non-emergency/elective surgical services (n=22)	4 (18%)	3 (14%)	6 (27%)	0 (0%)	11 (50%)	3 (14%)
21. Other inpatient services (n=12)	0 (0%)	0 (0%)	1 (8%)	2 (17%)	2 (17%)	0 (0%)
Community outreach services						
22. Maternal and child health (n=29)	4 (14%)	0 (0%)	2 (7%)	1 (4%)	3 (10%)	--
23. Immunization (n=29)	3 (12%)	1 (4%)	2 (8%)	2 (8%)	4 (15%)	--
24. TB contact tracing/treatment (n=30)	3 (10%)	0 (0%)	2 (7%)	1 (3%)	4 (13%)	--
25. HIV contact tracing/treatment (n=30)	3 (10%)	0 (0%)	2 (7%)	2 (7%)	3 (10%)	--
26. Community-based mobile clinics (n=9)	2 (22%)	0 (0%)	1 (11%)	0 (0%)	1 (11%)	--
27. Other community/outreach services (n=29)	6 (23%)	3 (12%)	1 (4%)	0 (0%)	3 (12%)	--

Table 4: Frequency of essential services disruption among health facilities by type of disruption, Cameroon

Service Point	Type of Disruption					
	<i>Service suspended</i>	<i>Service scope reduced</i>	<i>Service staff reduced</i>	<i>Service hours reduced</i>	<i>Limited patient volumes</i>	<i>Inpatient ward closure(s)</i>
	<i>(n, %)</i>	<i>(n, %)</i>	<i>(n, %)</i>	<i>(n, %)</i>	<i>(n, %)</i>	<i>(n, %)</i>
Outpatient services						
1. Antenatal care (n=56)	0 (0%)	8 (14%)	7 (13%)	1 (2%)	36 (64%)	--
2. Postnatal care (n=53)	0 (0%)	8 (15%)	7 (13%)	0 (0%)	32 (60%)	--
3. Family planning and contraception (n=55)	1 (2%)	8 (15%)	6 (11%)	0 (0%)	35 (64%)	--
4. Routine immunization (n=56)	1 (2%)	7 (13%)	8 (14%)	0 (0%)	34 (61%)	--
5. Under five clinic (n=53)	0 (0%)	7 (13%)	12 (23%)	1 (2%)	36 (68%)	--
6. HIV prevention, diagnosis, and treatment (n=56)	0 (0%)	8 (14%)	9 (16%)	0 (0%)	30 (54%)	--
7. TB case detection and treatment (n=34)	0 (0%)	4 (12%)	6 (18%)	1 (3%)	16 (47%)	--
8. Cancer screening, diagnosis, and treatment (n=10)	0 (0%)	0 (0%)	1 (10%)	0 (0%)	4 (40%)	--
9. Non-communicable disease services (n=39)	0 (0%)	4 (10%)	6 (15%)	1 (3%)	20 (51%)	--
10. Acute care services (n=40)	0 (0%)	6 (15%)	8 (20%)	0 (0%)	23 (58%)	--
11. Mental health services (n=10)	0 (0%)	0 (0%)	1 (10%)	0 (0%)	3 (30%)	--
12. Rehabilitation services (n=28)	2 (7%)	2 (7%)	4 (14%)	0 (0%)	12 (43%)	--
13. 24-hour emergency care/ casualty services (n=54)	0 (0%)	7 (13%)	13 (24%)	0 (0%)	33 (61%)	--
14. Other outpatient service (n=33)	2 (6%)	7 (21%)	12 (36%)	0 (0%)	15 (46%)	--
15. Nutrition (n=19)	0 (0%)	1 (5%)	2 (11%)	0 (0%)	8 (42%)	--
Inpatient services						
16. Maternity ward (n=55)	1 (2%)	7 (13%)	9 (16%)	0 (0%)	30 (55%)	0 (0%)
17. Medical wards (n=56)	2 (4%)	7 (13%)	12 (21%)	2 (4%)	29 (52%)	2 (4%)

18. Mental health wards (n=7)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (29%)	0 (0%)
19. Emergency/non-elective surgeries (n=45)	0 (0%)	5 (11%)	7 (16%)	0 (0%)	20 (44%)	1 (2%)
20. Non-emergency/elective surgical services (n=40)	0 (0%)	6 (15%)	9 (23%)	1 (3%)	21 (53%)	0 (0%)
21. Other inpatient services (n=13)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	6 (46%)	1 (8%)
Community outreach services						
22. Maternal and child health (n=21)	0 (0%)	2 (10%)	1 (5%)	0 (0%)	19 (91%)	--
23. Immunization (n=37)	0 (0%)	4 (11%)	5 (14%)	0 (0%)	29 (78%)	--
24. TB contact tracing/treatment (n=21)	1 (5%)	5 (24%)	3 (14%)	0 (0%)	11 (52%)	--
25. HIV contact tracing/treatment (n=41)	2 (5%)	6 (15%)	9 (30%)	0 (0%)	17 (42%)	--
26. Community-based mobile clinics (n=7)	0 (0%)	1 (14%)	2 (14%)	0 (0%)	6 (23%)	--
27. Other community/outreach services (n=13)	3 (23%)	4 (31%)	1 (8%)	0 (0%)	6 (46%)	--

Outpatient Services

In Kenya, all outpatient service points were disrupted by all five types of disruptions. Overall, disruptions were most frequently reported to affect Under-5, ANC, NCD, and “other” outpatient services (for example, social work, dermatology, respiratory conditions such as asthma), averaging about 1 in 3 disruptions across these service points. Limiting patient volumes affected 40%-89% of all service points, including 89% of Under-5 Clinics and 84% of FP/contraception points, 82% of ANC points, and 81% of NCD points. Reduced service staff led to disruptions in 10%-39% of service points, including 39% of ANC points, and about one-third each of 24-hour emergency care/casualty points, FP/contraception points, and Under-5 clinics. Reduced service hours affected at least 4% of all service points, including 25% of ANC points, 16% of Under-5 clinics, and 15% of “other” outpatient services. Besides “other” outpatient services, service suspensions and reduced service scope occurred most frequently in NCD points with 25% experiencing suspended services and 19% experiencing a reduced scope, and in Under-5 clinics with 16% experiencing suspended services and 20% experiencing a reduced scope.

Overall, we found smaller proportion of disruptions at service points in Cameroon. Very few service points experienced disruptions due to service suspension or reduced service hours. Limiting patient volumes led to disruptions at 40%-68% of all outpatient service points, including 68% of Under-5 clinics, 64% of both ANC and FP/conception service points, and around 60% of postnatal care, routine immunization, and 24-hour emergency care/casualty service points. Reduced service staff led to disruptions in 10%-36% of outpatient service points, including 36% of “other” outpatient service points, 24% of 24-hour emergency care/casualty service points, and 23% of Under-5 clinics. Reduced service scope led to disruptions in approximately 10-15% of most service points.

Inpatient Services

Fewer disruptions were reported in inpatient service points compared to outpatient service points in both Kenya and Cameroon. In Kenya, almost 20% of health facilities suspended non-emergency/elective surgery and 14% suspended emergency surgeries. Though only five facilities had mental health wards, disruptions occurred in three facilities due to limited patient volumes, in two facilities due to reductions in service staff, and in one facility due reduced service hours. About 70% of medical wards and 50% of maternity wards and emergency and non-emergency surgery service points experienced limited patient volumes.

Very few Cameroon health facilities suspended in-patient services or reduced hours. However, 23% of facilities had disrupted non-emergency surgical services due to reduced staff. Over half of facilities with maternity and medical wards and non-emergency services were disrupted by limited patient volumes.

Community Outreach Services

In Kenya, over 20% of health facilities with community mobile clinic and other community/outreach services suspended services. Similarly, in Cameroon, 20% of health facilities with other community/outreach suspended these services, and 31% reduced their scope. Of facilities with TB contact tracing/treatment, 24% reduced the scope of these services. About 90% of facilities limited maternal and child health service patient volumes, as did 78% of facilities offering immunization services.

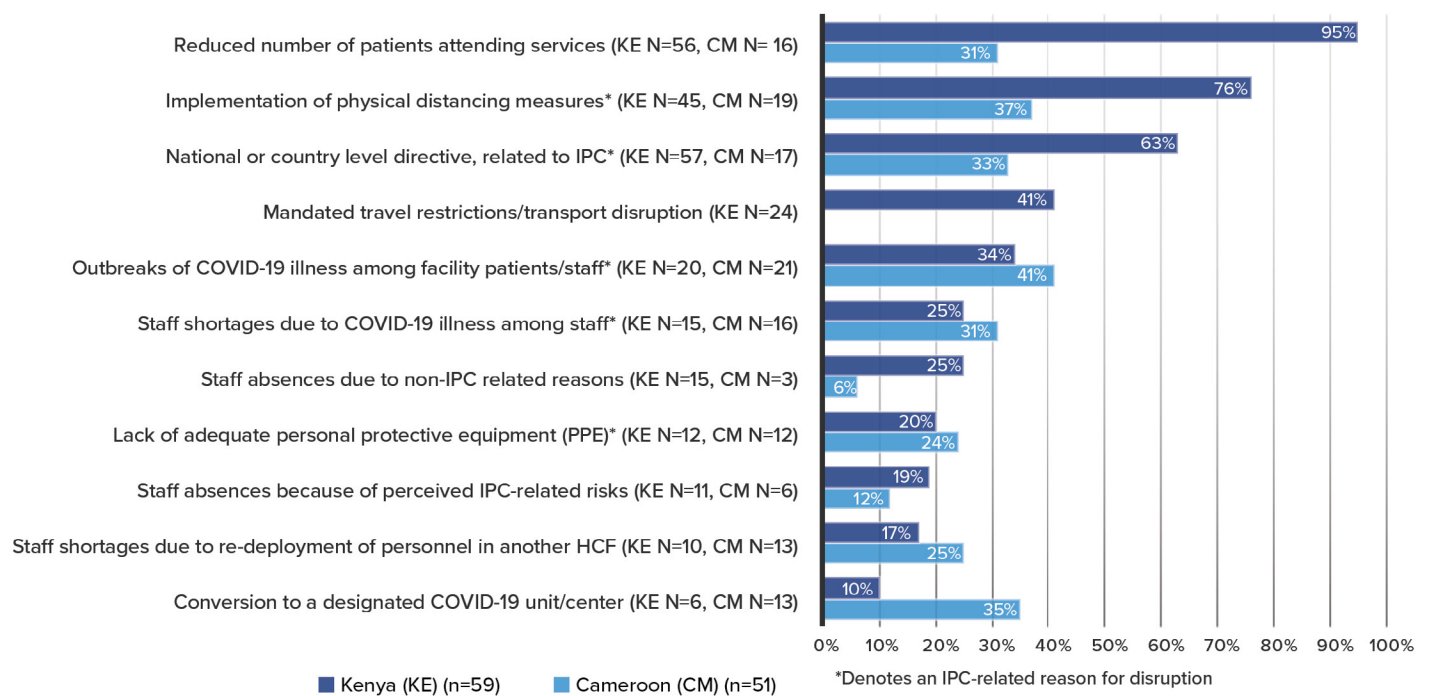


Figure 1: Proportion of health facilities reporting reasons for disruptions; Kenya and Cameroon, March 2020 – February 2021.

Reasons for disruptions

As reported by the facility administrators, 95% of Kenya health facilities reported the reduced number of patients attending the facilities disrupted essential health services (Figure 1). The next most frequently reported reasons for service disruption in Kenya were the implementation of physical distancing measures (76%) and national or county

directive-related to IPC (63%). One-third of disruptions were due to outbreaks of COVID-19 illness among facility patients/staff and 41% resulted from mandated travel restrictions/transport disruption.

In Cameroon, outbreaks of COVID-19 illness among facility patients/staff (41% of health facilities) were the most frequently cited reason for service disruption. Other frequently cited reasons were implementation of physical-distancing measures (37%); conversion to a designated COVID-19 unit/center (25%); national or provincial level directive related to IPC (33%); reduced number of patients attending services (31%); and staff shortages due to COVID-19 illness among staff (31%).

Detailed reasons for IPC-related disruptions

Facility IPC Focal Points (IPC-FP), provided more detailed responses for the reasons for IPC-related disruptions, including relevant practices/procedures prior to the disruption, and strategies taken to mitigate the effect of the disruption.

Service disrupted as per national/regional/district MOH IPC-related directives

IPC Focal Points (IPC-FPs) were asked about service disruption due to MOH IPC-related directives. There were responses from IPC-FPs of 37 health facilities in Kenya, and 16 health facilities in Cameroon, reporting *any* disruption due to these directives. All 37 Kenya facilities were reported to have taken mitigating actions, and 12 (75%) Cameroon facilities. The responses have been summarized for any facility disruption. Table 5 presents this information.

Table 5: Actions taken to mitigate health facility service disruptions due to MOH IPC-related directives, Kenya, and Cameroon.

	Kenya (n=37)	Cameroon (n=12)
Priority given to serving high-risk patients	34 (92%)	7 (58%)
Redirected patients to other healthcare facilities	26 (70%)	7 (58%)
Extended multi-month prescriptions (e.g., for HIV, NCD)	26 (70%)	9 (75%)
Provided all care in a single visit for multiple morbidities	17 (46%)	4 (33%)
Cared for patients via telephone or internet connection	14 (38%)	8 (67%)
Supported self-care initiatives, where appropriate	13 (35%)	2 (17%)
Redirected patients to community-located sites	7 (19%)	2 (17%)
Provided home-based care for certain patients	5 (14%)	3 (25%)
Other	12 (32%)	3 (25%)

In Kenya, 92% (n=34) of health facilities mitigated IPC-related service disruption caused by MOH directives through prioritizing high-risk patients. Other commonly cited actions were redirecting patients to other facilities (70%, n=26), and extending multi-month prescriptions (70%, n=26). In Cameroon, the commonly cited actions were extending multi-month prescriptions (75%, n=9), caring for patients via telephone or internet (67%, n=8), redirecting patients to other facilities (58%, n=7), prioritizing high-risk patients (58%, n=7).

Health personnel shortages due to COVID-19 illness or fear of illness

IPC-FPs from 26 health facilities in Kenya and 13 in Cameroon, provided responses on the ways in which health personnel could have been exposed to COVID-19 in the facility leading to staff shortages due to COVID-19 illness or fear of illness. The IPC-FPs also reported on the staff cadres that had experienced shortages for this reason, whether staff had been deployed from other units to keep services running as normal within the same facility, and to other facilities, and on planned actions to reduce staff absences due to COVID-19 illness or exposures. These findings are presented in Tables 6-8.

Table 6: Ways in which HCWs could have been exposed to COVID-19 while working at the health facility, (prior to service disruption).

	Kenya (n=26)	Cameroon (n=13)
Lack of or insufficient training in IPC	22 (85%)	7 (54%)
Lack of COVID-19 training/orientation	21 (81%)	5 (38%)
Lack of or insufficient PPE	20 (77%)	11 (85%)
Congregating in settings with other staff	20 (77%)	9 (69%)
Inadequate training in donning/doffing PPE	19 (73%)	2 (15%)
Unable to social distance from other staff	19 (73%)	4 (31%)
Lack of or insufficient cleaning and disinfecting supplies	18 (69%)	9 (69%)
Unable to social distance from patients (no space)	18 (69%)	5 (38%)
Lack of or unclear IPC guidance	18 (69%)	5 (38%)
Improper use of PPE	17 (65%)	4 (31%)
Lack of or insufficient supplies for handwashing	17 (65%)	7 (54%)
Lack of guidance about which PPE to use	10 (38%)	4 (31%)
Poor ventilation	8 (31%)	2 (15%)
Other	5 (19%)	3 (23%)

In Kenya, lack of or insufficient training in IPC (85%, n=22), lack of COVID-19 training/orientation (81%, n=21), and lack of or insufficient PPE (77%, n=20) were the most common reasons for the ways in which HCWs could have been exposed to COVID-19 while working at the facility. Inadequate training in donning/doffing PPE was also cited as a reason in 19 health facilities (73%). In Cameroon, lack of PPE was the most cited reason (85%, n=11). Other reasons were lack of or insufficient cleaning and disinfecting supplies (69%, n=9) and lack of/insufficient supplies for handwashing (54%, n=7). Lack of/insufficient training in IPC was stated as a reason in 7 (54%) facilities.

Table 7: Staff cadre shortages due to COVID-19 illness or fear of illness

	Kenya (n=26)	Cameroon (n=13)
Professional nursing staff	23 (88%)	9 (69%)
Medical staff	22 (85%)	10 (77%)
Office staff (administrators/clerks)	16 (62%)	4 (31%)
Cleaners	15 (58%)	3 (23%)
Lay cadres	11 (42%)	4 (31%)
Auxiliary nursing staff	8 (31%)	9 (69%)
Support staff (cooks/gardeners/security guards)	7 (27%)	1 (8%)
Other	7 (27%)	4 (31%)

In Kenya, professional nursing and medical staff were most affected by shortages due to COVID-19 illness or fear of illness; (88%, n=23 and 85%, n=22), respectively. This was similar in Cameroon where (77%, n=10) were medical staff and (69%, n=9) each were professional nursing staff and auxiliary nursing staff.

At the time of service disruption, staff were deployed from their usual units to other units in the facility to keep service running as normal in 21 health facilities (81%) in Kenya, and in 11 facilities (85%) in Cameroon, due to insufficient numbers of staff in those units. In nearly half of Kenya facilities (46%, n=12), and 77% (n=10) of facilities in Cameroon, staff were deployed to other facilities to keep services there running as normal.

The responses to whether the health facility had developed plans to prevent or reduce staff absences due to COVID-19 illness, exposure, or fear of exposure resulting from health personnel shortages, are summarized in Table 8.

Table 8: Planned actions to prevent/reduce staff absences due to COVID-19 illness, exposure, or fear of exposure

	Kenya (n=26)	Cameroon (n=13)
Screen staff daily for fever, symptoms, and/or exposures	26 (100%)	10 (77%)
Quarantine for exposed staff	23 (88%)	12 (92%)
Isolation and return-to-work requirements for infected staff	23 (88%)	11 (85%)
Provided training on COVID-19	22 (85%)	7 (54%)
Provide training on IPC/PPE use	21 (81%)	8 (62%)
Provided guidance/SOPs on IPC	20 (77%)	6 (46%)
Requested sufficient PPE	20 (77%)	11 (85%)
Requested sufficient sanitizing materials	20 (77%)	9 (69%)
Installed barriers in registration area	19 (73%)	4 (31%)
Reorganized/increase space, patient triage for social distancing	17 (65%)	10 (77%)
Repaired/improved water supply/obtained sufficient soap	14 (54%)	9 (69%)
Re-budgeted/redirected funds to purchase PPE and IPC supplies	13 (50%)	5 (38%)
Improved ventilation (i.e., installed fans)	6 (23%)	2 (15%)
Instituted disciplinary guidelines for not following procedures	2 (8%)	8 (62%)
Other	3 (12%)	2 (15%)

In Kenya, all the responding health facilities developed plans for screening staff, and 88% (n=23) had plans for both quarantining exposed staff, and isolation and return to work requirements for infected staff. Other frequently reported plans were the provision of training on COVID-19 (85%, n=22) and IPC/PPE use (81%, n=21). In Cameroon, fewer health facilities had plans for daily screening of staff (77%, n=10). Nearly all facilities had plans for quarantining exposed staff (92%, n=12), and 85% (n=11) of facilities had plans for isolating infected staff and requesting sufficient PPE.

Lack of PPE

There were responses from IPC-FPs of 14 Kenya and 12 Cameroon health facilities to questions on the lack of PPE contributing to service disruption. Tables 9-11 present their responses on the reported availability of PPE, whether and how frequently an inventory was done, if a calculator was used to estimate “burn” rates, the PPE ordering process, and strategies to conserve PPE.

Table 9: Availability of PPE prior to service disruption

	Kenya (n=14)	Cameroon (n=12)
Gloves	13 (93%)	9 (75%)
Surgical/medical mask	9 (64%)	9 (75%)
Gown	8 (57%)	4 (33%)
Respirator mask (i.e., N95)	7 (50%)	2 (17%)
Goggles	5 (36%)	4 (33%)
Boots	5 (36%)	6 (50%)
Face shield	1 (7%)	4 (33%)

In both countries, gloves were generally available, (Kenya: 93%, n=13, Cameroon: 75%, n=9), while face shields in Kenya (7%, n=1), and respirator masks in Cameroon (17%, n=2), tended to be less available. All health facilities in Kenya did an inventory of PPE, while 2 in Cameroon apparently did not.²

A single Kenya facility used the MOH calculator to estimate “burn-rates”, 2 used other calculators, the remainder of the facilities (79%, n=11), did not use any calculators. In Cameroon, none of the IPC-FPs reported that facilities used calculators.

The summary of the process of ordering PPE is presented in Table 10. Most health facilities (64%, n=9) in Kenya, placed orders through the county health authority, while 1 facility did not order, and had supplies provided. In Cameroon, 42% (n=5) of health facilities had supplies provided, 3 (25%) ordered through the regional health authority, while 25% (n=3) of IPC-FPs did not know.

Table 10: Process of ordering PPE

	Kenya (n=14)	Cameroon (n=12)
Placed order through region/county health authority	9 (64%)	3 (25%)
Placed order with national/central stores/organization	4 (29%)	1 (8%)
Placed order through central faith-based organization	2 (14%)	-
No ordering, supplies provided	1 (7%)	5 (42%)
Do not know	1 (7%)	3 (25%)
Other	4 (29%)	3 (25%)

Responses to strategies implemented to conserve PPE are presented in Table 11. In Kenya, about two-thirds of responses (n=16) were extended use of surgical/medical masks, similarly in Cameroon. However, extending the use of respiratory masks in Cameroon was also frequently mentioned, 9/17, responses.

Table 11: Strategies to conserve PPE

	Kenya (n=14)	Cameroon (n=12)
Extended use of surgical/medical masks*	10 (71%)	6 (50%)
Extended use of respiratory masks	6 (43%)	6 (50%)
Extended use of gowns	6 (43%)	4 (33%)
Reuse of gowns[†]	6 (43%)	2 (17%)
Reuse of surgical/medical masks	5 (36%)	6 (50%)
Reuse of respiratory masks	4 (29%)	1 (8%)
Reuse of face shields/goggles	3 (21%)	3 (25%)
Extended use of face shields/goggles	2 (14%)	1 (8%)
Other	5 (36%)	1 (8%)

*Extended use = wearing same PPE for multiple patients without removing respirator between patients

[†]Reuse = using same PPE for multiple patients but removing it after each patient

None of the health facilities reported reasons related to shortages of IPC-related equipment or supplies other than PPE or a lack of hand washing stations.

Unable to identify and isolate patients for COVID-19

In Kenya, IPC-FPs in all 18 health facilities who reported disruption due to this reason screened patients for COVID-19. All 18 used temperature checks, 14 (78%) also used a screening questionnaire, and 2 (11%) used other screenings. In Cameroon, among the IPC-FPs of 16 health facilities reporting on this reason for disruption, 81% (n=13) screened

patients. Of those 13 facilities, 12 (92%) used a screening questionnaire, 8 (62%) employed temperature checks, and 8 (62%) used additional screenings. The 3 (19%) facilities that did not screen reported the reasons as being staff shortages, lack of equipment and supplies, and lack of guidelines/SOPs.

All 18 Kenya health facilities triaged patients with suspected COVID-19 (Table 12). Nearly all, (94%, n=17) placed patients in a separate room. Similarly, in Cameroon, 94% (n=15) of health facilities triaged these patients, with 9 (60%) placing patients in a separate ward. One facility did not triage due to staff shortages.

Table 12: Triaging of patients with suspected COVID-19

	Kenya (n=18)	Cameroon (n=15)
Placed them in a separate room	17 (94%)	5 (33%)
Placed them in a separate ward	11 (61%)	9 (60%)
Referred them to another facility	10 (56%)	7 (47%)
Other (tents)	4 (22%)	7 (47%)

IPC-FPs reported on testing patients with suspected COVID-19 in their facility. In over 70% (n=13) of Kenya health facilities, IPC-FPs reported not testing suspected COVID-19 patients, instead referring these patients to other facilities (Table 13). The IPC-FPs for 10 facilities (77%) stated that they lacked test kits, and 3 (23%) reported not having trained staff. In Cameroon, 56% (n=9) health facilities were reported to have not tested patients with suspected COVID-19. The reasons for this are shown in Table 13. Of the 8 IPC-FP who gave reasons, 4 (50%) reported referral of these patients to other facilities, 3 (38%) noted a lack of test kits.

Table 13: Reasons for not testing suspected COVID-19 patients

	Kenya (n=13)	Cameroon (n=8)
Referred to other facility	13 (100%)	4 (50%)
Lack of test kits	10 (77%)	3 (38%)
Lack of trained staff	3 (23%)	1 (13%)
Other	2 (15%)	1 (13%)

Table 14 presents actions taken for patients testing COVID-19 positive by health facilities in Kenya and Cameroon. The most frequently stated actions were referral to another facility (Kenya 83%, n=15), Cameroon 63%, n=10), recommended home isolation (Kenya 78%, n=14, Cameroon 50%, n=8), and placed in isolation ward (Kenya 78%, n=14, Cameroon 31%, n=5). About 30% of health facilities (n=5) in Cameroon were reported to have referred patients to state-run isolation centers.

Table 14: Actions taken for patients testing COVID-19 positive

	Kenya (n=18)	Cameroon (n=16)
Referred to other facility	15 (83%)	10 (63%)
Placed in isolation ward	14 (78%)	5 (31%)
Recommended home isolation	14 (78%)	8 (50%)
Referred to state-run isolation centers	2 (11%)	5 (31%)
Other	2 (11%)	6 (38%)

COVID-19 illness in health facility staff

In Kenya, IPC-FPs for 17 health facilities reported COVID-19 illness in health facility staff as a reason for service disruption. Of these, immediately prior to the disruption, 88% (n=15) reported screening staff for COVID-19, all 15 used

temperature checks, 13 (n=87%) also used a screening questionnaire, and 3 (20%) used other screening methods. Two facilities reported not screening staff due to a lack of equipment and supplies, no guidelines/SOPs, and for other reasons. One facility also indicated a shortage of staff as a reason. Prior to the service disruption, if staff were suspected of having COVID-19 illness, 16 (94%) facilities required home isolation, 12 (71%) tested staff for COVID-19, 7 (41%) isolated staff in the facility (e.g., nurses' home), and 6 took additional actions.

Of 5 (29%) facilities that did not test staff for COVID-19, all reported a lack of test kits as a reason. Other reasons reported were the need to prioritize the use of test kits (1 facility), no guidelines/SOPs (1 facility), and for other reasons (2 facilities).

In Cameroon, 12 health facilities reported COVID-19 illness in health facility staff as a reason for service disruption. Of these, immediately prior to the disruption, 8 (67%) screened for staff for COVID-19, 7 (58%) used a screening questionnaire, 6 (50%) used temperature checks, and 2 (17%) used other screening procedures. Among the 4 (33%) facilities that did not screen, 3 indicated that this was for "other" reasons, and one reported a lack of equipment and supplies. If staff were suspected of having COVID-19 illness, they were reported to be tested in 11 facilities (92%), to isolate in the facility (e.g., nurses' home), in 6 (50%), and 3 (25%) required home isolation. The one facility that did not test for COVID-19 reported the reason being a lack of test kits.

IPC-FPs responses to the facility plans to reduce the chance of future outbreaks of COVID-19 illness in patients and/or staff are presented in Table 15.

Table 15: Plans to reduce the risk of future outbreaks of COVID-19 among patients and/or staff in the facility

	Kenya (n=17)	Cameroon (n=11)
Implement IPC guidelines/SOPs	17 (100%)	8 (73%)
Provide all staff with appropriate PPE	16 (94%)	10 (91%)
Screen and triage patients	16 (94%)	10 (91%)
Provide training on IPC/PPE use	16 (94%)	9 (82%)
Provide training on COVID-19	15 (88%)	9 (82%)
Screen staff	15 (88%)	5 (45%)
Regular facility disinfecting/sanitizing	15 (88%)	10 (91%)
Implement COVID-19 guidelines	14 (82%)	10 (91%)
Reorganize/increase space, patient triage for social distancing	14 (82%)	8 (73%)
Repair/improved water supply/obtained sufficient soap	12 (71%)	8 (73%)
Re-budget/redirect funds to purchase PPE and IPC supplies	8 (47%)	5 (45%)
Improve ventilation (i.e., installed fans)	6 (35%)	3 (27%)
Institute disciplinary guidelines for not following procedures	3 (18%)	6 (55%)
Other	2 (12%)	--

In Kenya, all 17 health facilities planned to implement IPC guidelines/SOPs. Most facilities (94%, n=16) also reported providing all staff with appropriate PPE, training on IPC/PPE use, and screening and triaging patients. In Cameroon, most health facilities (91%, n=10) responded they planned to provide all staff with appropriate PPE, implement COVID-19 guidelines, screen and triage patients, and regularly disinfecting/sanitizing the facility.

Additional time needed to implement IPC procedures (e.g. facility disinfection, equipment sterilization, etc.)

Six health facilities each in Kenya and Cameroon reported services that were disrupted due to the additional time needed to implement IPC procedures. Table 16 presents the IPC procedures that required additional implementation time.

Table 16: IPC procedures requiring additional time for implementation

	Kenya (n=6)	Cameroon (n=6)
Routine environmental cleaning	4	4
Facility disinfection	6	4
Ward/outpatient area disinfection	6	5
Equipment sterilization	4	3
Infectious waste management	2	4

All six Kenyan health facilities indicated that disinfection procedures in the facility and ward/outpatient area required additional time, resulting in service disruption. In Cameroon, five of the six health facilities stated the need for ward/outpatient disinfection as the reason. Reasons given for the need for additional time are presented in Table 17.

Table 17: Reasons for additional time needed to implement the IPC procedures

	Kenya (n=6)	Cameroon (n=6)
Identification of staff with COVID-19	5	4
Identification of patient(s) with COVID-19	6	3
Procedures could only be done during working hours	4	--
Shortage of cleaning supplies	1	1
Water supply problem	--	2
Shortage of trained cleaning staff	--	2

In Kenya, all six facilities indicated that additional time was needed because patients had COVID-19, and five facilities reported that staff had COVID-19. In Cameroon, four out of six facilities reported that staff had COVID-19 and three facilities reported patients had COVID-19.

Implementation of physical (social) distancing requirements to reduce the risk of infection

IPC-FPs responses on the implementation of the types of social distancing measures taken that contributed to service disruption, and the actions taken to reduce/mitigate the impact of these measures, are presented in Tables 18 and 19.

In Kenya, all 44 health facilities asked about physical distancing utilized outdoor space for distancing in waiting rooms, and 93% (n=43) limited the number of patients in indoor spaces to maintain distancing. In Cameroon, the frequency of the measures was similar, though in 8 of the 10 health facilities, modifications were made for indoor patient distancing and for limiting close contact by staff.

Table 18: Types of physical (social) distancing measures implemented (prior to disruption)

	Kenya (n=44)	Cameroon (n=10)
Use of outdoor space to provide for distancing in waiting rooms	44 (100%)	7 (70%)
Limiting the number of patients in indoor space to allow for distancing	43 (98%)	6 (60%)
Modifications of indoor space to allow for distancing between patients	28 (64%)	8 (80%)
Modification to limit close contact/gathering of staff	26 (59%)	8 (80%)
Installation of barriers between staff/patients or patients/patients	17 (39%)	5 (50%)
Modifications to provide additional distancing between beds in wards	15 (34%)	4 (40%)
Other	10 (23%)	1 (10%)

In Kenya, the more frequent actions taken to mitigate the effect of the distancing measures on service disruption were reorganizing the patient flow (98%, n=43) and using more outdoor space (91%, n=40). This was similar to health facilities in Cameroon, with the addition of the use of under-utilized facility/space.

Table 19: Actions taken to reduce the impact of the distancing measure on service disruption

	Kenya (n=44)	Cameroon (n=10)
Reorganized patient flow	43 (98%)	8 (80%)
Used more outdoor space	40 (91%)	6 (60%)
Used underutilized facility/space	14 (32%)	6 (60%)
Renovated facility to create more space	8 (18%)	2 (20%)
Other	10 (23%)	--

Facility was unable to implement physical (social) distancing requirements to reduce the risk of infection

Only Kenya health facilities reported service disruption related to inability to implement distancing requirement to reduce the risk of infection. A total of eight facilities reported on this reason with seven reporting this was due to lack of sufficient indoor space for patient distancing. The lack of outdoor space to provide additional room for distancing was a reason in five facilities, as was inability to provide barriers between staff/patients or patients/patients. Additional reasons included: lack of sufficient space for staff to distance from each other (three facilities), lack of space to provide distancing between beds in wards (two facilities), staff transport provided by the facility did not allow for distancing (one facility), and other reasons (three facilities).

Actions taken to mitigate the inability to implement distancing requirements included reorganized patient flow in all eight facilities, using more outdoor space and providing patients with other locations to receive services in seven facilities, providing care by phone instead of in-person in two facilities, renovating facility to create more space in one facility, using/converting underutilized facility/space in one facility. Other reasons were reported in one facility.

Facility attendance by service delivery over time

To correlate changes in attendance with health service disruptions potentially due to IPC, routine aggregate patient attendance reports from the surveyed health facilities were abstracted from the MOH DHIS2 databases in Kenya and Cameroon, for the period preceding the SARS-CoV-2 pandemic (March 2019-February 2020) and during the pandemic (March 2020-February 2021). Figures 2-10 present attendance at inpatient and outpatient services, ANC, TB and surgical services by county (Kenya) and except for surgery, similarly for the regions in Cameroon, as well as hypertension and diabetes services. Attendance data for hypertension and diabetes services were not available for the Kenya health facilities.

In Kenya, there were declines in attendances for outpatient, ANC and surgical services associated with the COVID-19 waves, in general. The trend for TB services and inpatient admissions was less clear. There was an increase in inpatient admissions most obviously in Nairobi from October -December 2020, corresponding with the increase in confirmed COVID-19 cases, (Figure 2). Overall outpatient attendances declined during the COVID-19 waves, with sharp declines in all three counties at the beginning of the first wave in April 2020, and again in December, around the peak of the second wave (Figure 3). Declines were also observed for ANC attendances in September/October 2020 and December 2020/January 2021 associated with the COVID-19 waves, (Figure 4). Attendances for TB services, (Figure 5), showed Kiambu only exhibiting a decline in TB attendances associated with COVID-19. There did not appear to be any correlation of attendance with the trend in national confirmed COVID-19 cases in the other counties. Though there was variation by time, attendances for surgical services, (Figure 6) showed declines associated with the waves of COVID-19.

In Cameroon, trends in inpatient admissions and ANC attendances varied by region, while there were overall declines in OPD visits, and attendances for hypertension and diabetic services, in relation to COVID-19 waves, though OPD visits recovered after the first wave. Centre and Littoral regions showed little change in in-patient admissions, while the Ouest region showed a decline in association with COVID-19, (Figure 7). After OPD visit declines associated with

the first COVID-19 wave in all three regions, there were increases in all regions, though a slightly different time point, (Figure 8). Attendance for ANC services declined in the Centre and Littoral regions in association with the COVID-19 wave April – June 2020, but not the Ouest, (Figure 9), with a decline again in January 2021. Overall attendances for hypertension and diabetic services declined in relation to the COVID-19 waves for all three regions, (Figure 11).

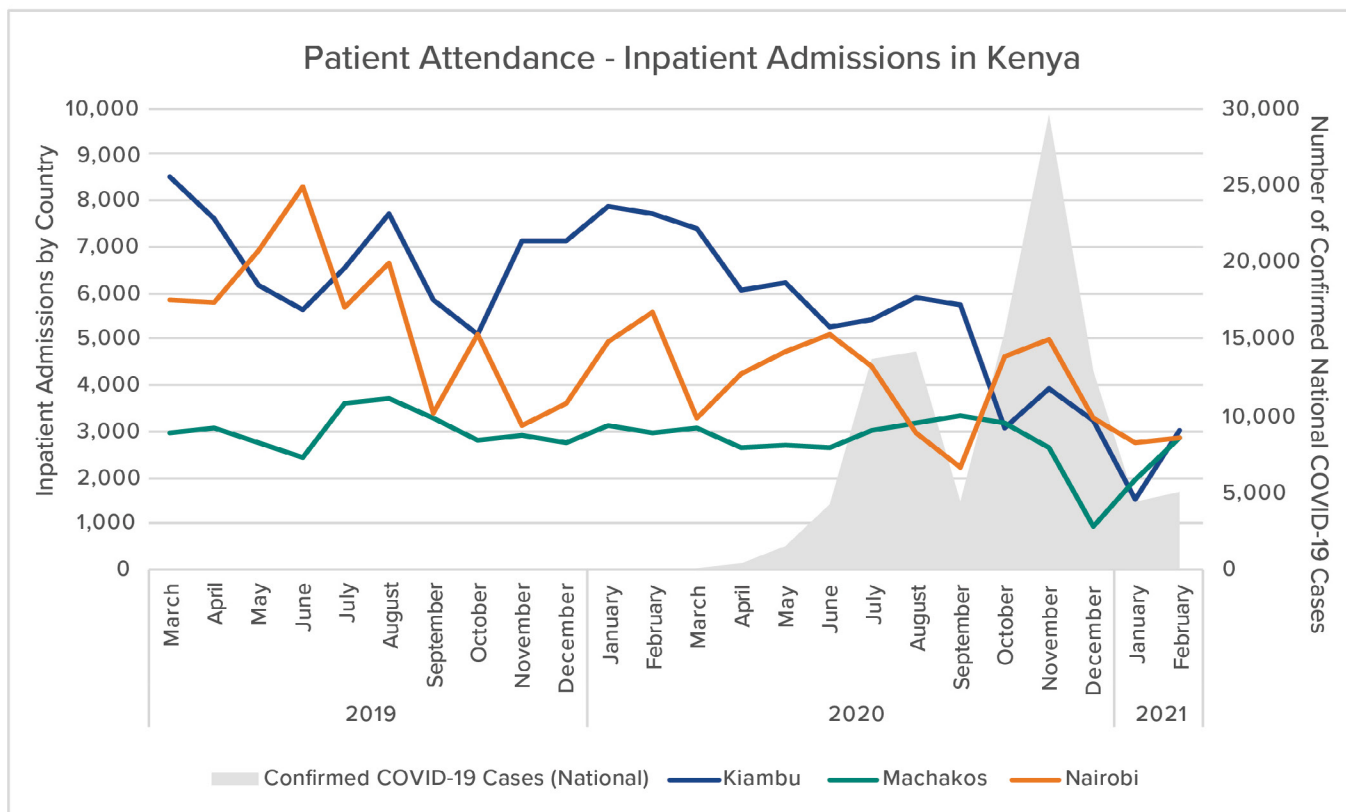


Figure 2. Patient attendance: Inpatient admissions in Kenya

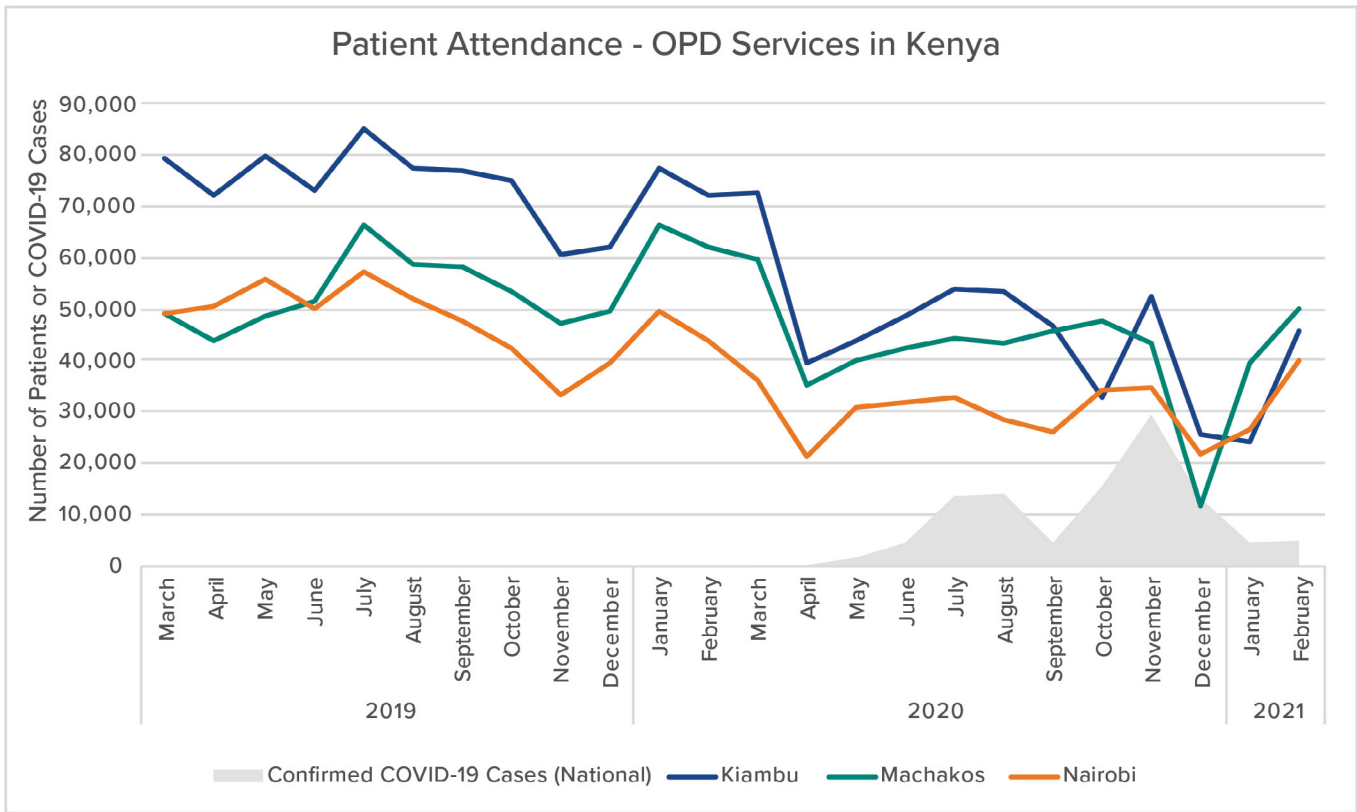


Figure 3. Patient attendance: OPD services in Kenya

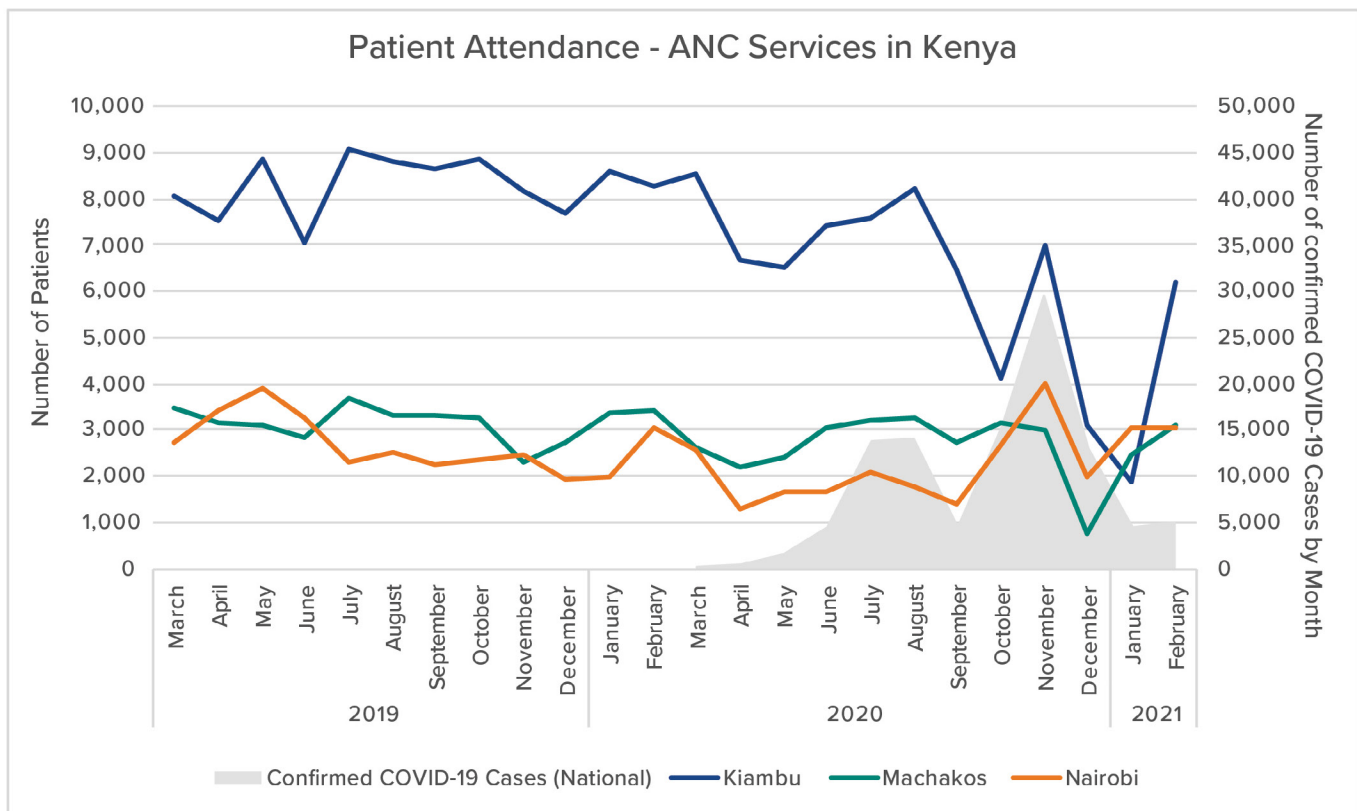


Figure 4. Patient attendance: ANC services in Kenya

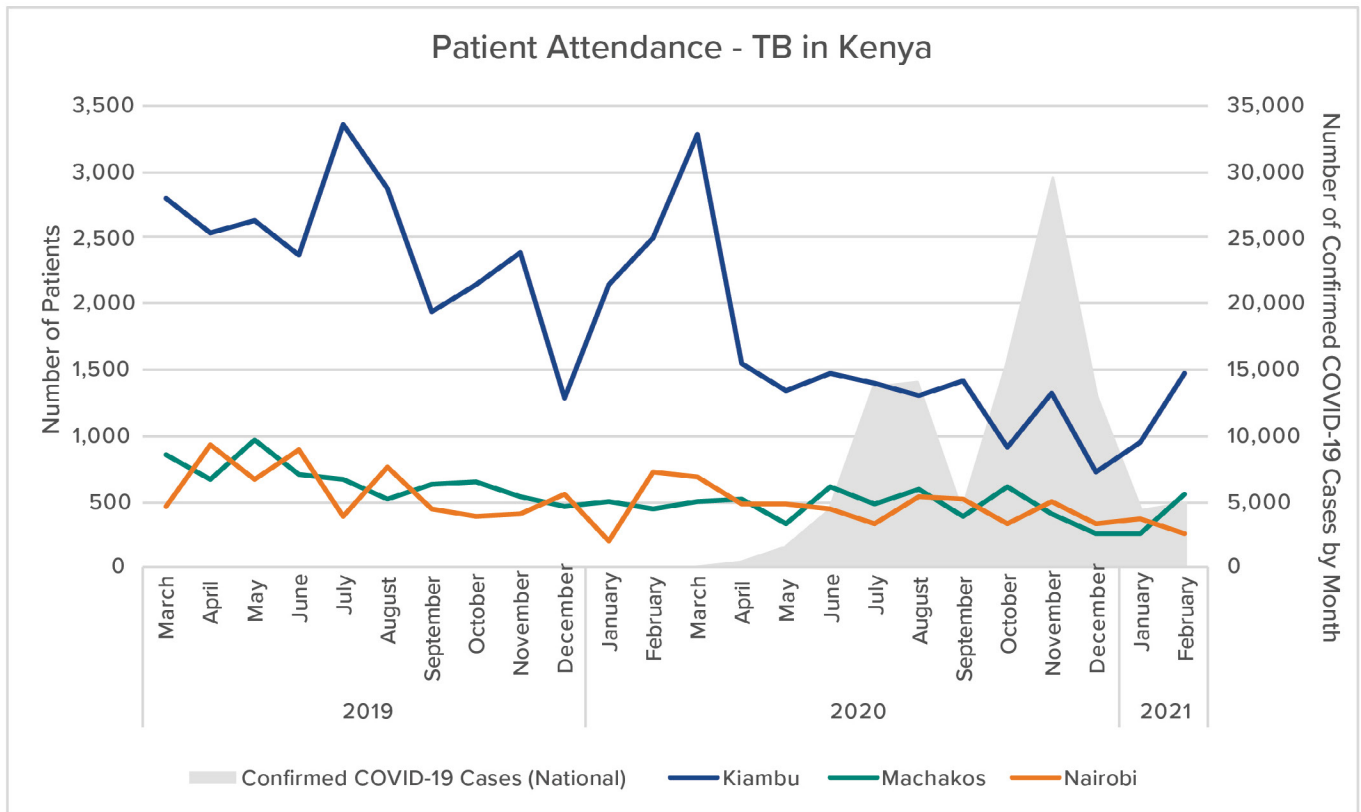


Figure 5. Patient attendance: TB services in Kenya

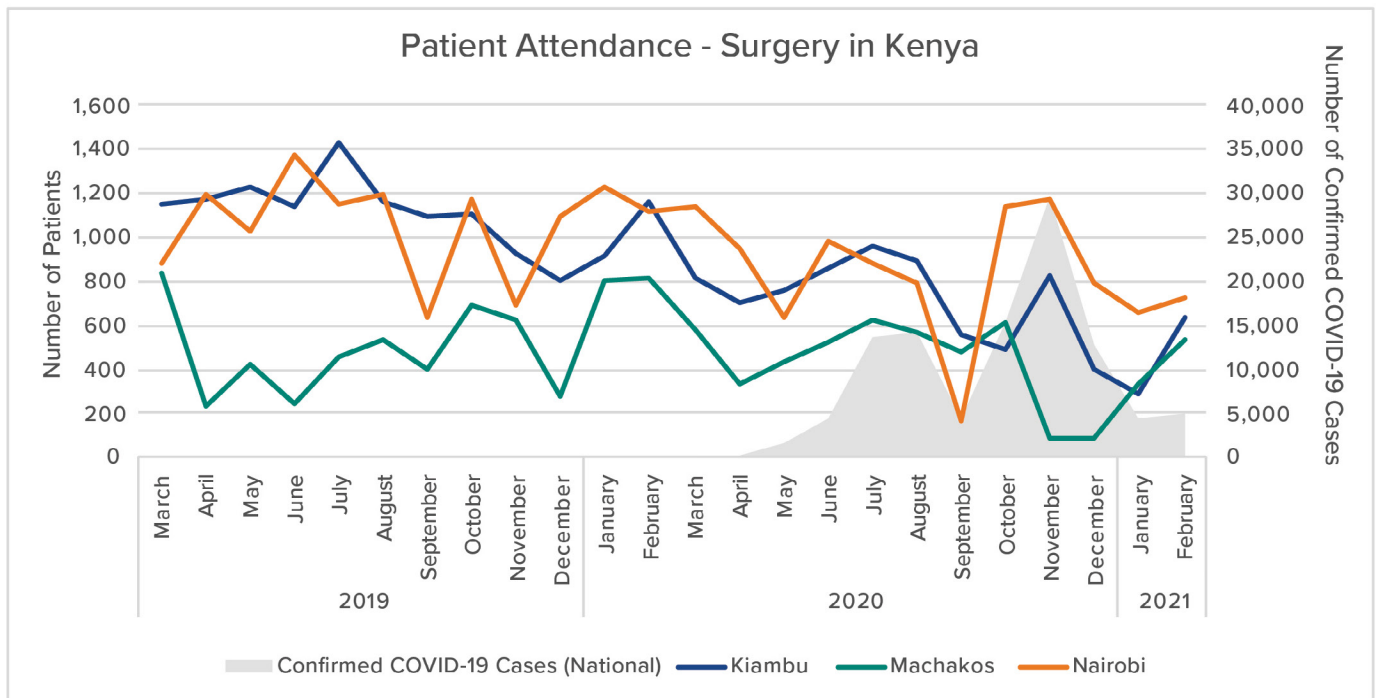


Figure 6. Patient attendance: Surgery services in Kenya

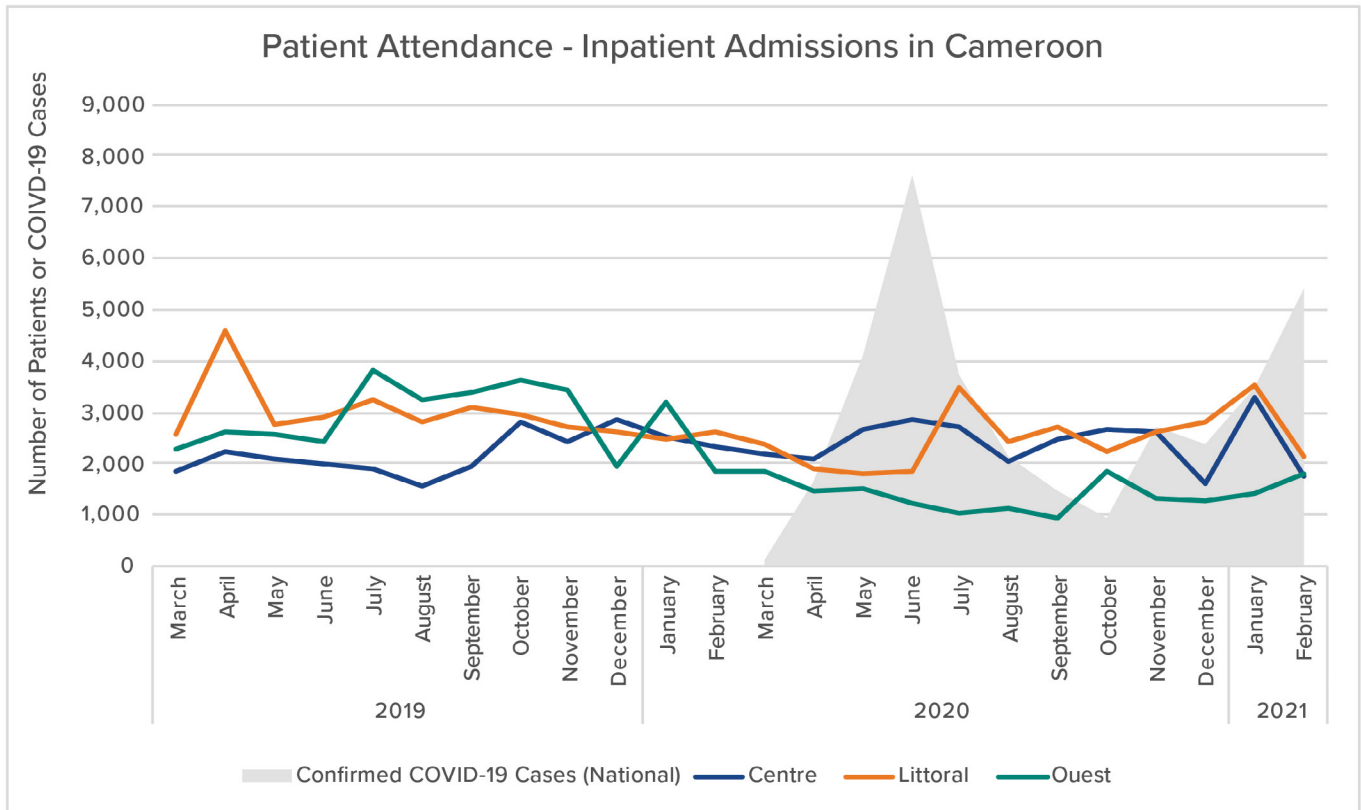


Figure 7. Patient attendance: Inpatient admissions in Cameroon

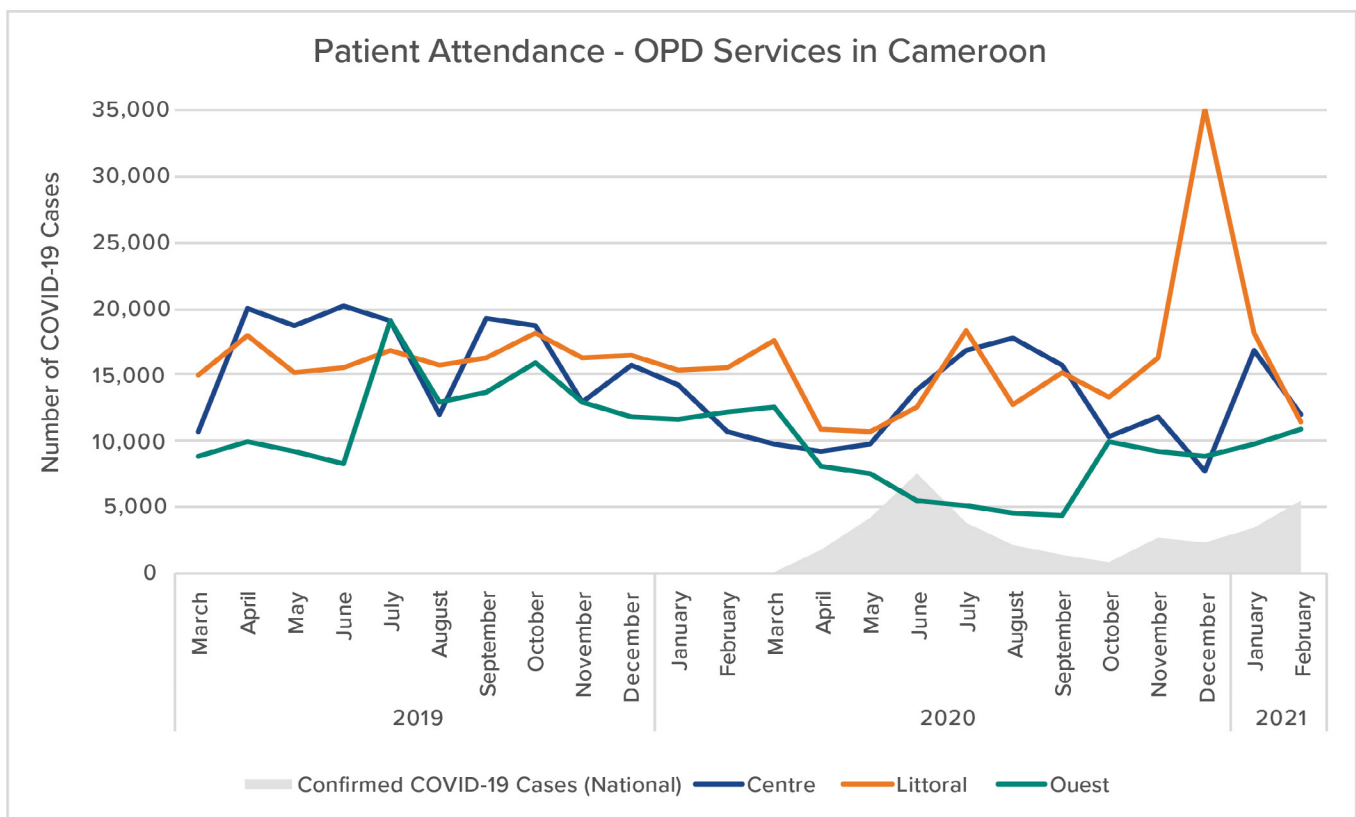


Figure 8. Patient attendance: OPD services in Cameroon

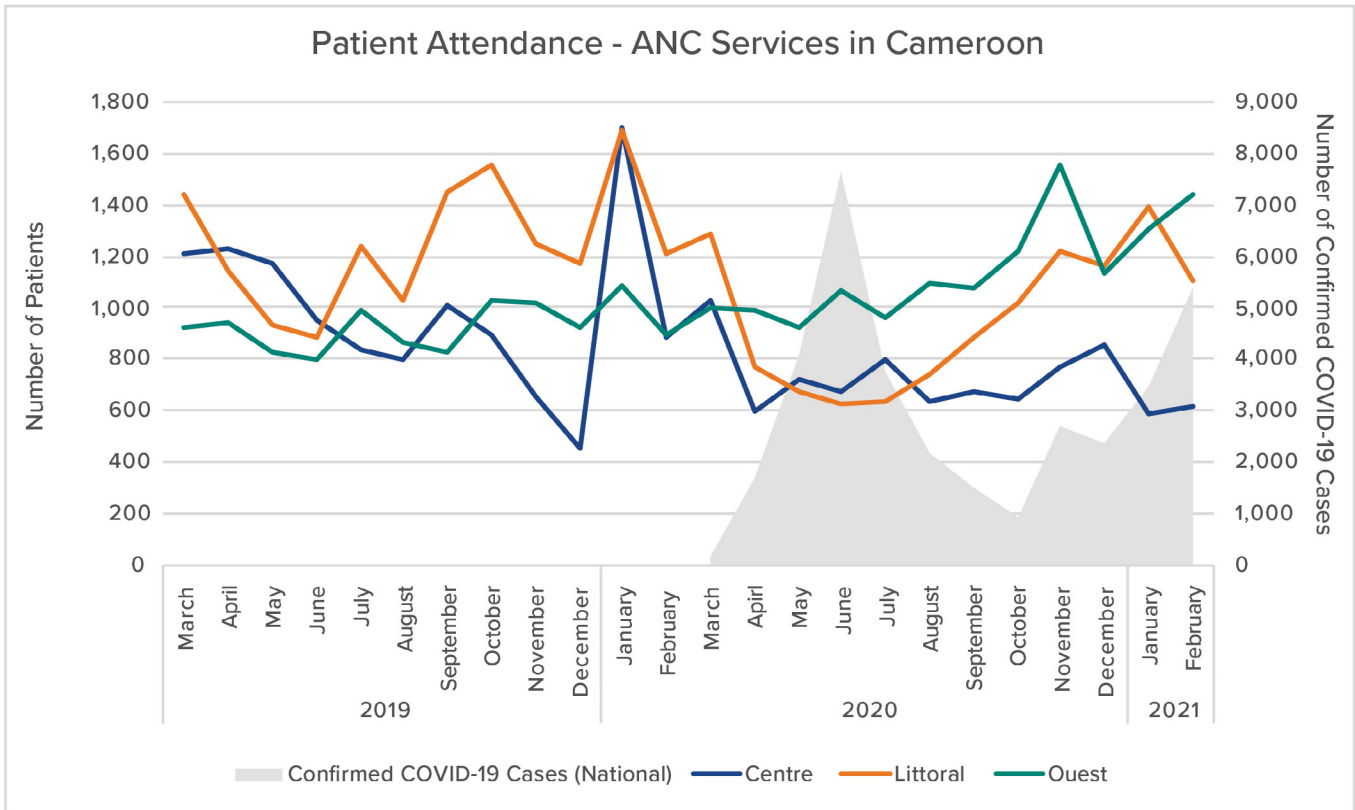


Figure 9. Patient attendance: ANC services in Cameroon

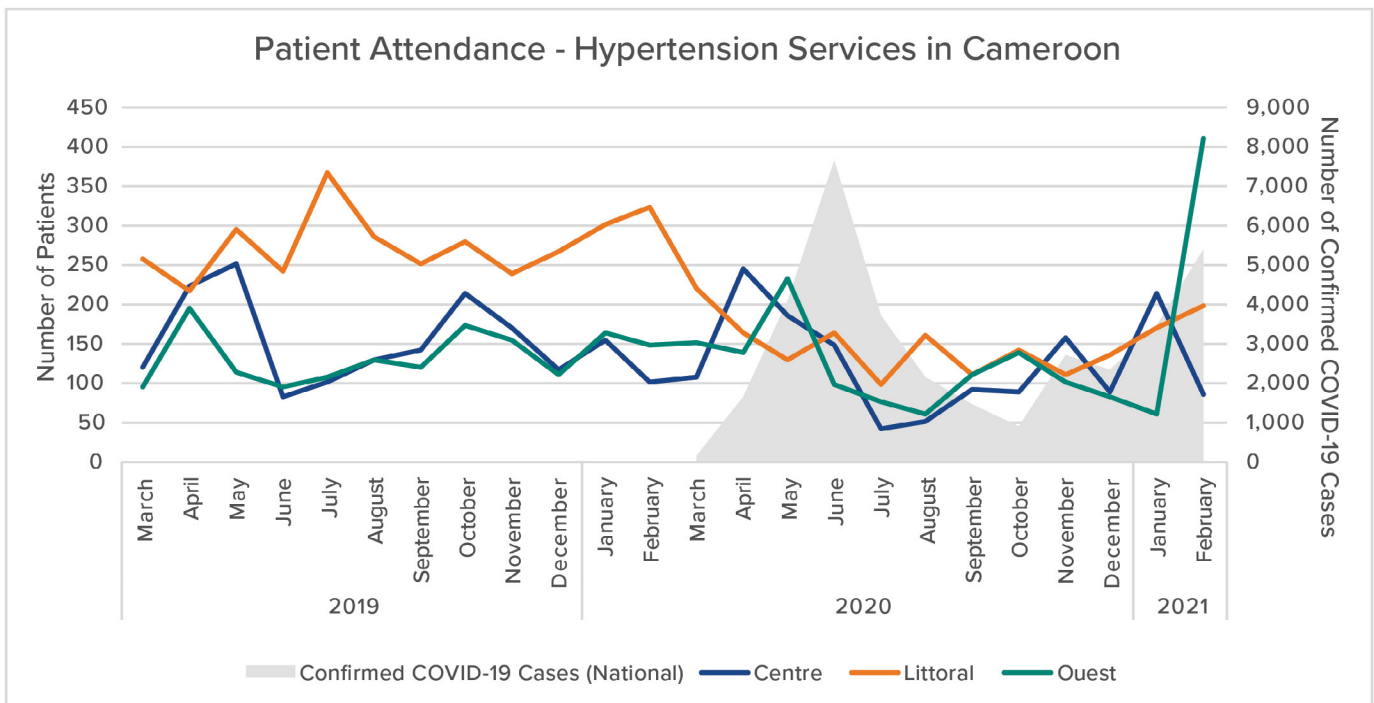


Figure 10. Patient attendance: Hypertension services in Cameroon

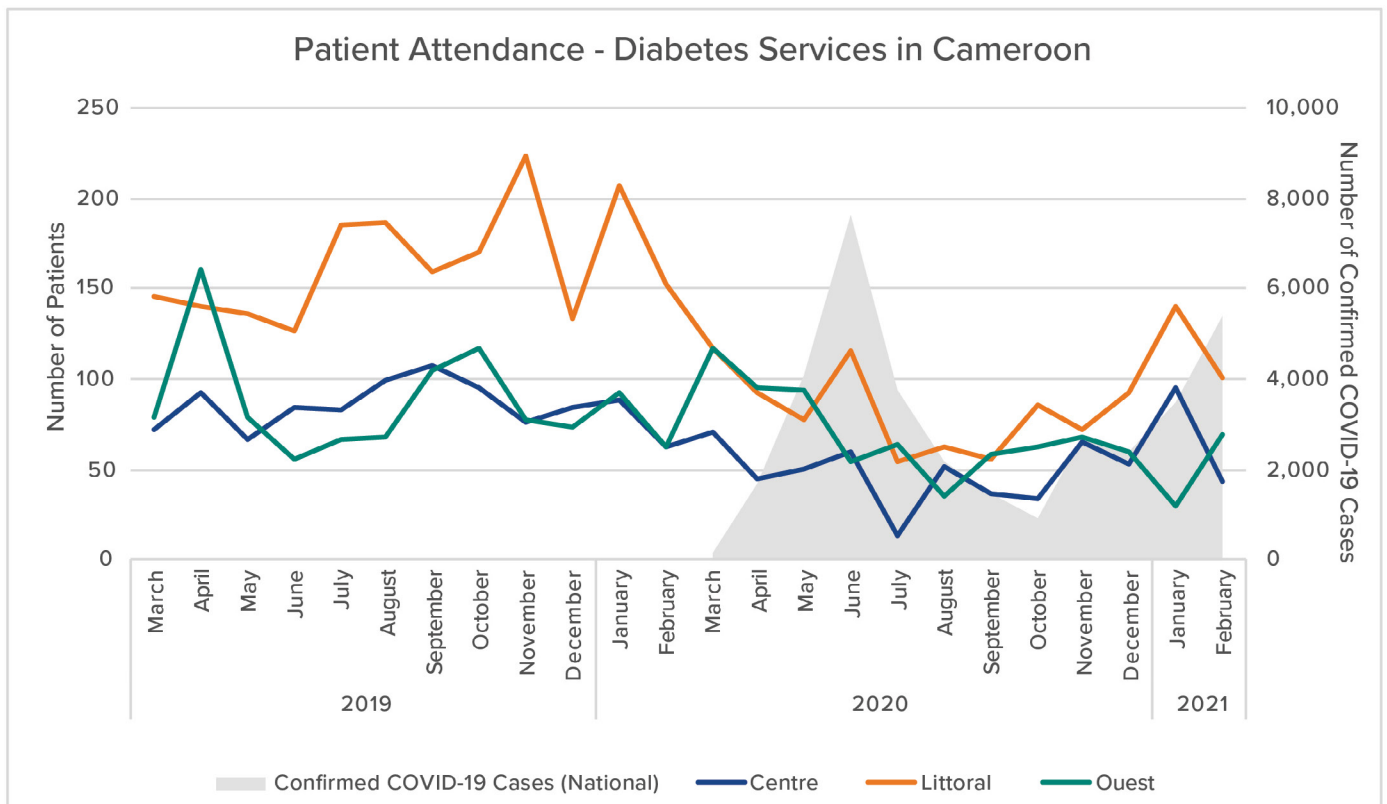


Figure 11. Patient attendance: Diabetes services in Cameroon

Policies and directives

IPC facility-related directives relevant to the 3 counties/regions in each country were reviewed and the focus and content summarized. The overall summaries of these directives are presented below.

In Kenya, there were directives in all three counties on suspension of services, patient spacing and sanitizing procedures. These directives were issued from March 2020, with some at the beginning of April 2020. Elective surgeries were suspended in all three counties, and in Machakos, this included deferral of routine dental procedures (which was a country-wide directive), and stand-alone dental services ceased for at least 14 days. Included in the patient spacing directives were directives on adjusting scheduled clinical visits, for example for TB, HIV, NCD, and physical therapy patients. An effect of patient spacing was that in some cases, service hours were reduced because of hospitals adapting this directive to reduce congestion. The directives on sanitizing procedures were a mandate that all health facilities have adequate handwashing points and sanitizers.

In Cameroon, there were specific directives on patient spacing (physical distancing) and sanitizing procedures included in the SOPs for COVID-19 Preparedness and Response in Cameroon prepared and disseminated by the MOH. However, there appeared to be no specific directives on suspension of services, reduction in service hours or patient volumes.

Summary

Extent, type, and duration of health service disruptions

- Nearly all health facilities reported service disruptions in both countries; 98% of Kenya facilities and 75% of Cameroon facilities reported at least one disruption.
- Limiting patient volumes, service staff reductions and service suspension/reduced scope were the most frequently reported disruptions. Ward closures and facility closures were rarely reported.

- In Kenya, overall, the severity of disruption tended to be low-to-moderate (<50%), though 20% of facilities reported that the reduction in service scope affected >50% of services. In Cameroon however, 36% of facilities reported that limiting patient volume was severe (>50% of services affected), as did 33% for reduced service hours.
- The duration of disruptions ranged from 7 (IQR: 0-15) weeks for ward closures to 25 (IQR:14-37) weeks due to limited patient volumes in Kenya. In Cameroon, the duration of disruption ranged from 0 (IQR: 0-4) weeks for ward closures to 32 (IQR: 19-42) weeks for limiting patient volumes.
- Disruption occurred across all health service delivery areas. Services involving children (Under-five clinics, nutrition, immunization) and women (maternal and child health, ANC/maternity, FP/contraceptive), surgery, medical ward, and mental health (Kenya only) were particularly affected.

Reasons for disruption: IPC and non-IPC

- In Kenya, frequently reported reasons for service disruption were a reduced number of patients attending, the need to implement physical distancing measures, and national or county directives related to IPC. For Cameroon, these reasons were outbreak of COVID-19 illness in the facility, the need to implement physical distancing, conversion of health facilities to a COVID-19 treatment center, and directives related to IPC.
- In both countries common IPC-related reasons for disruption were diverting resources to accommodate physical distancing, IPC-related directives, COVID-19 outbreaks among patients or staff, staff shortages due to COVID-19 illness, or perceived infection risk, and lack of adequate PPE.

IPC-related reasons for disruption; limitations or commitments

- Nearly two-thirds of Kenya health facilities and one-third of Cameroon facilities reported services were disrupted due to IPC-related directives.

Service disrupted resulting from national/regional/district MOH IPC-related directives

- Actions taken to mitigate disruption from implementation of IPC-related directives included prioritization of high-risk patients, redirecting patients to other health facilities, extending multi-month prescriptions, and caring for patients via telephone or internet.

Health personnel shortages due to COVID-19 illness or fear of illness

- In Kenya, lack of or insufficient training in IPC, lack of COVID-19 training/orientation, and lack of or insufficient PPE were the most common reasons HCWs could have been exposed to SARS-CoV-2 in the facility. Inadequate training in donning/doffing PPE was also cited as a reason. In Cameroon, lack of PPE was the most cited reason, followed by lack of/insufficient supplies for cleaning/disinfecting and handwashing, and lack of/insufficient IPC training. Medical and nursing staff faced the most shortages in both countries and staff from other units were deployed to keep services running as normal. While many Cameroon health facilities deployed staff to other facilities to keep services running as normal, this was less common in Kenya.
- Most health facilities developed plans to reduce the risk of staff shortages due to COVID-19 illness or fear of illness. These plans included exposure/symptom screening, quarantine for exposed staff, isolation for infected staff, training on COVID-19/IPC (Kenya), and requests for sufficient PPE (Cameroon).

Lack of PPE

- All health facilities in Kenya did an inventory of PPE regularly, while about one-third of health facilities in Cameroon did not conduct a PPE inventory.
- While most HCWs had access to gloves and surgical masks, face shields, respirator masks, goggles and gowns were less available.
- None of the facilities in either country used calculators to estimate the use or “burn” rates of PPE.

- To access PPE, most Kenya facilities ordered PPE through the county health authority, while in Cameroon, the greater number were provided with supplies (without ordering).
- The majority of Kenya facilities extended the use of surgical/medical masks, while in Cameroon, half of the facilities extended the use of respiratory and surgical/medical masks and reused surgical/medical masks.

Identification and isolation of patients for COVID-19 (prior to disruption)

- Nearly all health facilities screened patients for COVID-19 using temperature checks and a screening questionnaire. The few facilities that did not screen reported staff shortages, lack of equipment and supplies, and no guidelines/SOPs as the reasons.
- Nearly all facilities triaged patients with suspected COVID-19, either in a separate room or a separate ward. One Cameroon facility did not triage due to staff shortages.
- Over two-thirds of Kenya facilities and half of Cameroon facilities did not test patients for COVID-19. In Kenya, most of these facilities lacked test kits, all referred patients to other facilities, and some lacked trained staff. Among facilities not providing COVID-19 testing, only half referred patients to another facility and over a third reported they lacked test kits.
- Common actions taken for patients testing positive were referral to another facility, recommended home isolation, and placement in an isolation ward.

COVID-19 illness in health facility staff

- Most health facilities screened staff for COVID-19 using temperature checks and/or a screening questionnaire. Common reasons for not screening were a lack of equipment and supplies, no guidelines/SOPs, and staffing shortages.
- Most staff suspected of having COVID-19 illness were tested for SARS-CoV-2 and were required to home-isolate, or isolate in the facility (i.e., nurses' home)
- All health facilities that did not test staff for COVID-19 reported a lack of test kits, with some also reporting a need to prioritize the use of test kits and a lack of SOPs.
- Plans to reduce the risk of future outbreaks among staff and/or patients included implementing COVID-19 and IPC guidelines/SOPs, providing all staff with appropriate PPE, screening and triaging patients, and regular facility disinfecting/sanitizing.

Additional time needed to implement IPC procedures (contributing to service disruption)

- 10% of Kenya health facilities and 13% of Cameroon health facilities (6 facilities in each country) noted that services were disrupted due to the need to follow IPC procedures, primarily disinfection of the facility, wards, or outpatient areas.
- Reasons for needing additional time included patients and/or staff having COVID-19, procedures could only be done during working hours, water supply problems, and/or a shortage of trained cleaning staff. In one instance there was also a shortage of cleaning supplies.

Implementation of physical (social) distancing requirements

- To implement distancing requirements, health facilities utilized outdoor space in waiting rooms, limited the number of patients in indoor spaces, and made modifications for indoor patient distancing and to limit close contact/gathering by staff.
- Actions taken to mitigate the effect of distance requirements on service disruption included reorganizing the patient flow and using more outdoor space and making use of under-utilized facility/space.

Unable to implement physical distancing requirements (Kenya only)

- The inability to implement distancing was mostly due to lack of outdoor space to provide additional room for distancing, lack of sufficient indoor space for distancing between patients, and being unable to provide barriers between staff and patients or among patients.
- To mitigate the inability to implement distancing requirements, health facilities reorganized patient flow, used more outdoor space, and provided patients with other locations to receive services. A few facilities provided care by phone instead of in-person.

Contribution of IPC-related service disruptions on facility attendance across service delivery points

- There were declines in attendances for outpatient, ANC and surgical services associated with the COVID-19 waves, in Kenya, consistent with the findings from the interviews with the health facility directors on IPC-related disruptions. The trend for TB services and inpatient admissions was however, less clear; this may be because TB symptoms are related to that of COVID-19, so that some of those attendances, at least initially, may have been mistakenly documented at attendances for TB services. In Cameroon, there were declines in attendances for OPD, hypertension and diabetic services in Cameroon, consistent with those reported by the facility directors in relation to IPC-related disruptions. There was regional variation in the inpatient and ANC attendances.

Discussion

This survey demonstrated that nearly all sampled health facilities experienced service disruptions, with disruptions across all health service delivery areas. However, NCD, maternal and child health, surgery and in Kenya, mental health services tended to be more affected. Much of the disruption was associated with limited patient volumes, reduced service staff, and suspended or reduced services. The severity of the disruptions was low-to-moderate in both countries. Severity was associated with reductions in staff or the scope of services.

The reasons for the service disruptions tended to differ between Cameroon and Kenya, with Cameroon reporting more reasons directly related to COVID-19 illness; staff or patients getting COVID-19 illness, staff diverted to taking care of COVID-19 patients, conversion to COVID-19 center or unit. Kenya's reported reasons, tended to be around decisions to reduce COVID-19 illness such as through directives, limiting transport, social distancing, fewer patients coming. It suggests that these actions were more of a direct cause of the service disruptions. These actions, however, may have reduced the extent of COVID-19 illness among health personnel and patients.

Many of the IPC-directives were focused on physical distancing and the suspension of services, which contributed to service disruption, as in implementing distancing requirements, some health facilities limited the number of patients that could be serviced in a day. The implementation of distancing was the most common IPC reason for service disruption across all health facilities. Similarly, the suspension of non-elective and dental surgical services was by directive. However, outbreaks of COVID-19 illness among patients and staff, and staff shortages due to COVID-19 illness or fear of illness contributed significantly to service disruption, with the unavailability of staff, time taken to disinfect health facilities, and the need to triage services. This suggests that protection of staff, especially nurses and doctors, should be prioritized, particularly during public health emergencies. Vaccination is a key strategy in protection of staff. Training in IPC and/or COVID-19 was identified as a gap, as was insufficient PPE. Greater attention should be paid to these needs, and plans developed to reduce or mitigate staff shortages. These plans should include movement of staff within and even across health facilities in a district, county, or region. The shortage of PPE could be alleviated through regular inventory of supplies and the use of approved calculators to estimate use rates, as most facilities did not appear to use calculators.

Actions taken to mitigate disruption from the directives, including prioritization of high-risk patients, extending multi-month prescribing and caring for patients via telephone or internet, should be evaluated, and if found effective, should be extended. By providing viable patient care options, these actions could help in reducing patient absenteeism, which can also be enhanced by focusing on visible protections for patients through enhanced environmental cleansing, screening, and isolation practices, and through improved patient confidence in health facilities. As with health staff, vaccination is essential in limiting risk of SARS-CoV-2 transmission and risk of COVID-19 illness and can help in reducing patient absenteeism.

The declines in attendances for outpatient services in Kenya and Cameroon, and ANC and surgical services associated with the COVID-19 waves, in Kenya, and hypertension and diabetes in Cameroon, is consistent with the directives suspending services, the impact of physical distancing, and the facility directors limiting patient volumes. The reduced number of ANC attendances may have been associated also with less women coming for this service because of fear of SARS-CoV2 infection, and government limiting of movement. The trend for TB services and inpatient admissions was less clear; this may be because TB symptoms are related to that of COVID-19, so that some of those attendances, at least initially, may have been mistakenly documented at attendances for TB services. The regional variation in the inpatient and ANC attendances in Cameroon may be affected by the quality of reporting by region, and regional differences in the prevalence of COVID-19.

Limitations of the study include sample selection, recall and data limitations. Hospitals were over sampled, so the findings are more likely to be representative of hospitals rather than lower-level health facilities. The counties and regions were purposively selected based on the high burden of COVID-19 transmission to explore the extent of and reasons for health services disruptions. As such, the results might not be generalizable to settings with lower transmission. The study relied on facility director and IPC focal person knowledge of IPC and how it might have impacted disruptions to health services over a period of 17 months, thus having the potential for recall bias. Finally, the attendance data may be limited by data error and the inability of comparison with county/regional COVID-19 data. However, a strength of the study was that it obtained facility-level data in the more COVID-19 affected areas of each country.

Conclusion

Health services were disrupted in nearly all health facilities because of COVID-19. The disruption affected all major areas of health service delivery. Investment in IPC infrastructure is key to reducing and mitigating the impact of the SARS-CoV-2 pandemic and future epidemics/pandemics on health services. Protection of health staff through vaccination, availability of PPE, screening, isolation of infected staff, and training, should be prioritized. Investments should be made in IPC measures to prevent the risk of COVID-19 (and other infectious conditions) through environmental cleaning, screening, and testing to generate patient confidence in health facilities.

Recommendations

1. Protection of health care personnel from infection is a priority, especially to prevent staff shortages and absences. Vaccination of health care personnel should be mandatory. PPE should be made easily available and should be accompanied by appropriate training in the use, maintenance, and care of the various types of PPE, including reuse/recycling. Appropriate health personnel should be trained in the use of one of the standard calculators for the monitoring of PPE and other IPC resources, consumption, and supply.
2. Plans should be developed for the mitigation of staff shortage, including plans to distribute health personnel across health facilities where possible and the use of volunteers and auxiliary personnel.
3. Plans should be developed also for rapid responses to COVID-19 like emergencies, emergencies which risk overwhelming health facility resources and stress IPC interventions. The plans should include the rapid deployment of human, fiscal and material resources, with an emphasis on resilient systems.
4. To facilitate screening and testing of patients and health personnel, resources such as rapid test kits, should be made easily available and accessible.
5. To reduce infection risk, there should be clear, easily accessible, and available IPC and COVID-19 guidelines, including guidance on implementation of the guidelines. The guidelines and implementation guidance should be accompanied by appropriate and frequent training.
6. Efforts to extend patient care beyond the health facility and provide distributed service delivery, such as prioritization of high-risk patients, extending multi-month prescribing and caring for patients via telephone or internet, (telehealth) should be evaluated, and if found effective, should be extended.

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Figure 10: Patient Attendance: Hypertension services in Cameroon

Figure 11: Patient Attendance: Diabetes services in Cameroon

Appendix 1: Sampled Facilities, Kenya and Cameroon

Kenyan health facilities

County	Constituency	Name of facility	Facility type
Nairobi	<i>Tertiary facilities</i>		
	Embakasi West	Mama Lucy Kibaki Hospital – Embakasi	Hospital
	Kamukunji	Pumwani Maternity Hospital	Hospital
	Embakasi Central	Kayole II Sub-District Hospital	Hospital
	Kibra	Mbagathi District Hospital	Hospital
	Kibra	Kenyatta National Hospital	Hospital
	Dagoretti South	Mutuini Sub-District Hospital	Hospital
	Dagoretti North	Better Living Hospital	Hospital
	Ruaraka	Royal Victory Hospital	Hospital
	Langata	Shree Swaminarayan Hospital	Hospital
	Westlands	Nairobi Adventist Hospital Limited	Hospital
	Kasarani	St Francis Community Hospital	Hospital
	Makadara	Jamaa Mission Hospital	Hospital
	Dagoretti North	Coptic Hospital	Hospital
	Langata	St Mary's Mission Hospital	Hospital
	Mathare	Jumuia Hospital (Huruma)	Hospital
	<i>Secondary facilities</i>		
	Kasarani	Maji Mazuri Health Centre	Health centre
	Langata	Karen Health Centre	Health centre
	Dagoretti North	Riruta Health Centre	Health centre
	Embakasi East	Embakasi Health Centre	Health centre
	Makadara	Bahati Health Centre	Health centre
	Kasarani	Kasarani Health Centre	Health centre
	Ruaraka	Korogocho Health Centre	Health centre
	Ruaraka	Babadogo Health Centre	Health centre
	Roysambu	NSIS Health Centre (Ruaraka)	Health centre
	<i>Primary facilities</i>		
	Kibra	KEMRI Mimosa	Dispensary
	Langata	Port Health Dispensary (Langata)	Dispensary
	Dagoretti North	Lady Northey Dispensary	Dispensary
Starehe	Pangani Dispensary	Dispensary	
Ruaraka	P & T Clinic	Dispensary	

	Constituency	Name of facility	Facility type
Machakos	<i>Tertiary facilities</i>		
	Kangundo	Kangundo Sub county Hospital	Hospital
	Masinga	Masinga Sub County Hospital	Hospital
	Matungulu	Kimiti Level 4 Hospital	Hospital
	Yatta	Matuu District Hospital	Hospital
	Mwala	Mwala Subcounty Hospital	Hospital
	Machakos Town	Kalama Level 4	Hospital
	Machakos Town	Mutituni Level 4 Hospital	Hospital
	Mavoko	Mavoko Level 4 Hospital	Hospital
	Kathiani	Kathiani Sub County Hospital	Hospital
	Machakos Town	Machakos County Referral Hospital	Hospital
	Masinga	Masinga Sub County Hospital	Hospital
	Matungulu	Kimiti Level 4 Hospital	Hospital
	Yatta	Matuu District Hospital	Hospital
	Machakos Town	Bishop Kioko Catholic Hospital	Hospital
	<i>Secondary facilities</i>		
	Mwala	Mbiuni Health Centre	Health Centre
	Masinga	Ekalakala Health Centre	Health Centre
	Yatta	Katangi Health Centre	Health Centre
	Matungulu	Kalandini Health Centre	Health Centre
	<i>Primary facilities</i>		
	Kangundo	Kikal Dispensary	Dispensary
	Kangundo	Ndunduni Dispensary	Dispensary
		Kathukini Dispensary	Dispensary

	Constituency	Name of facility	Facility type
Kiambu	<i>Tertiary facilities</i>		
	Lari	Lari Level 4 Hospital	Hospital
	Gatundu South	Gatundu District Hospital	Hospital
	Gatundu North	Igegania Sub-District Hospital	Hospital
	Kiambaa	Kihara Sub County Hospital	Hospital
	Kabete	Nyathuna Level 4 Hospital	Hospital
	Kabete	Wangige Sub-County Hospital	Hospital
	Kiambu	Kiambu County Referral Hospital	Hospital
	Kiambaa	Karuri Level 4 Hospital	Hospital
	Limuru	Tigoni District Hospital	Hospital
	Thika Town	Thika Level 5 Hospital	Hospital
	Ruiru	Ruiru Sub-County Hospital	Hospital
	Juja	Oasis Mission Hospital	Hospital
	Githunguri	Holy family Catholic Hospital (Githunguri)	Hospital
	Thika Town	St Mulumba Mission Hospital	Hospital
	Limuru	Nazareth Hospital	Hospital
	Kikuyu	Kikuyu (PCEA) Hospital	Hospital
	Thika Town	Mary Help of the Sick Hospital	Hospital
	Juja	Kalimoni Mission Hospital (Juja)	Hospital
	Lari	Kijabe (AIC) Hospital	Hospital
	Lari	Immaculate Heart Hospital Kereita	Hospital
	<i>Secondary facilities</i>		
	Ruiru	Lang'ata Health Centre (Ruiru)	Health Centre
	Juja	Juja Farm Health Centre	Health Centre
	Githunguri	Kigumo Health Centre (Kiambu East)	Health Centre
	Gatundu South	Gitare Health Centre (Gatundu)	Health Centre
	Lari	Kagaa Health Centre	Health Centre
	Kabete	Uthiru Health Centre	Health Centre
	<i>Primary facilities</i>		
	Juja	Ndururumo Dispensary	Dispensary
Kiambu Town	Anmer Dispensary	Dispensary	
Githunguri	Gitiha Dispensary	Dispensary	

Cameroonian health facilities

Region	District	Name of facility	Facility type
Centre	<i>Tertiary facilities</i>		
	Biyem Assi	CHU	Hospital
	Cite Verte	CURY	Hospital
	Cite Verte	Hopital Central de Yaoundé (HCY)	Hospital
	Djoungolo	Hopital Jamot	Hospital
	Djoungolo	CHRACERH Yaounde	Hospital
	Djoungolo	HGOP Yaounde	Hospital
	Djoungolo	Hopital General de Yaounde (HGY)	Hospital
	Djoungolo	Centre Hospitalier d'Essos (CNPS)	Hospital
	Cite Verte	CME Fondation Chantal Biya	Hospital
	<i>Secondary facilities</i>		
	Efoulan	Efoulan District Hospital	Hospital
	Elig Mfomo	Elig Mfomo District Hospital	Hospital
	Ngoumou	Ngoumou District Hospital	Hospital
	Nkolbisson	Nkolbisson District Hospital	Hospital
	Nkolndongo	Nkolndongo District Hospital	Hospital
	Soa	Soa District Hospital	Hospital
	<i>Primary facilities</i>		
	Djoungolo	Elig Essono	Health Centre
	Djoungolo	Mvog Ada	Health Centre
Efoulan	Ahala	Health Centre	
Ngoumou	Akono	Health Centre	

Littoral	<i>Tertiary facilities</i>		
	Cite Des Palmiers	Hopital General de Douala (HGD)	Hospital
	Deido	Hopital Laquintinie	Hospital
	Japoma	HGOPED	Hospital
	Bonamikano	Hopital Catholique St Albert Le Grand	Hospital
	Ngwele	Hopital Cebec Bonaberi	Hospital
	Nkololoun	Mboppi Baptist Hospital	Hospital
	<i>Secondary facilities</i>		
	Bonassama	Bonassama District Hospital	Hospital
	Cite Des Palmiers	Cite des Palmiers District Hospital	Hospital
	Deido	Deido District Hospital	Hospital
	Dibombari	Dibombari District Hospital	Hospital
	Japoma	Japoma District Hospital	Hospital
	Logbaba	Logbaba District Hospital	Hospital
	New Bell	New Bell District Hospital	Hospital
	Ngambe	Ngambe District Hospital	Hospital
	Nylon	Nylon District Hospital	Hospital
	<i>Primary facilities</i>		
	Bangue	Bonamoussadi	Health Centre
	Japoma	Nyalla	Health Centre
	Japoma	Dibamba	Health Centre
	Logbaba	Ndogsimbi	Health Centre
	Logbaba	Ndokotti – Logbaba	Health Centre
	New Bell	Mairie Douala 2e	Health Centre
	Nylon	Ndogpassi 3 Centre	Health Centre
	Nylon	Ndogpassi 3 ZR	Health Centre

Ouest	<i>Secondary facilities</i>		
	Mifi	Bafoussam Regional Hospital	Hospital
	Bafang	Bafang District Hospital	Hospital
	Baham	Baham District Hospital	Hospital
	Bamendjou	Bamendjou District Hospital	Hospital
	Bandja	Bandja District Hospital	Hospital
	Bandjoun	Bandjoun District Hospital	Hospital
	Bangangte	Bangangté District Hospital	Hospital
	Bangourain	Bangourain District Hospital	Hospital
	Batcham	Batcham District Hospital	Hospital
	Dschang	Dschang District Hospital	Hospital
	Foumban	Foumban District Hospital	Hospital
	Mbouda	Mbouda District Hospital	Hospital
	Mbouda	SOHDECAM Integrated Health Centre	Health Centre
	Mifi	MIFI FAMLA District Hospital	Hospital
	Bangoua	Hôpital EEC Bangoua	Hospital
	<i>Primary facilities</i>		
	Bafang	Bakou	Health Centre
	Bangangte	Bassamba	Health Centre
	Bangangte	Bazou	Health Centre
Dschang	Nkong Ni	Health Centre	
Dschang	Fongo Tongo	Health Centre	
Mifi	Djeleng	Health Centre	

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