

The impact of COVID-19 on use of maternal and reproductive health services and maternal and perinatal mortality

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Overall, antenatal care services were maintained during the first two waves of COVID-19 in South Africa, but use of reproductive health services declined.

South Africa experienced two waves of COVID-19 infection in the financial year 2020/21. This study examines the impact of these waves on maternal and perinatal mortality and their effect on the use of and access to maternal and reproductive health services.

Data from the District Health Information System on maternal and perinatal deaths, births, antenatal visits, and use of contraceptive termination of pregnancy services were used, and the 2020/21 and 2019/20 financial years were compared in order to formulate national and provincial perspectives.

Data on visits for initiating antenatal care, births, contraceptive prescriptions and termination-of-pregnancy services were used to assess utilisation of maternal and reproductive health services respectively; and the number and rates of maternal and perinatal deaths were examined to assess impact. A second descriptive analysis of pregnant women who had delivered after having contracted COVID-19 was performed using a separate database set up by the National Department of Health/South African Medical Research Council/University of Pretoria (NDoH/SAMRC/UP), specifically to monitor the effects of COVID-19).

The data suggest that there was a marked increase (of 40%) in maternal deaths ($p < 0.00001$), 10% in stillbirths ($p < 0.00001$),

and 3% in ($p = 0.31$) neonatal deaths when compared with the same period in 2019/20. There was a mean 28% increase in the institutional maternal mortality ratio in all provinces during the second wave compared with the first wave ($p < 0.0001$), except in the Western Cape which had a decrease of 1%. Data from the National Institute for Communicable Diseases showed that the case fatality rate for pregnant women with COVID-19 was high (4.5%), as was the perinatal mortality rate (70.6 per 1 000 births), while the institutional maternal mortality ratio for South Africa was 16.94/100 000 live births.

An increase of 3.6% in in-facility births in 2020/21 compared with 2019/20 was observed, with increased movement of pregnant women to the more rural provinces and districts for delivery. Antenatal care services were maintained overall, but use of reproductive health services declined (contraceptive prescriptions by 5%, and termination of pregnancy by 17% overall).

The effect of the COVID-19 epidemic on pregnant women and its collateral damage is severe. Strengthening the health system to maintain essential services during a pandemic and vaccination of healthcare workers and pregnant women are key to reducing maternal and perinatal mortality.

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Introduction

South Africa's COVID-19 epidemic occurred during the first quarter of the 2020/21 financial year (FY), with Quarter 1 (April to June 2020) and Quarter 2 (July to September 2020) constituting the first wave, and Quarter 3 (October to December) and Quarter 4 (January to March 2021) constituting the second wave.^{1,2}

At the onset of the pandemic, Robertson et al.³ had warned of an 8.3% to 38.6% per month potential increase in maternal mortality for low-and middle-income countries if routine and emergency services were not maintained by the health system or used by pregnant women. With this in mind, this study aimed to perform a rapid assessment of the effect of COVID-19 on maternal and reproductive health services and maternal and perinatal mortality in South Africa.

South Africa has a routine data system – the District Health Information System (DHIS) – that collects data on the usage and outcome of various health services offered in the public sector. As the gravity of the COVID-19 pandemic became apparent to the world, additional data systems were created to monitor its impact on health services and on mortality, and to describe the nature and course of the disease within the South African context. Guidelines were developed for screening and managing pregnant women for COVID-19, and protocols for maternity staff on the use of personal protective equipment (PPE) and healthcare messages for pregnant women were distributed.

This chapter examines the usage of maternal services and epidemic's impact on mortality during FY2019/20 (prior to the first COVID-19 lockdown), and during FY2020/21, which coincides with the period following the commencement of COVID-19 lockdown in South Africa. The effect of COVID-19 on a sample of pregnant women diagnosed with COVID-19 was also analysed. The first wave of SARS-CoV-2 infections had subsided by the end of September 2020, and the second wave by the end of March 2021.

Methodology

Data from the DHIS were used to compare FY2020/21 data with FY2019/20 data as a control. The difference between financial years or quarters was used; a positive value indicates more cases in FY2020/21, and a negative value indicates fewer cases in FY2020/21. Visits for initiating antenatal care, termination of pregnancy (ToP) services, contraceptive use, and births in facilities were used to assess usage of maternal and reproductive health services, and the number of maternal deaths was used to assess impact.

Validated data covering the two financial years were available from the DHIS and obtained on 25 May 2021. The causes of maternal deaths are not recorded on the DHIS. In addition, a specific and separate monitoring system was set up by the National Department of Health (NDoH) Maternal Health division, the South African Medical Research Council (SAMRC), and the University of Pretoria (UP) Maternal and Infant Health Care Strategies Unit to assess the effect of COVID-19 on pregnancy. This monitoring system assembled information on all women who had confirmed COVID-19 disease during pregnancy and who delivered, irrespective of the outcome. Only data on women who delivered in public hospitals were collected. Data included maternal death, stillbirths and neonatal deaths, pregnancy complications, route of delivery, use of intensive care facilities, and some basic demographics. The data did not distinguish between those with COVID-19 at delivery and those who had recovered from the disease.

Data for year-on-year comparison are presented first, followed by comparison of the quarterly data, and finally a comparison between the first and second waves for the country and the provinces is described.

Quality of the data

The COVID-19 epidemic has led to certain problems with reporting data to the DHIS, resulting in missing data. For example, Mpumalanga Province recorded approximately 20% of the stillbirths in FY2020/21 compared to FY2019/20. There was not an 80% reduction in stillbirths in FY2020/21, and data from the Perinatal Problem Identification Program (PPIP) for the first two quarters show that stillbirths increased during FY2020/21 compared with the same quarters in FY2019/20. For this reason, data from Mpumalanga on stillbirths were excluded.

Furthermore, the number of maternal deaths might be under-reported; in the Western Cape, there was under-reporting of maternal deaths compared with surveillance data from the National Committee on Confidential Enquiry into Maternal Deaths (NCCEMD). The data used in this analysis included the excess public service maternal deaths recorded in the NCCEMD for the Western Cape. At present it is not known whether other provinces observed similar discrepancies. Therefore, the data presented in this report constitute a conservative estimate of the number of deaths.

Results

Tables 1 to 3 illustrate the data sets from which the information for this chapter was extracted.

Table 1: Maternal deaths, stillbirths and early neonatal deaths FY2019/20 and FY2020/21 in quarters

Maternal death in facility (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	28	27	34	33	36	38	53	44
Free State Province	17	12	18	13	11	22	24	29
Gauteng Province	49	59	72	65	64	76	66	85
KwaZulu-Natal Province	34	44	37	54	50	58	58	96
Limpopo Province	33	32	39	30	47	36	44	47
Mpumalanga Province	15	17	14	13	22	18	24	46
Northern Cape Province	10	7	6	3	2	6	6	6
North West Province	18	16	13	10	18	19	25	20
Western Cape Province	13	10	11	14	30	18	15	14
South Africa	217	224	244	235	280	291	315	387

Stillbirth in facility (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	484	469	525	586	541	566	577	665
Free State Province	280	270	298	267	313	300	310	377
Gauteng Province	1 028	1 057	1 130	1 096	1 228	1 161	1 105	1 204
KwaZulu-Natal Province	1 154	1 086	1 088	1 256	1 036	1 304	1 240	1 427
Limpopo Province	617	635	643	747	733	705	660	839
Mpumalanga Province	374	411	388	411	78	69	60	87
Northern Cape Province	124	125	148	133	120	109	141	148
North West Province	362	316	331	339	336	337	404	410
Western Cape Province	444	409	415	453	453	475	481	502
South Africa	4 867	4 778	4 966	5 288	4 838	5 026	4 978	5 659

Early neonatal deaths (death in facility 0–6 days) (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	303	253	263	250	273	270	287	307
Free State Province	164	150	131	106	144	118	135	163
Gauteng Province	526	490	549	562	533	536	609	584
KwaZulu-Natal Province	469	470	437	470	494	422	496	520
Limpopo Province	378	418	424	435	389	365	360	378
Mpumalanga Province	184	201	223	199	241	206	251	298
Northern Cape Province	72	60	55	95	52	58	77	71
North West Province	161	145	130	141	194	157	165	154
Western Cape Province	174	137	168	193	193	172	159	153
South Africa	2 431	2 324	2 380	2 451	2 513	2 304	2 539	2 628

Table 2: Use of Maternal Health services FY2019/20 and FY2020/21 in quarters

Antenatal 1st visit before 20 weeks (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	19 095	20 819	19 182	22 883	18 388	20 761	18 279	21 416
Free State Province	7 697	8 409	7 303	8 515	6 992	7 269	7 207	7 723
Gauteng Province	17 315	19 577	17 181	19 487	15 745	15 061	14 772	16 842
KwaZulu-Natal Province	33 241	36 794	32 181	38 723	34 481	37 594	35 589	38 280
Limpopo Province	21 067	25 394	22 737	24 666	23 285	25 763	22 985	22 433
Mpumalanga Province	16 010	18 816	17 452	20 446	19 711	21 516	20 710	19 817
Northern Cape Province	3 833	4 265	4 044	4 314	3 620	4 187	3 745	3 943
North West Province	11 561	13 447	11 151	13 170	11 116	12 676	11 157	12 850
Western Cape Province	15 218	17 275	16 190	17 507	13 435	16 119	14 861	15 327
South Africa	145 037	164 796	147 421	169 711	146 773	160 946	149 305	158 631

Antenatal 1st visit total (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	30 726	32 434	29 551	35 902	29 459	32 608	29 313	34 840
Free State Province	11 437	12 405	10 853	13 258	11 479	11 636	11 755	12 738
Gauteng Province	26 905	29 468	26 350	30 866	25 091	25 686	25 069	28 405
KwaZulu-Natal Province	45 999	48 672	43 355	53 880	47 180	50 008	47 664	53 279
Limpopo Province	30 757	35 564	33 101	36 614	34 686	37 567	34 372	34 823
Mpumalanga Province	21 056	23 977	22 395	26 601	26 137	28 586	27 491	26 978
Northern Cape Province	5 891	6 215	6 178	7 048	6 261	6 780	6 183	7 272
North West Province	16 215	18 529	15 606	19 102	16 867	18 205	16 437	18 747
Western Cape Province	20 831	23 479	22 027	24 355	18 943	22 607	20 381	21 515
South Africa	209 817	230 743	209 416	247 626	216 103	233 683	218 665	238 597

Live birth in facility (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	25 766	26 367	24 755	26 589	26 640	26 968	25 925	27 585
Free State Province	11 084	11 208	10 812	11 118	11 230	11 430	10 740	11 279
Gauteng Province	54 733	54 771	52 775	54 900	57 543	57 243	56 221	53 257
KwaZulu-Natal Province	52 253	52 553	46 601	50 633	50 291	51 212	46 860	51 544
Limpopo Province	32 314	33 197	30 542	36 690	35 285	35 372	33 195	36 532
Mpumalanga Province	20 368	20 201	19 421	21 859	22 967	23 424	23 609	26 346
Northern Cape Province	5 509	5 432	5 177	5 403	5 781	5 440	5 418	5 764
North West Province	14 923	15 259	14 749	15 435	15 783	15 537	15 271	15 605
Western Cape Province	24 540	25 005	24 940	25 444	25 945	25 581	25 244	23 710
South Africa	241 490	243 993	229 772	248 071	251 465	252 207	242 483	251 622

Table 3: Use of reproductive health services FY2019/20 and FY2020/21 in quarters

Termination of pregnancy – total (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	3 210	3 454	2 871	3 062	2 094	2 506	2 550	2 546
Free State Province	1 646	2 032	1 965	2 133	1 618	1 470	1 954	1 846
Gauteng Province	5 028	5 584	6 065	6 371	4 863	5 215	6 571	6 183
KwaZulu-Natal Province	7 057	7 604	6 571	6 209	4 767	5 497	6 126	5 364
Limpopo Province	3 129	4 078	3 826	3 927	3 105	3 900	3 623	3 032
Mpumalanga Province	1 625	2 069	2 145	2 288	772	541	625	556
Northern Cape Province	406	467	302	322	262	379	389	424
North West Province	2 309	2 835	2 328	2 334	2 171	2 152	1 987	2 057
Western Cape Province	4 477	4 906	4 771	5 040	3 636	4 270	4 294	4 005
South Africa	28 887	33 029	30 844	31 686	23 288	25 930	28 119	26 013

Contraception prescriptions (numbers)								
Province	FY 19/20 Q1	FY 19/20 Q2	FY 19/20 Q3	FY 19/20 Q4	FY 20/21 Q1	FY 20/21 Q2	FY 20/21 Q3	FY 20/21 Q4
Eastern Cape Province	379 450	407 184	397 924	399 056	344 042	373 568	362 740	367 014
Free State Province	154 339	161 328	155 414	153 924	160 628	148 106	155 275	151 300
Gauteng Province	285 100	292 864	276 605	270 155	235 142	240 084	255 010	257 139
KwaZulu-Natal Province	459 644	476 524	454 867	483 895	434 863	453 540	479 255	472 847
Limpopo Province	411 135	418 483	417 114	413 464	395 195	433 867	435 145	434 662
Mpumalanga Province	246 249	235 388	220 508	175 375	168 462	178 329	210 400	201 265
Northern Cape Province	63 967	66 283	62 281	63 289	60 703	61 956	57 446	58 845
North West Province	186 363	198 455	195 655	205 906	182 504	190 363	186 711	176 812
Western Cape Province	168 547	179 210	172 777	174 965	157 268	173 207	171 844	165 869
South Africa	2 354 794	2 435 719	2 353 145	2 340 029	2 138 807	2 253 020	2 313 826	2 285 753

Year-on-year comparison

There were 920 and 1 273 maternal deaths in FY2019/20 and FY2020/21 respectively. Nationally, maternal deaths and the institutional maternal mortality ratio (IMMR) increased significantly ($p < 0.00001$) in all provinces except the Northern Cape, overall by 40% and 37% respectively (see appendix, Figure A1). Large percentage increases (>40%) occurred in the Free State (42%), KwaZulu-Natal (57%), Mpumalanga (58%) and the Western Cape (86%, but from a low base).

Stillbirths and the stillbirth rate increased significantly nationally ($p < 0.00001$) in all provinces except the Northern Cape, and this influenced the perinatal mortality rate which mostly increased (see appendix, Figure A2). The stillbirth rate increases were 10% in number and 8% (1 892). Mpumalanga was not included in the analysis due to missing data. The early

neonatal death rate remained relatively constant ($p = 0.31$), except in Limpopo and the Northern Cape where it decreased and in the North West where it increased. The neonatal death rate ranged from a 15% decrease in Limpopo to a 13% increase in North West Province (see appendix, Figure A3).

Year-on-year antenatal care first visits (see appendix, Figure A4) increased in KwaZulu-Natal and Mpumalanga, remained the same in Eastern Cape, Free State, Northern Cape and North West, and decreased in Gauteng, Limpopo and Western Cape. Thus, overall, there was no change in antenatal visits, which occurred despite the overall number of the births increasing by 3.6% (see appendix, Figure A5). There were marked increases in births in Eastern Cape, Gauteng, Limpopo and Mpumalanga. The number of contraceptive prescriptions and terminations of pregnancy declined in most provinces, overall all by 5% and 17% respectively (see appendix, Figure A6).

Analysis comparing FY2020/21 quarters with FY2019/20 quarters, expressed as percentage difference

Figure 1 and 2 display the trends in maternal and perinatal mortality for the two financial years as calculated from

Table 1. The peaks of the first and second waves are clearly visible in the maternal deaths, but only in the second wave for stillbirths, which is then reflected in the perinatal mortality.

Figure 1: In-facility maternal mortality ratio per month for South Africa: FY2019/20 and FY2020/21

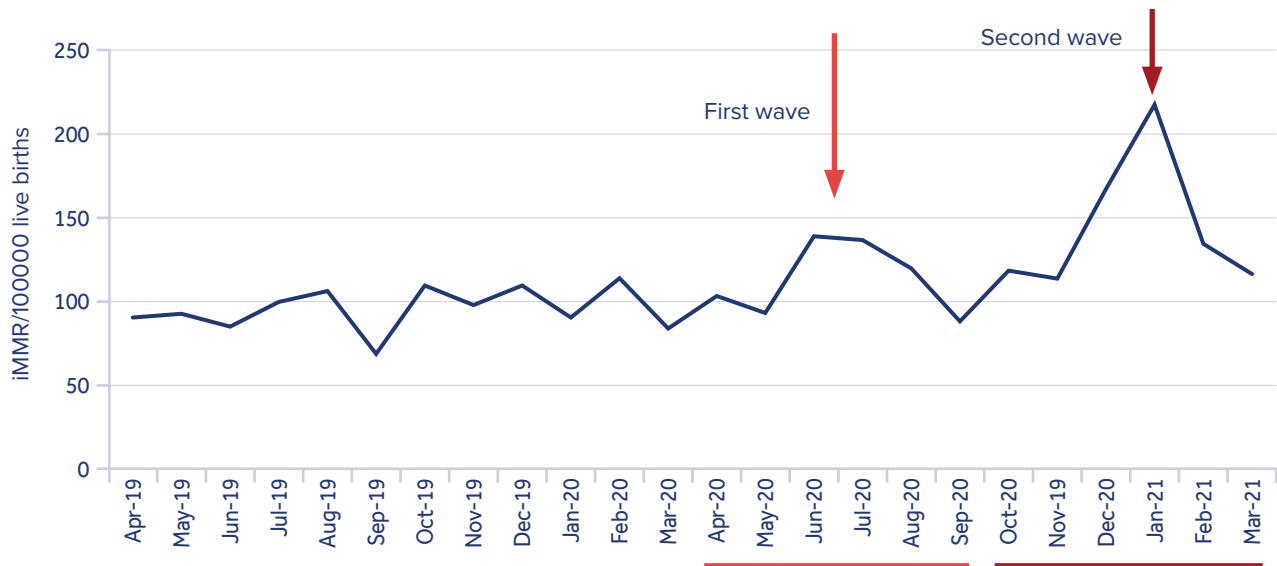
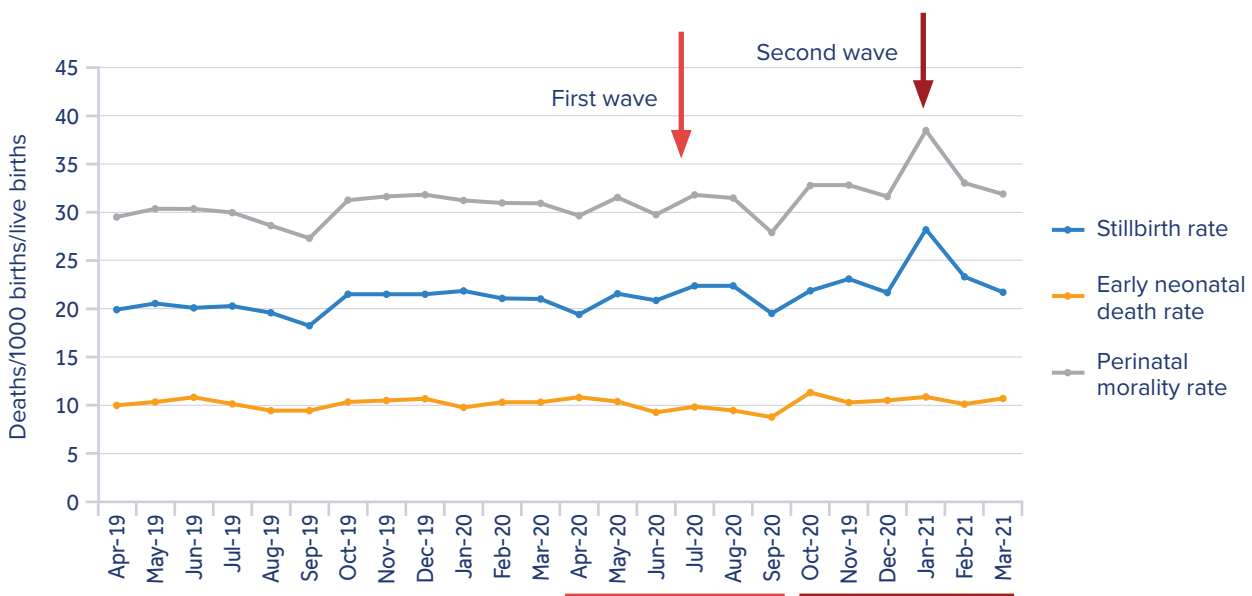


Figure 2: In-facility perinatal indices per month for South Africa: FY2019/20 and FY2020/21



Maternal deaths increased in most quarters in all provinces. Overall, South Africa had a 64% increase in maternal deaths in Quarter 4 of FY2020/21 when compared to the pre-pandemic rates in Quarter 4 of FY2019/20 (see appendix,

Figure A7). All provinces saw an increase in maternal deaths, ranging from 31% Gauteng to 254% in Mpumalanga, 123% in Free State, and 100% in the Northern Cape and North West.

The stillbirth rate increased in all provinces during Quarter 4 of FY2020/21 compared with Quarter 4 of FY2019/20, and this led to an increase in the perinatal mortality rate (see appendix, Figure A8). The neonatal death rate varied considerably between quarters and provinces, with the maximum decrease of 30% recorded for Quarter 1 in Northern Cape and of 54% for Quarter 4 in Free State (see appendix, Figure A8).

KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape and North West saw an increase in antenatal visits per quarter, but these decreased in Gauteng and the Western Cape (see appendix, Figure A9). The number of births increased notably in Mpumalanga and Limpopo. Mpumalanga had almost a 20% increase in births during the second wave (see appendix, Figure A10). The use of reproductive health services declined in all provinces with Mpumalanga having a 32% reduction in contraceptive prescriptions in the first quarter of the pandemic (see appendix, Figure A11). There was a marked change in prescription practices between the two years, with considerably more long-acting reversible contraceptives being used (see appendix, Figure A12).

Maternal deaths and the iMMR increased significantly in the second wave compared with the first, with an overall increase of 26% and 28% respectively ($p < 0.0001$) (see appendix, Figure A13). The stillbirth rate increased in all provinces by an average of 11% ($p < 0.00001$), but the early neonatal death rate declined by 8% ($p < 0.00001$), leaving the perinatal mortality rate unchanged (see appendix, Figure A14). However, there was massive variation across the provinces, with an increase in the stillbirth rate of 26% in Northern Cape and 22% in North West.

Antenatal visits remained relatively constant during the first and second waves, but Limpopo saw a decrease in first visits of 7% and Free State had an increase of 5%. Births in facilities decreased during the second wave in all provinces, except in Mpumalanga where there was an increase from the first wave (see appendix, Figure A15). In some provinces, there was a degree of recovery in the use of reproductive health services, with terminations of pregnancy averaging a 10% increase and contraceptive prescriptions 5% (see appendix, Figure A16). There was a considerable increase in contraceptive prescriptions in Mpumalanga (19%), but Northern Cape had a 5% decrease.

Effect of COVID-19 on pregnancy

According to the NDoH/SAMRC/UP database, 1 005 women who delivered had COVID-19. Forty-five maternal deaths (with a case fatality rate of 4.5%) were recorded, as were 42 stillbirths and 29 neonatal deaths, with a perinatal mortality rate of 70.6 per 1 000 births. The Caesarean delivery rate was 54.4%. Prevalence of hypertensive disorders in pregnancy was 11.5%, but spontaneous pre-term labour was only 2.4%.

Discussion

In summary, there were more births each month in health facilities during FY2020/21 than in FY2019/20. Births increased by 3.6% on average. There was a marked movement of pregnant women to more rural provinces and districts for delivery throughout the period. Use of antenatal care – as measured by the number of women starting antenatal care – showed great variation, with Gauteng and the Western Cape seeing 8% fewer first visits and Mpumalanga 16% more. Pregnant women attended clinics later than usual. The number of contraceptive prescriptions declined by 5%, although there was increased utilisation of long-acting reversible contraceptives. Termination-of-pregnancy numbers declined by an average of 17% overall, probably due to a combination of limited access to services and fewer women requesting termination-of-pregnancy services.

Since lockdown began, there has been a significant increase in maternal deaths (40%, with an excess of 368 maternal deaths) when compared with the same period in 2019, along with a significant increase of 35% in iMMR overall. The increase in iMMR shows that the increased number of maternal deaths is not merely a reflection of higher numbers of institutional births, but also represents a real increase in the proportion of women dying. Excluding the Mpumalanga data, there was also a significant increase in stillbirths (1 892 more), and neonatal deaths increased, with 207 deaths overall. The use of services differed negligibly between the waves; however, there was a mean 28% increase in iMMR in all provinces during the second wave compared with the first, except in the Western Cape which had a decrease of 1%. The second data source (the NDoH/SAMRC/UP database), which obtained data on pregnant women with COVID-19, showed that there was a high maternal case fatality rate (CFR) of 4.5%, whereas the CFR of all pregnant women is 0.1% (a 40 times increase). The perinatal mortality rate (PNMR) of 70.6/1 000 births recorded in women with COVID-19 in pregnancy is much higher than the PNMR of 30.8/1 000 for the country.⁴ The Caesarean delivery rate of 54.4% was very much higher than that of 28.1% for South Africa in 2017–2019, as was the rate of hypertensive disorders in pregnancy of 11.5% compared with a population-based incidence of 5%.⁵ However, the pre-term delivery rate of 2.4% was much lower than the estimated 8% in the country.⁶ The reasons for these differences are unknown at present.

The effect of COVID-19 on pregnancy and maternal death has been underestimated. If one uses the 169 maternal deaths recorded in the National Institute for Communicable Diseases (NICD) database⁷ (representing only a sample of the health facilities in South Africa, as data were submitted only by public and private hospitals that agreed to report COVID-19 admissions in all nine provinces), and if one uses the number of live births for FY2020/21 as the denominator,

the iMMR for COVID-19 is 16.94/100 000 live births. This COVID-19 iMMR is similar to the iMMR from obstetric haemorrhage, hypertensive disease in pregnancy, and medical and surgical conditions, and is three to four times higher than the rates of miscarriage, pregnancy-related sepsis and ectopic pregnancies when compared with the iMMR from those conditions in the NCCEMD data of 2017–2019.⁴ This is clearly an underestimation, given that only a sample of the country was assessed. Contrary to the conclusion of the NICD⁵, COVID-19 in pregnancy is a serious condition. This high rate of maternal and perinatal mortality was also found by the INTERCOVID Multinational Cohort Study group.⁸

Prior to 2020, there had been a steady decline in iMMR from 2012, with the lowest rate achieved in 2019. This sharp increase in 2020 is temporally related to the onset of the COVID-19 pandemic, and it is reasonable to suggest that the direct and indirect effects of the pandemic contributed to these findings.

It is unlikely that the majority of excess maternal deaths are due to undiagnosed SARS-CoV-2 infection; these could also be due to the indirect effects of COVID-19 on maternal care, ambulance and general hospital services. The causes of maternal death, which are not captured in the DHIS, could not be identified in this study. The NCCEMD is the body that will provide data for and analysis of maternal deaths once its 2020 report has been finalised; this release has been delayed by the constraints of managing the epidemic and limitations on meetings.

The second wave was more severe, with a higher number of infections and expansion to predominantly rural areas such as in Mpumalanga, whereas the first wave was milder. The Western Cape had a smaller peak in maternal deaths (1% lower) during the second wave compared to the first. Overall, preparations were inadequate for the second wave. The processes for preparation of the second wave in the Western Cape should be examined to see how they differed from those implemented in the rest of the country, and lessons should be extracted from this comparison. Ultimately, work should commence on creating a resilient Primary Health Care system that can withstand crises such as the COVID-19 epidemic.

The epidemic had a major impact on clinical maternity services, and there are several possible reasons for this. Most of those described are anecdotal, and targeted studies are needed to establish how these factors contributed to the running of services. Determining these factors will inform the design of a resilient health system.

An international scoping review⁹ on COVID-19 and pregnancy, which found adverse maternal and perinatal outcomes and reduced maternal and reproductive service utilisation, also described the pandemic's negative impact in terms of associated restrictions on maternal mental health, and increases in gender-based violence.

The effect on work performance and the mental health of healthcare workers during emergency conditions is significant. In a systematic review on the subject, Nowrouzi et al.¹⁰ identified nine factors associated with the work performance and mental health of healthcare workers, these being depression, anxiety, inadequate support, occupational stress, decreased productivity, financial concerns, fear of infection transmission, and burnout/fatigue. This is essential to address, and could be a partial reason for the increase in adverse outcomes during the second wave, which arose during the December 2020 holiday season when exhausted healthcare staff had to cancel leave plans and return to face yet another disaster. Similar findings have been reported in South Africa.¹¹ The use of information and communication technologies such as telehealth is also warranted. Of note, the Western Cape Head of Health held regular electronic debriefing sessions with frontline workers and managers to boost morale and share experiences.

The net effect was that, despite knowing the outcomes of the first wave, the second was worse. This may be due to inadequate preparations, although it might have been that preparations were hampered by the limited resources available. The severity of the second wave could also be due to SARS-CoV-2 variants being more transmissible; infection rates rose more steeply and healthcare workers were overwhelmed during the holiday season. Evidence on whether the death rate from the new variant was higher (i.e. more virulent) is still awaited.

One ray of hope emerged in the Western Cape, where the mortality pattern differed in that there was no excess increase in maternal deaths during the second wave compared to the first. A second reason for optimism is the vaccination roll-out, and every effort should be made to complete full vaccination of all healthcare workers. Vaccination of pregnant women is essential to reduce the high mortality associated with COVID-19.

Although there are limitations associated with the two data sets used in this study, there was an urgent need for a rapid appraisal of the impact of COVID-19 on maternity services and outcomes. This chapter provides a preliminary account of these problems, and further research is needed to explain the observed trends in more detail.

Conclusions

Since the start of the COVID-19 epidemic in South Africa, there has been a significant increase of 40% in maternal deaths, 10% in stillbirths, 8% in perinatal mortality, and a non-significant increase of 2% in neonatal deaths, compared with the same period in FY2019/20. Use of maternal services (for in-facility birth and antenatal care) has varied considerably, but use of reproductive health services (contraception and termination of pregnancy) have declined sharply since

lockdown. There have been two markedly different regional effects of COVID-19 on maternal care: the rural provinces experienced increased pressure on their services due to pregnant women migrating from metropolitan areas back to their homes, increasing the burden on already under-resourced facilities; and metropolitan areas were inundated with severe COVID-19-specific conditions, leading to an increased burden in these areas and an inability to manage routine emergencies. COVID-19 had a severe effect on pregnancy, with an iMMR of 16.94/100 000 live births, which is at least similar to that of obstetric haemorrhage and hypertensive conditions in pregnancy.

Recommendations

- It is essential to complete the vaccination of healthcare workers in order to halt or minimise the attrition of human resources for health and allow for maintenance of a critical mass of staff to effectively manage all women seeking maternal and neonatal care services.
- All pregnant women should be offered vaccination.
- Maternal and Reproductive Health services must be maintained at full capacity during epidemics.
- A resilient healthcare system should be developed to maintain essential services during epidemics, especially with regard to termination of pregnancy and contraceptive services.

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Appendix

Figure A1: Maternal deaths FY2019/20 and FY2020/21

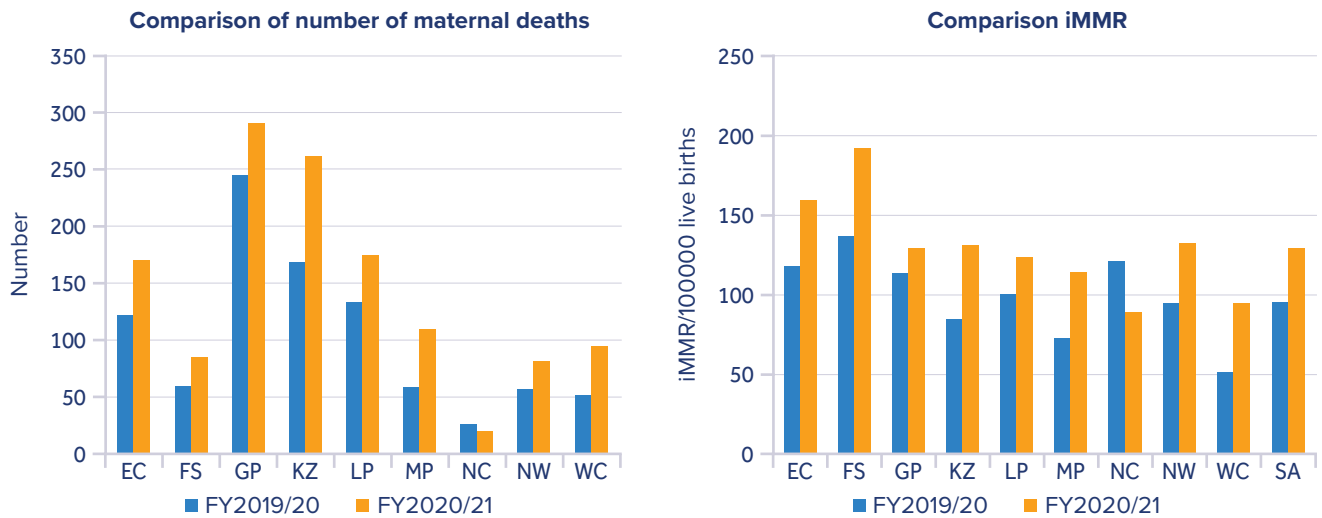


Figure A2: Stillbirths FY2019/20 and FY2020/21 (without Mpumalanga)

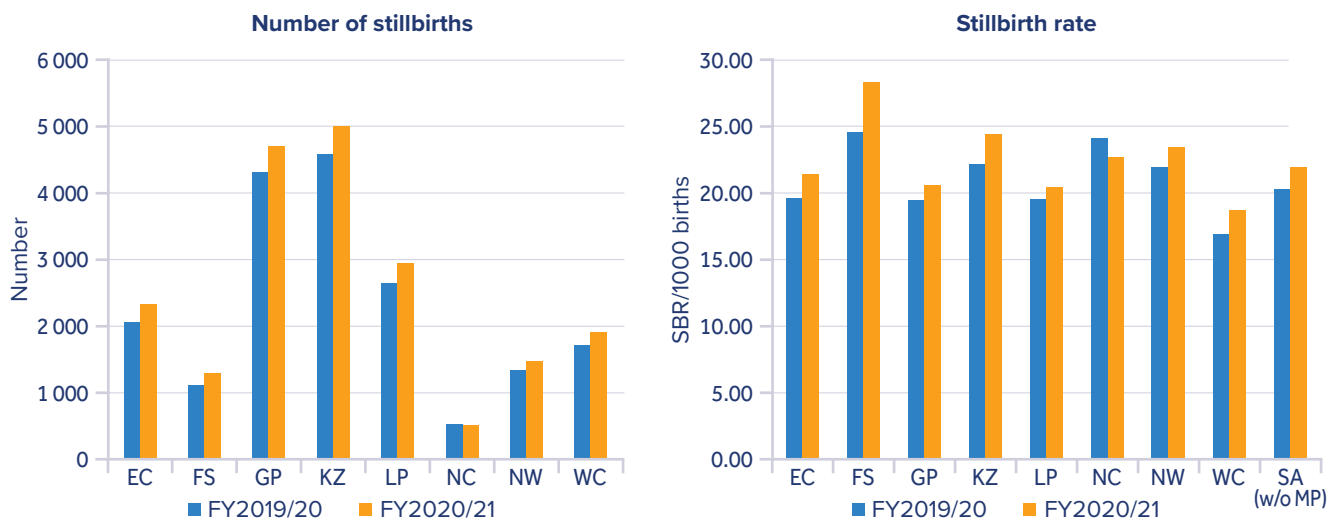


Figure A3: Early neonatal deaths FY2019/20 and FY2020/21

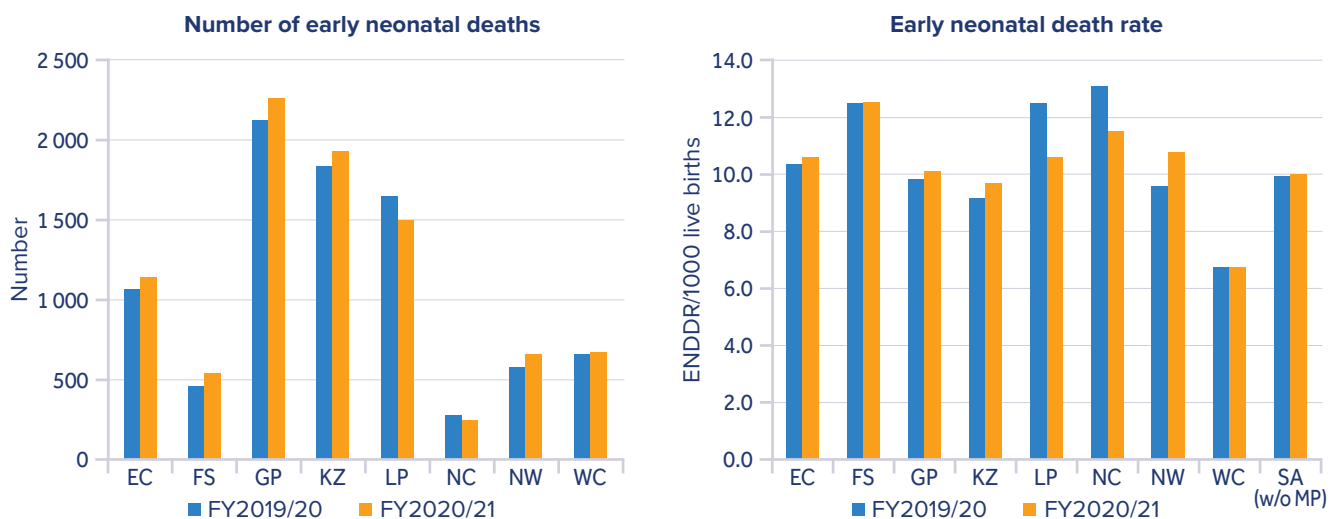


Figure A4: Antenatal visits FY2019/20 and FY2020/21

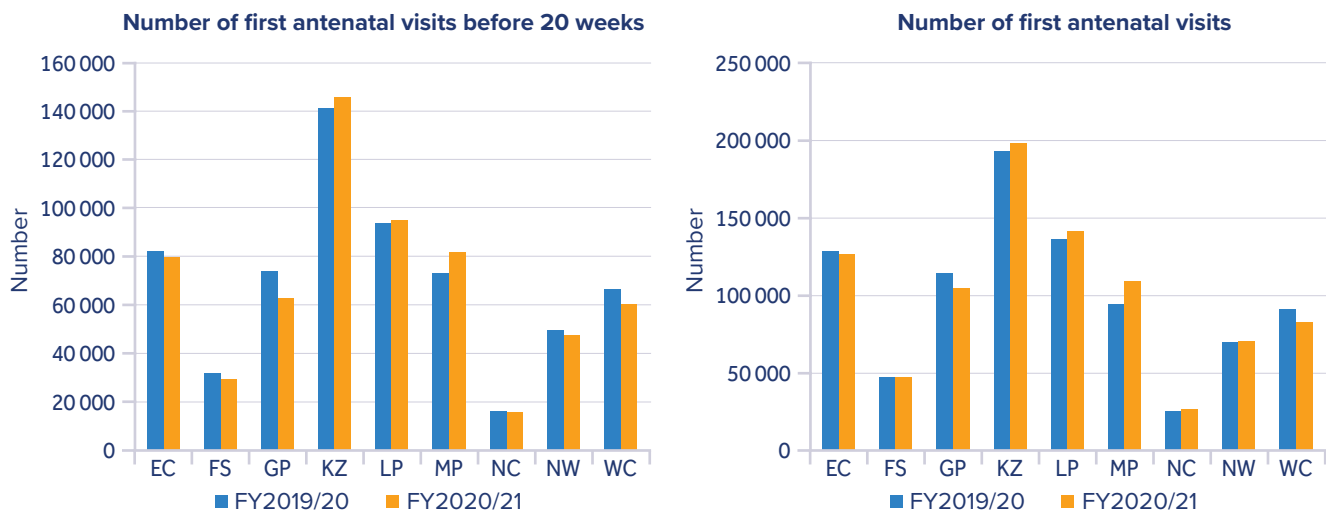


Figure A5: Number of birth in-facility FY2019/20 and FY2020/21

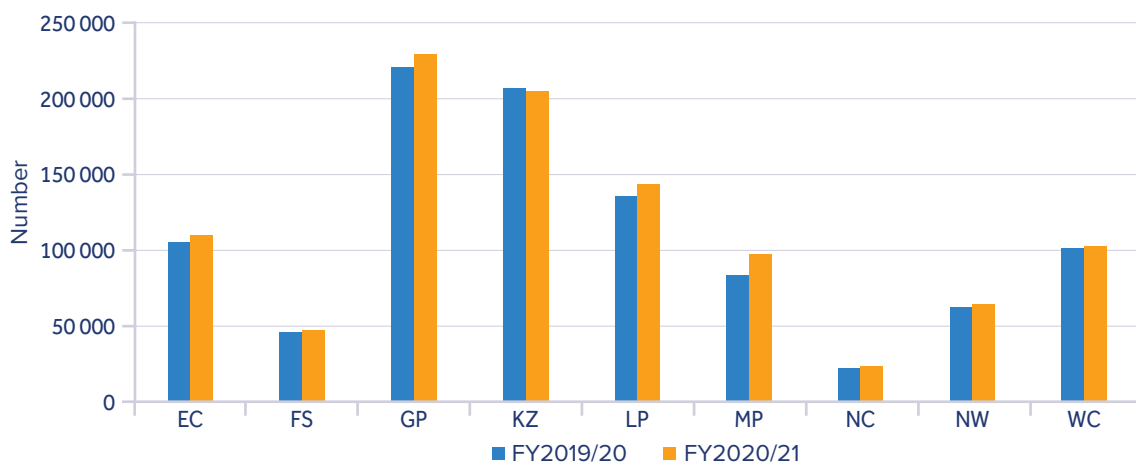


Figure A6: Use of reproductive health services FY2019/20 and FY2020/21

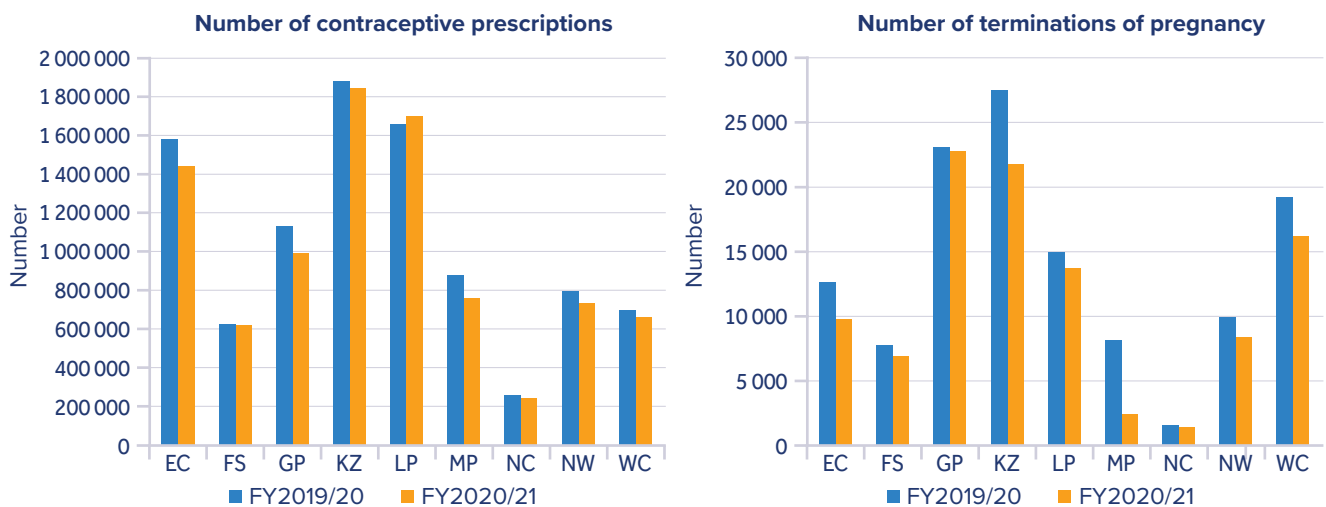


Figure A7: Percentage change in maternal deaths FY2020/21 from FY2019/20 per quarter

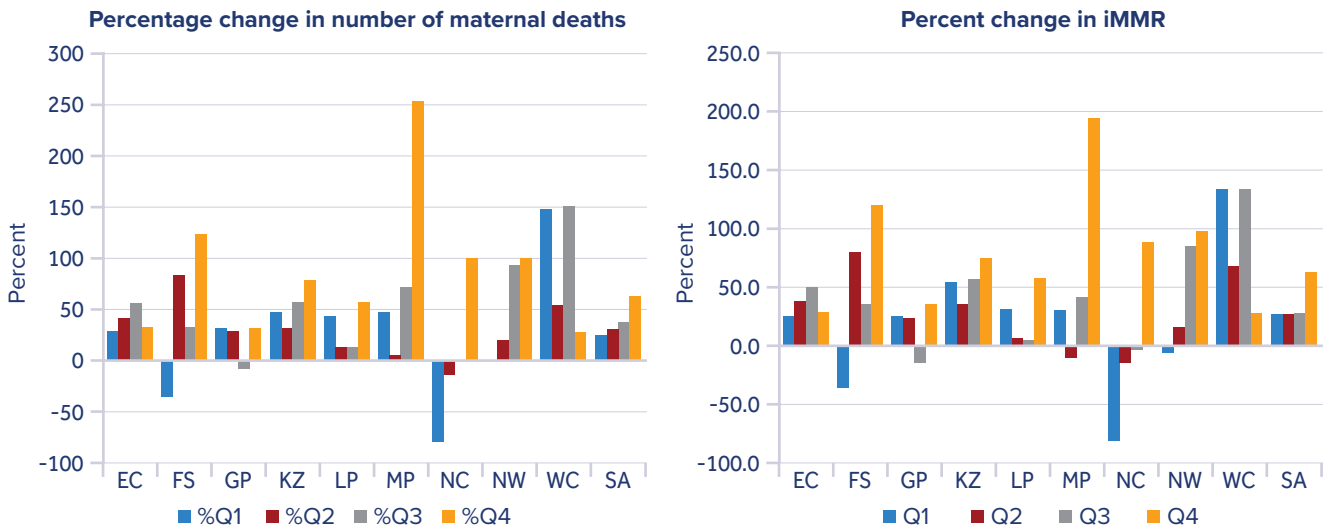


Figure A8: Percentage change in stillbirth rate and early neonatal death rate FY2020/21 from FY2019/20 per quarter

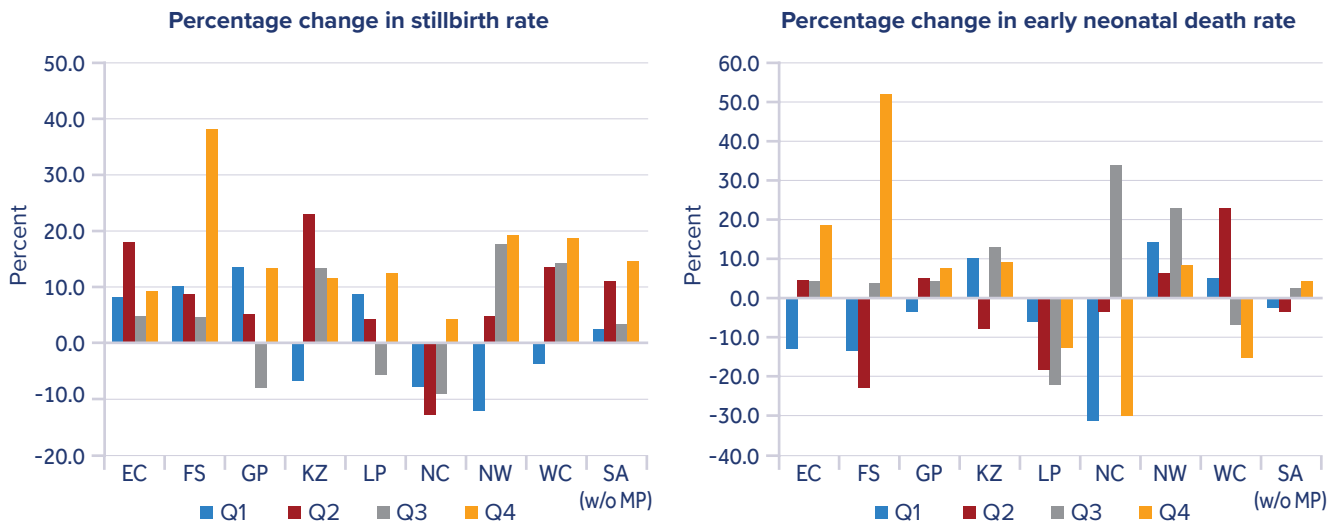


Figure A9: Percentage change in number of antenatal visits FY2020/21 from FY2019/20

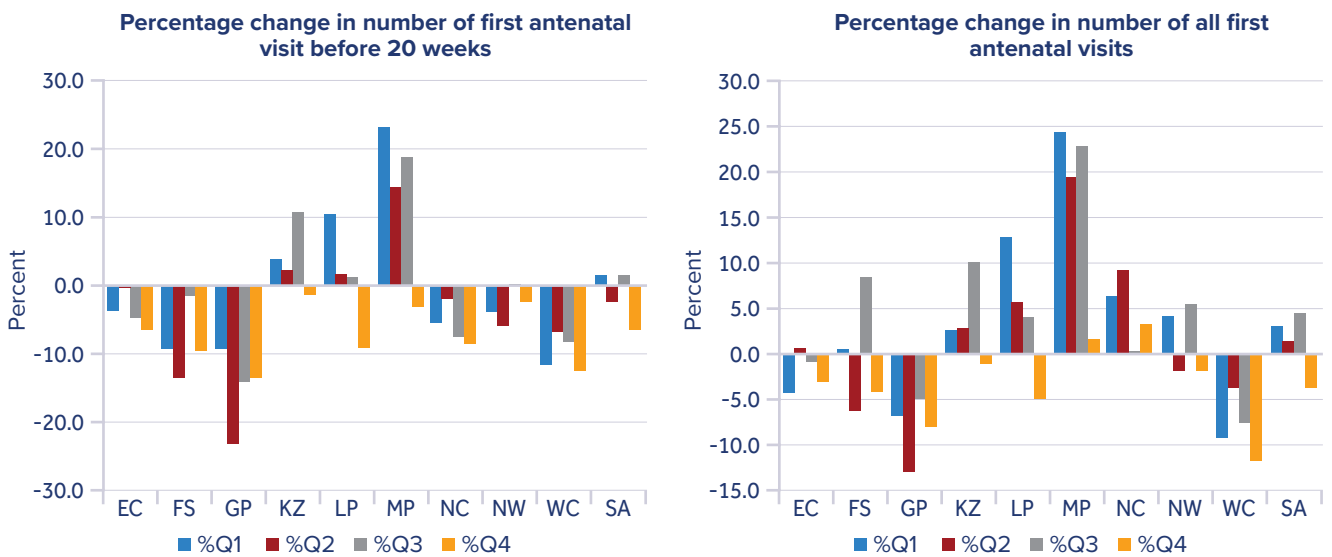


Figure A10: Percentage change in number of births FY2020/21 from FY2019/20

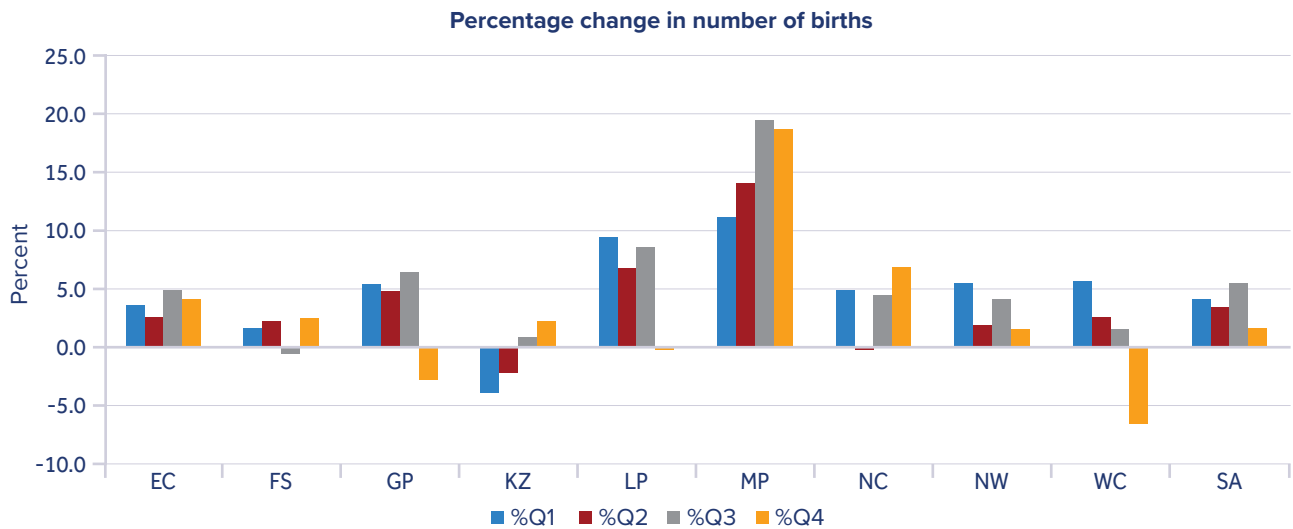


Figure A11: Percentage change in use of reproductive health services FY2020/21 from FY2019/20

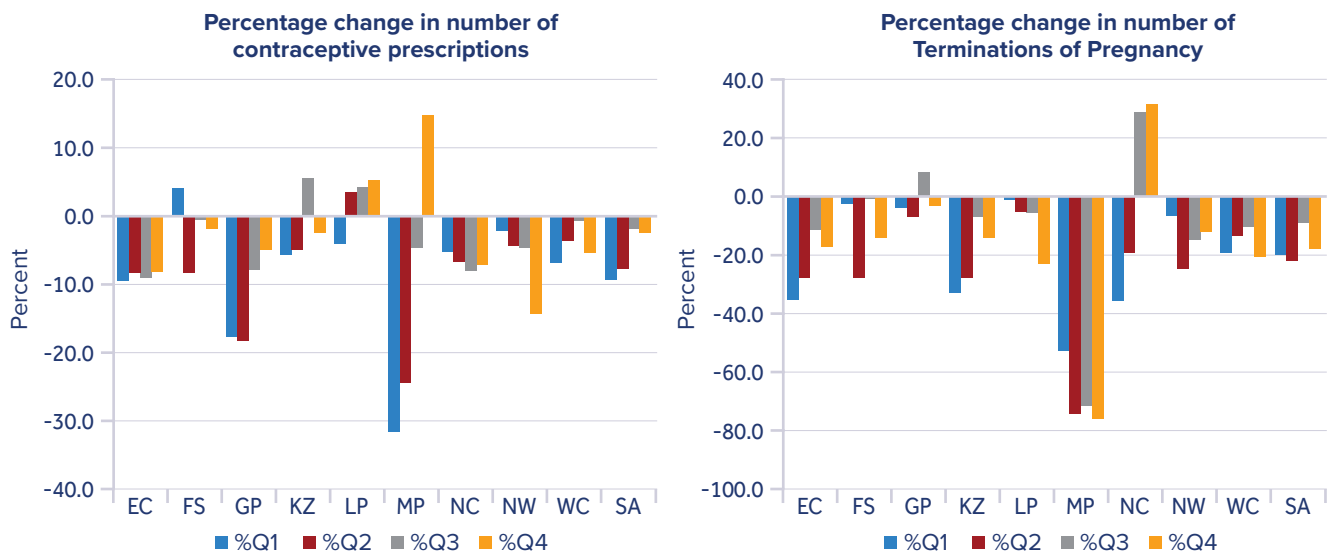


Figure A12: Percentage change in use of long active reversible contraceptives FY2020/21 from FY2019/20

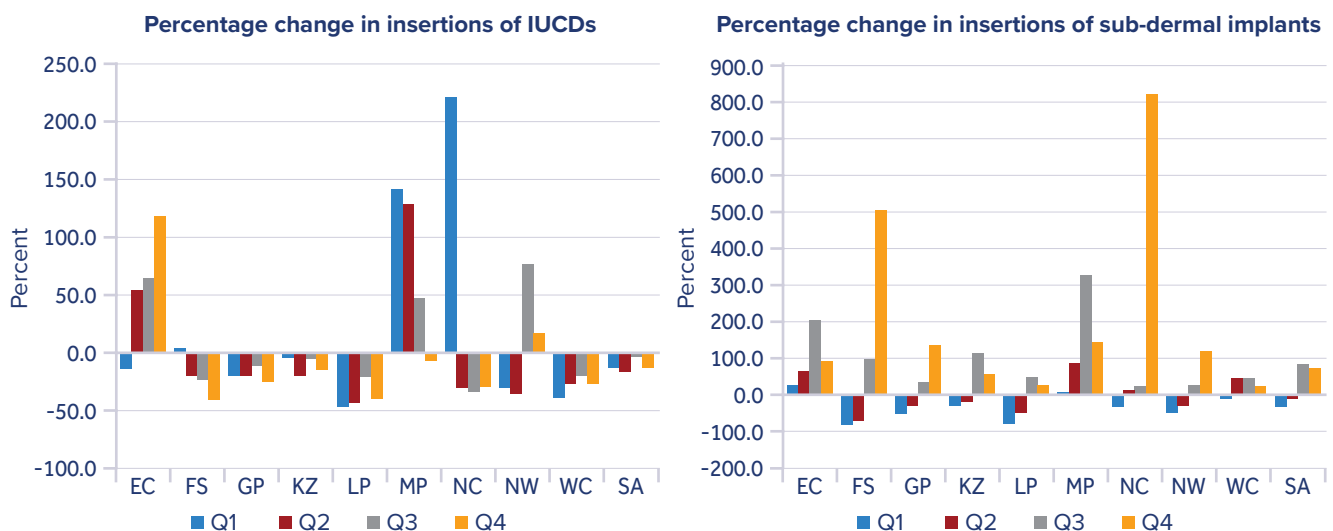


Figure A13: Comparison of maternal deaths in first and second waves of COVID-19

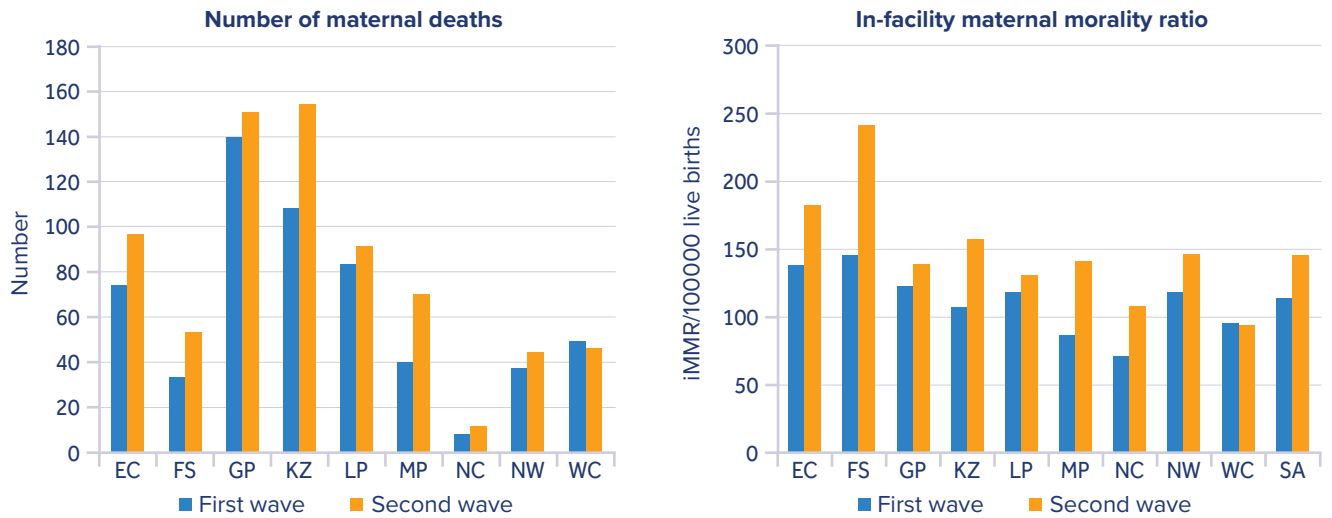


Figure A14: Comparison of stillbirth rate and early neonatal death rate between first and second waves of COVID-19

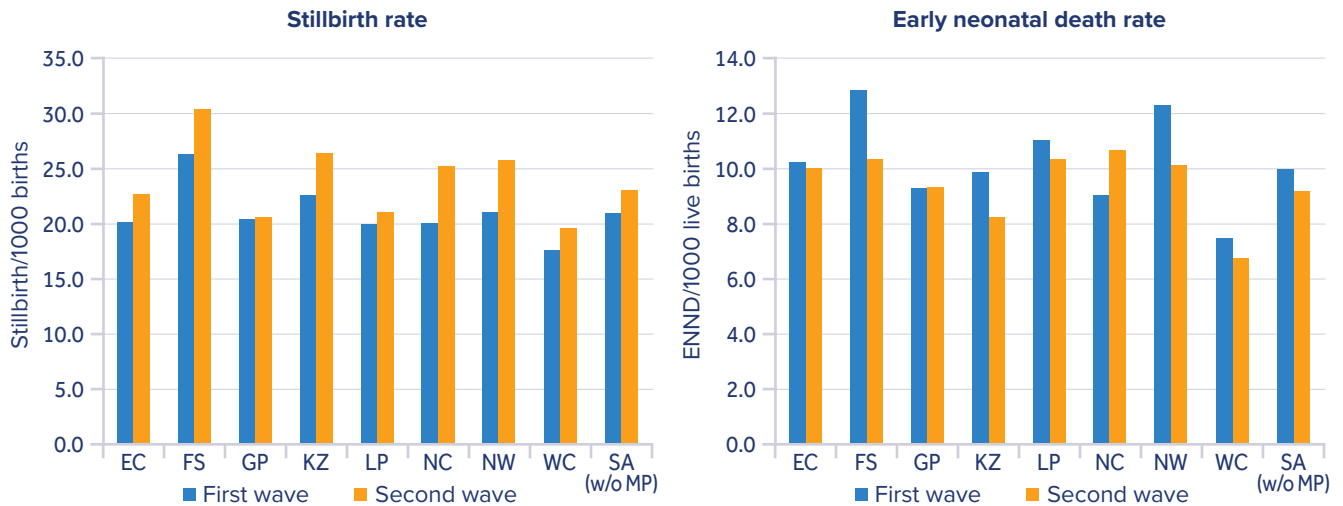


Figure A15: Comparison of births between first and second waves of COVID-19

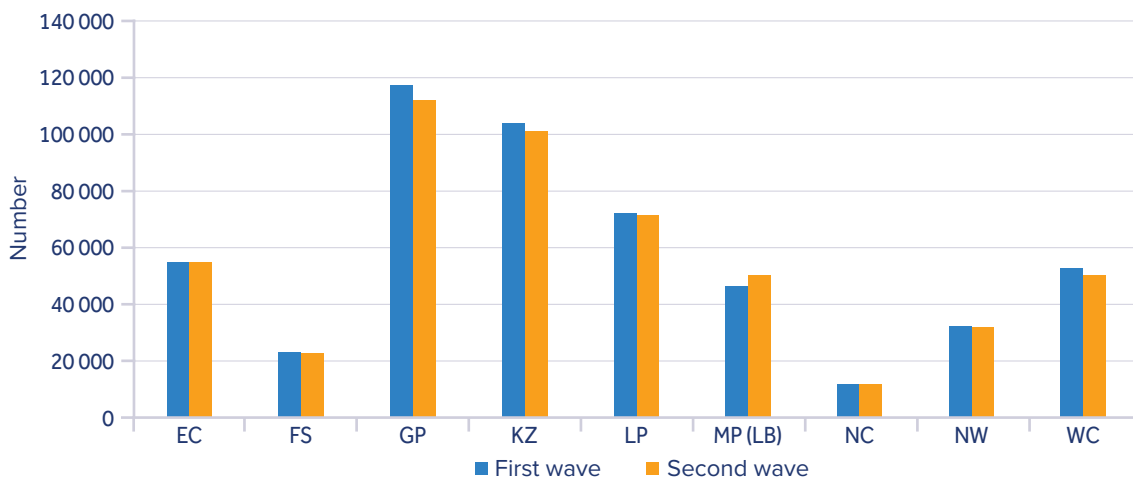


Figure A16: Comparison of number of contraceptive prescriptions and terminations of pregnancy between first and second waves of COVID-19

