



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

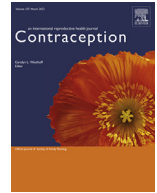
Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



ELSEVIER

Contents lists available at ScienceDirect

Contraception

journal homepage: www.elsevier.com/locate/contraception

Original Research Article

Impact of Coronavirus disease 2019 (COVID-19) on contraception use in 2020 and up until the end of April 2021 in France ^{☆,☆☆}Noémie Roland ^{a,b,*}, Jérôme Drouin ^a, David Desplas ^a, Lise Duranteau ^c, François Cuenot ^a, Rosemary Dray-Spira ^a, Alain Weill ^a, Mahmoud Zureik ^{a,b}^a EPI-PHARE, epidemiology of health products (French National Agency for Medicines and Health Products Safety, and French National Health Insurance), Saint-Denis Cedex, France^b University of Paris-Saclay, UVSQ, Univ. Paris-Sud, Inserm, Anti-infective Evasion and Pharmacoepidemiology, CESP (Center for Research in Epidemiology and Population Health), Montigny le Bretonneux, France^c Adolescent and Young Adult Gynaecology Unit and Reference Center for Rare, Diseases of Genital Development, APHP University of Paris Saclay, Bicêtre Hospital, Le Kremlin Bicêtre, France

ARTICLE INFO

Article history:

Received 20 September 2021

Received in revised form 2 December 2021

Accepted 8 December 2021

Keywords:

Contraceptive methods

Covid-19

Healthcare access

Reproductive health

Sexual Health

ABSTRACT

Objectives: To assess the impact of the COVID-19 pandemic on the use of reimbursed contraceptives in France after 15 months of the pandemic, according to age-group and updating previous data only pertaining to the first lockdown (2 months).

Study design: We conducted a national register-based study by extracting all reimbursements of oral contraceptives (OC), emergency contraception (EC), intrauterine devices (IUD), and implants from the French National Health Insurance database (SNDS), which includes and covers 99.5% of the French population, in 2018, 2019, 2020 and from January 1, 2021 to April 30, 2021. We calculated the expected use of contraceptives in 2020 and 2021 in the absence of the pandemic, based on 2018 and 2019 usage and taking annual trends into account. We assessed the difference between observed and expected dispensing rates by contraceptive type and by age-group (≤ 18 years old, $18 < \text{age} \leq 25$, $25 < \text{age} \leq 35$, > 35).

Results: Dispensing of all contraceptives decreased compared to expected dispensing numbers: -2.0% for OC, -5.3% for EC, -9.5% for LNG-IUS, -8.6% for C-IUD, and -16.4% for implant. This decrease in the dispensing of contraceptives was observed in all age-groups, but mainly concerned women under the age of 18 years (-22% for OC, -10% for EC, -37.2% for LNG-IUS, -36.4% for C-IUD, -26.4% for implant) and those aged 18 to 25 (-5.1% for OC, -11.9% for EC, -18.1% for LNG-IUS, -15.9% for C-IUD, -17.6% for implants).

Conclusions: Our study showed that the dispensing of contraceptives in France was markedly impacted by the COVID-19 pandemic. Prescriptions for long-acting contraceptive use and women under the age of 25 years were the most substantially impacted. Ensuring access to contraceptive methods during health emergencies must be a public health policy priority.

Implications: The COVID-19 pandemic strongly impacted the dispensing of contraceptives in France with varying degrees of decreased dispensing according to the type of contraceptive, the age-group and the level of pandemic-related restrictions. The impact of these restrictions on unintended pregnancy at the population level remains undetermined.

© 2021 The Authors. Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

[\(http://creativecommons.org/licenses/by-nc-nd/4.0/\)](http://creativecommons.org/licenses/by-nc-nd/4.0/)

Abbreviations: COVID-19, CoronaVirus Disease 19; EC, Emergency Contraception; IUD, Intra-Uterine Device; LARC, Long-Acting Reversible Contraception; OC, Oral Contraception.

^{*} Funding: This research was funded by EPI-PHARE, the French National Health Insurance Fund (CNAMTS) and the French National Agency for Medicines and Health Products Safety (ANSM). NR, DD, FC, RDS and MZ are employees of the French Na-

tional Agency for Medicines and Health, JD and AW of the French National Health Insurance Fund.

^{☆☆} Declarations of interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

^{*} Corresponding author.

E-mail address: noemie.roland@ansm.sante.fr (N. Roland).

1. Introduction

Health systems all over the world have been overwhelmed by the CO₂naVirus Disease 19 (COVID-19) pandemic and have struggled to maintain routine services. Difficulties accessing family planning services in 2020 have been reported even in high-income countries [1].

To reduce the spread of COVID-19, French authorities imposed 3 national lockdowns in 2020 and 2021. The first and most restrictive lockdown lasted from March 17 to May 11, 2020. People were required to stay at home, except when shopping for essential items (including pharmacy-related items), attending medical appointments that could not be conducted by telemedicine or postponed, or assisting vulnerable people. Schools and universities were closed and people were strongly encouraged to work at home. Health services focused on emergencies and managing of the pandemic. The second lockdown began on October 29, and ended on December 15, 2020 and was less restrictive: schools, public services and some “nonessential” shops remained open. A nationwide curfew from 8 pm to 6 am was then enforced in December, and then from 6 pm to 6 am in January 2021. Finally, a third lockdown was implemented from April 3 to May 3, 2021: schools were closed and working from home was encouraged, but shops remained open (Fig. 1). Some French recommendations may have encouraged access to contraception, such as a decree authorizing French pharmacists to fill expired prescriptions without requiring a new medical consultation [2], but the effectiveness of these recommendations have not yet been studied.

Our group has previously demonstrated profound changes in contraceptive use observed during the first lockdown in 2020 (2 months): numbers of Oral Contraception (OC), Emergency Contraception (EC), and levonorgestrel intrauterine system (LNG-IUS) prescriptions decreased during the lockdown and 1 month after compared to expectations [3]. An update of our results was needed after over 1 year of health crisis. We added an analysis by age-groups for a more accurate description of the impact of the pandemic on younger users whose sex lives may have changed substantially due to decreased social interaction. We also added the contraceptive implant and the Copper Intrauterine Device (C-IUD) to our analysis to gain a more comprehensive vision of the main contraceptive methods in France.

We conducted a national register-based cross-sectional study on OC, EC, implant, C-IUD, and LNG-IUS dispensing during 2020 and up to April 2021 to assess the impact of the COVID-19 pandemic on contraceptive prescriptions in France.

2. Materials and methods

2.1. Data sources

This study analyzed data from the French National Health Data System (SNDS), which provides information on health insurance claims for 99.5% of the population living in France (67,000,000 people). This database includes information on hospitalizations, outpatient care and reimbursed drugs, and is regularly used for monitoring drug utilization [4,5]. Drugs are coded according to the Anatomical Therapeutic Chemical (ATC) classification, and medical devices are coded according to the list of medical devices and services (LPP).

We screened all dispensing of contraceptives in pharmacies during 2018, 2019 and 2020, and from January 1 to April 30 2021 (i.e., incidence for EC, C-IUDs, LNG-IUSs and implants, and incidence and prevalence for OC). Details on the methods used for this study are accessible online [6].

2.2. Follow-up period

The first lockdown lasted from March 17, 2020 to May 11, 2020, the second lockdown lasted from October 30, 2020 to December 15, 2020, and the third lockdown lasted from April 03, 2021 to May 03, 2021. Our analysis was based on the period from the beginning of the first lockdown to the end of the third lockdown, that is, from March 16, 2020 to April 30, 2021. The curfew period was defined from December 15, 2020 to April 02, 2021.

2.3. Data analysis

We extracted all instances of dispensing of solely OC reimbursed in France (i.e., progestogen-only and second-generation combined pills), EC, implant, C-IUD and LNG-IUS in 2018, 2019, 2020, and 2021.

We calculated the expected dispensing numbers per fortnight in 2020 and 2021 in the absence of the pandemic and lockdowns based on the dispensing data observed in 2018 and 2019 and taking annual trends and public holidays (when pharmacies are mostly closed) into account. Expected dispensing numbers in 2020 were calculated by multiplying the dispensing numbers observed in the corresponding fortnight in 2019 and 2018 by the trend coefficient calculated for 2018 and 2019 dispensing numbers (trend coefficient \times (observed numbers in 2018 and 2019)/2). Similarly, expected dispensing numbers in 2021 were calculated by multiplying the observed numbers in 2019 and 2018 by the double trend coefficient (coef. \times coef. \times (observed numbers in 2019 and 2018)/2). We calculated the difference between expected and observed dispensing numbers per fortnight, and the corresponding percentage changes ((observed-expected dispensing numbers)/expected dispensing numbers). Crude numbers are presented graphically in the figures and percent changes are presented in the tables.

Lastly, we analyzed the percentage variation between observed and expected dispensing numbers according to 4 age-groups (≤ 18 years old, between 18 and 25, between 25 and 35 and >35 years old) during the follow-up period.

All analyses were performed with SAS Enterprise Guide software 7.1 (SAS Institute, Cary, NC).

2.4. Ethics

This study was conducted in line with Decree 2016-1871 dated December 26, 2016 relating to French law articles R. 1461-13 and 14 [7]. As a permanent user of SNDS, Institutional Review Board approval is waived for the author's team.

3. Results

The percentage changes for each contraceptive are presented in Table 1 and the percentage changes for each contraceptive by age-group are presented in Table 2.



Fig. 1. Timeline of the restrictions during 15 months of the COVID-19 pandemic in France.

Table 1

Use of oral contraceptives (OC), emergency contraception (EC), Levonorgestrel-released intrauterine system (LNG-IUS) Copper-Intrauterine Device (C-IUD) and contraceptive implant in 2020 and 2021: Observed and expected dispensations, Percent changes ((observed-expected dispensations)/expected dispensations)

Contraception	Total pandemic in 2020(03/16–12/15/20)				Total pandemic in 2021(01/01–04/30/21)				Total pandemic(03/16/20–04/30/21)			
	Expected	Observed	O-E	Percent change	Expected	Observed	O-E	Percent change	Expected	Observed	O-E	Percent change
OC	11,001,807	10,718,913	-282,894	-2.6%	4,493,178	4,458,577	-34,601	-0.8%	15,494,985	15,177,490	-317,495	-2.0%
EC	525,724	488,318	-37,406	-7.1%	223,663	223,185	-478	-0.2%	749,387	711,503	-37,884	-5.3%
LNG-IUS	285,271	244,901	-40,370	-14.1%	127,151	128,000	849	0.7%	412,422	372,901	-39,521	-9.5%
C-IUD	374,719	327,853	-46,866	-12.5%	164,883	165,505	622	0.4%	539,602	493,358	-46,244	-8.6%
Implant	175,819	141,586	-34,233	-19.5%	77,658	70,208	-7450	-9.6%	253,477	211,794	-41,683	-16.4%

O, Observed; E, Expected.

Table 2

Use of oral contraceptives (OC), emergency contraception (EC), Levonorgestrel-released intrauterine system (LNG-IUS) Copper-Intrauterine Device (C-IUD) and contraceptive implant in 2020 and 2021: Percent change ((observed-expected dispensations)/expected dispensations) by age-groups

Type of contraception	Ages in 4 classes (years)	Total pandemic 2020 (03/16–12/15/20)	TOTAL 2021(01/01–04/30/21)	Total Pandemic (03/16/20–04/30/21)
OC	≤ 18	-19.1%	-29.3%	-22.0%
	18 < age ≤ 25	-1.7%	0.1%	-5.1%
	25 < age ≤ 35	-1.9%	0.3%	-1.2%
	> 35	-0.3%	7.3%	1.9%
EC	≤ 18	-13.1%	-3.1%	-10.0%
	18 < age ≤ 25	-16.1%	-1.9%	-11.9%
	25 < age ≤ 35	-18.6%	-8.8%	-15.8%
	> 35	-6.3%	3.8%	-3.5%
LNG-IUS	≤ 18	-37.3%	-37.0%	-37.2%
	18 < age ≤ 25	-21.0%	-11.4%	-18.1%
	25 < age ≤ 35	-20.4%	-17.5%	-19.5%
	> 35	-12.4%	3.1%	-7.7%
C-IUD	≤ 18	-34.5%	-40.5%	-36.4%
	18 < age ≤ 25	-19.4%	-8.0%	-15.9%
	25 < age ≤ 35	-15.3%	-11.0%	-14.0%
	> 35	-9.7%	8.2%	-4.3%
Implant	≤ 18	-31.2%	-12.6%	-26.4%
	18 < age ≤ 25	-21.6%	-8.4%	-17.6%
	25 < age ≤ 35	-19.2%	-11.4%	-16.8%
	> 35	-19.2%	-7.4%	-15.5%

3.1. Oral Contraception

OC dispensing increased during the first fortnight of the first lockdown compared to expected dispensing (+21.0% from March 16 to March 29, 2020) (see Supplementary Materials), then decreased throughout the lockdown. A similar phenomenon was observed during the second lockdown (Fig. 2).

OC dispensing decreased slightly between lockdowns, with a net decrease of -2.0% at the end of the study period (Table 1). It is estimated that OC dispensing numbers during the pandemic were down of 317,495 on expected numbers. Dispensing to women under the age of 18 years was impacted most, with a 22.0% decrease for this age-group, followed by the 18 to 25 group (-5.1%) (Table 2).

3.2. Emergency Contraception

Dispensing of EC decreased substantially from the beginning of the first lockdown (March 16–May 11, 2020) compared to expected dispensing numbers. Dispensing of EC did not increase between lockdowns, and after a surge during the first fortnight of November 2020 (+13.8%), EC dispensing decreased during the second lockdown and in 2021 (Fig. 2).

At the end of the follow-up period, we estimated that 37,884 women (-5.3%) did not use EC (-10.0% for ≤18 years old, -11.9% for women 18 < age ≤25 years old, -15.8% for women 25 < age ≤35, -3.5% for women ≥35; Tables 1 and 2).

3.3. Intrauterine contraception

Dispensing of intrauterine contraception decreased sharply during the first lockdown in March 2020 compared to the expected dispensing (Fig. 2). At the end of 2020, we estimated that 40,370 French women did not use LNG-IUS and 46,866 did not use C-IUD compared to expected numbers.

Subsequently, use of both devices stabilized compared to expectations during 2020 and 2021, even during the second and third lockdowns. At the end of the study period, LNG-IUS and C-IUD dispensing decreased by 9.5% and 8.6%, respectively. The most marked decreases were observed among the group of women under 18 (-37.2% for LNG-IUS, -36.4% for C-IUD).

3.4. Implants

Like intrauterine devices and EC, the dispensing of implants decreased substantially during the first lockdown. Implant dispensing remained lower throughout 2020 and 2021, resulting in a negative balance at the end of the follow-up period: we estimated that 41,683 French women did not receive a contraceptive implant compared to expectations (-16.4%). This decrease was observed for all age-groups (-26.4% for women ≤18, -17.6% for women 18 < age ≤25, -16.8% for women 25 < age ≤35, and -15.5% for women >35).

4. Discussion

After analyzing data from the whole French population, our study showed that contraceptive dispensing in France was strongly

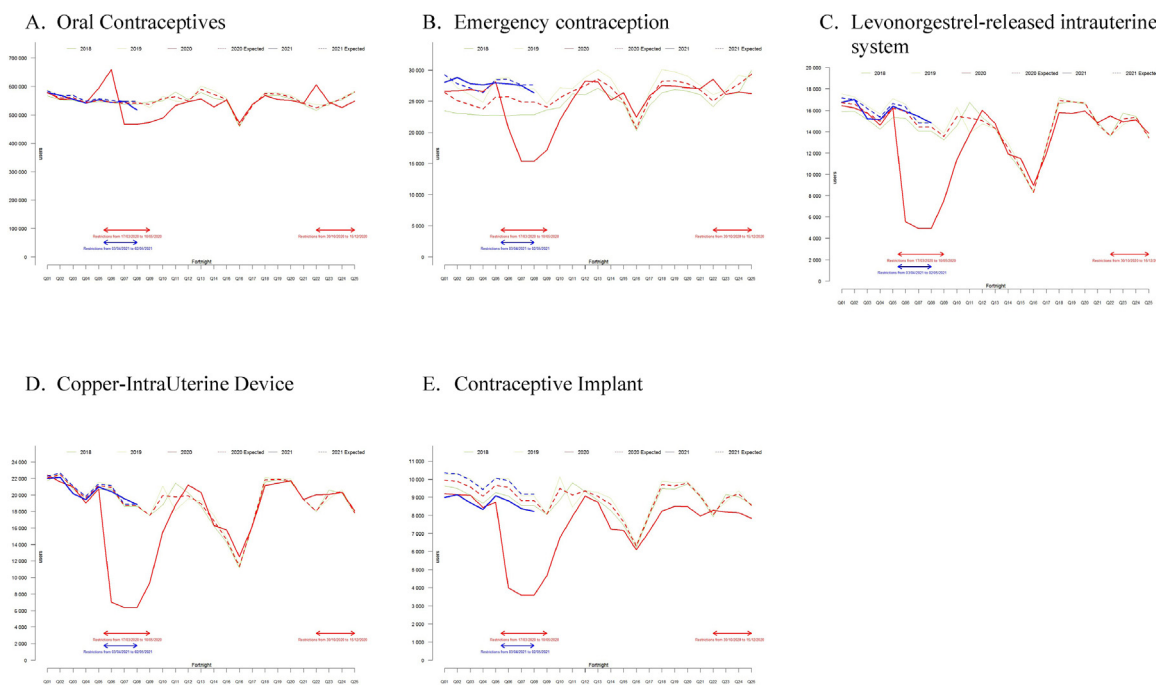


Fig. 2. Observed and expected dispensations of oral contraceptive (A), emergency contraception (B), levonorgestrel-releasing intrauterine system (C), Copper-Intrauterine Device (D) and Implant (E) users during 2018, 2019, 2020 and up to April 2021. A. Oral Contraceptives B. Emergency contraception C. Levonorgestrel-released intrauterine system D. Copper-Intrauterine Device E. Contraceptive Implant.

impacted by the COVID-19 pandemic, with varying degrees of decreased dispensing depending on the type of contraceptive, the age-group, and the level of necessary restrictions implemented for safety reasons. OC dispensing decreased very slightly compared to expected contraceptive use. Dispensing of EC and intrauterine contraceptives decreased more substantially during the first lockdown and then increased moderately at the end of 2020 and in 2021. Lastly, implant use decreased constantly during the follow-up period and was associated with the most marked negative balance. French women under the age of 25 years were the most severely impacted by the observed decrease in dispensing for the 5 contraceptives. To our knowledge, no other study has examined the use of contraceptives during the pandemic according to age-groups.

During the COVID-19 pandemic, the estimated decrease in contraceptive use in low-income countries was 10% [8]. In France, a high-income country with a high contraceptive coverage of 71.8% of women of reproductive age [9], our study showed that contraceptive use was also strongly impacted by the pandemic. Our study highlighted a difference between contraceptives dispensed directly to women by pharmacies and those requiring health professional interventions for insertion. Fears of OC shortage and lack of visibility could explain the OC stockpiling behavior during the first weeks of the first 2 lockdowns. This behavior was also observed in a South African study that reported increased OC use during the first five weeks of national lockdown, whereas Long-Acting Reversible Contraception (LARC) prescriptions decreased [10]. A Spanish study reported that 96.6% of the women surveyed continued their combined OC during lockdown despite decreased sexual activity among one-half of them. Moreover, Women who already used LARC before 2020 may have postponed device removal/replacement beyond the expiry date, as recommended by gynecological organizations during the pandemic [11,12]. Some women who would have considered LARC removal to become pregnant may also have postponed trying for a baby during the pandemic. We performed some additional analysis to support this hypothesis. We observed indeed a decrease of about 11% of the IUD removal in 2020 compared with

expectations. This decrease could reflect the fact that some women had postponed device removal.

Surprisingly, our study showed a difference between the three types of LARC. A significant decrease of the dispensing of implants was observed in 2020 and 2021 compared to expected numbers and compared to intrauterine contraceptive devices. Implants are the least commonly used contraceptive method in France and are mostly prescribed for younger women (4.3% of all women, but 9.6% of the 20–24 year age-group [9]). Due to the impact of lockdowns and curfews on their sex lives, younger women may have postponed their decision to have an implant inserted. In contrast, after a marked decrease during the first lockdown, LNG-IUS and C-IUD dispensing gradually increased. To our knowledge, no other study has reported a difference between C-IUD and LNG-IUS use during the pandemic [10]. Both types of IUD have different indications, and different user and prescriber profiles [13] but it would appear that the pandemic had similar impacts on their use.

In line with WHO guidelines [14], the French National College of Gynecologists and Obstetricians encouraged gynecologists to initiate or renew OC prescription using telemedicine, to propose intrauterine device insertion during physical consultations only under safe conditions, and to postpone LARC removal procedures [12]. These guidelines were also applied in the United States [15] and in Italy [16]. A systematic review has shown that telemedicine improved obstetric outcomes [17], but did not improve contraceptive follow-up, although women reported an overall positive experience with telemedicine for contraceptive counselling during the pandemic in New York [18]. As telemedicine was not fully implemented in France prior to the COVID-19 pandemic, no data are available concerning the acceptance of gynecological telemedicine by French patients and physicians. Telemedicine could possibly accentuate health access inequalities due to unequal access to technology, especially in the context of a health and social crisis [19].

The decreased use of EC and LARC during lockdowns could have led to unplanned pregnancies, especially among younger and women in more precarious circumstances. Moreover, difficulties

were encountered accessing safe abortion care during the pandemic [20]. In the United States, the women most economically affected by COVID-19 pandemic were more likely to have difficulties accessing contraception, despite a greater need of preventing pregnancy [21]. Lockdowns have a huge impact on unmet family planning needs: the United Nations sexual and reproductive health agency estimated that every three months of lockdown in the world could lead to an additional 2 million women losing access to modern contraceptives [22] resulting in numerous unintended pregnancies [23]. To tackle the issue, the French government decided to extend the legal limit for medical abortion (to 9 weeks of amenorrhea instead of 7 weeks) during and after the 2020 lockdowns [2]. In 2020, 220,000 abortions were recorded in France, which represents a 4% decrease compared to 2019. At the same time, a decreased birth rate was observed in France in 2020 (1.84 children per woman, –1.8% compared to 2019) [24]. Consequently, the decreased dispensing of EC and LARC might be the result of decreased sexual activity of women in France during the pandemic, due to decreased social interactions, rather than an unmet demand for contraception. A negative impact of the first lockdown on sexual activity was highlighted in another French study (but concerning men who have sex with men) [25]. Similarly, a decreased interest in sex during quarantine was observed in Australia [26]. Australian women also delayed their pregnancies during the first lockdown [27], and Turkish women reported a reduced desire to have a child during the pandemic [28].

4.1. Study limitations

The SNDS database does not include information about contraceptives not reimbursed by national health insurance such as male and female condoms (available over the counter) and pills including desogestrel, gestoden or drospirenon (prescribed by a health practitioner). Women in our study may have discontinued their contraception in 2020 and switched to non-reimbursed contraceptives. However, nonreimbursed pills only represent 14% of all pills prescriptions in France and their use may not be different from reimbursed pills during the crisis [29]. We used C-IUD and LNG-IUS dispensing as a proxy for device placement and use, as we considered it unlikely that women obtained the device from a pharmacist without device placement over the following days/weeks.

This study reflects the impact of the COVID-19 pandemic on the use of the main contraceptives in France over a whole year, as already demonstrated for other types of medications [30,31]. Younger French women were impacted most by the decrease observed in the dispensing of contraceptives. Ensuring access to contraceptive methods during health emergencies must be a public health policy priority.

Data availability

In accordance with data protection legislation and the French regulation, the authors cannot publicly release the data from the SNDS. However, any person or structure, public or private, for-profit or non-profit, is able to access SNDS data upon authorization from the French Data Protection Office (CNIL), in order to carry out a study, research or an evaluation in the public interest (<https://www.snds.gov.fr/SNDS/Processus-d-acces-aux-donnees> and <https://www.indsante.fr/>).

Supplementary materials

Supplementary Materials 1: Calculated annual trend coefficients values for each contraceptive

Supplementary Materials 2: Use of oral contraceptives, emergency contraception, Levonorgestrel-released intrauterine System,

Copper Intra-Uterine Device and contraceptive Implant in 2020 per fortnights: difference between observed and expected numbers of dispensations (W=week, OC=Oral Contraception, EC=Emergency Contraception, LNG-IUS= Levonorgestrel-released intrauterine System, C-IUD= Copper Intra-Uterine Device)

Supplementary Materials 3: Use of oral contraceptives, emergency contraception, Levonorgestrel-released intrauterine System, Copper Intra-Uterine Device and contraceptive Implant in 2021 per fortnights: difference between observed and expected numbers of dispensations (W=week, OC=Oral Contraception, EC=Emergency Contraception, LNG-IUS= Levonorgestrel-released intrauterine System, C-IUD= Copper Intra-Uterine Device)

Acknowledgments

Each author has confirmed compliance with the journal's requirements for authorship. We thank Anthony Saul for his help in correcting and clarifying the manuscript.

References

- [1] Bellizzi S, Pichierri G, Napodano CMP, Picchi S, Fiorletta S, Panunzi MG, et al. Access to modern methods of contraception in Italy: will the COVID-19 pandemic be aggravating the issue? *J Glob Health* 2020;10:020320. doi:10.7189/jogh.10.020320.
- [2] JOFV. Arrêté du 14 avril 2020 complétant l'arrêté du 23 mars 2020 prescrivant les mesures d'organisation et de fonctionnement du système de santé nécessaires pour faire face à l'épidémie de covid-19 dans le cadre de l'état d'urgence sanitaire - Légifrance n.d. <https://www.legifrance.gouv.fr/loda/id/JORFTEXT000041798289/> (accessed May 31, 2021).
- [3] Roland N, Drouin J, Desplas D, Cuenot F, Dray-Spira R, Weill A, et al. Effects of the coronavirus disease 2019 (COVID-19) lockdown on the use of contraceptives and ovulation inductors in France. *Obstet Gynecol* 2021;137:415–17. doi:10.1097/AOG.0000000000004281.
- [4] Colas S, Collin C, Piriou P, Zureik M. Association between total hip replacement characteristics and 3-year prosthetic survivorship: a population-based study. *JAMA Surg* 2015;150:979–88. doi:10.1001/jamasurg.2015.1325.
- [5] Semenzato L, Botton J, Drouin J, Cuenot F, Dray-Spira R, Weill A, et al. Chronic diseases, health conditions and risk of COVID-19-related hospitalization and in-hospital mortality during the first wave of the epidemic in France: a cohort study of 66 million people. *Lancet Reg Health Eur* 2021;8:100158. doi:10.1016/j.lanepe.2021.100158.
- [6] EPI-PHARE. Covid-19 : usage des médicaments - rapport 6. EPI-PHARE 2021. <https://www.epi-phare.fr/rapports-detudes-et-publications/covid-19-usage-des-medicaments-rapport-6/> (accessed May 31, 2021).
- [7] JORF. Décret n° 2016-1871 du 26 décembre 2016 relatif au traitement de données à caractère personnel dénommé « système national des données de santé ». 2016.
- [8] Marie Stopes International. Methodology for calculating impact of COVID-19. Marie Stopes International n.d. <https://www.mschoices.org/resources/methodology-for-calculating-impact-of-covid-19> (accessed June 1, 2021).
- [9] Rahib D, Le Guen M, Lydié N. Baromètre santé 2016. Contraception. Quatre ans après la crise de la pilule, les évolutions se poursuivent. Saint Maurice: Santé Publique France; 2017.
- [10] Adelekan T, Mihretu B, Mapanga W, Nqeketo S, Chauke L, Dwane Z, et al. Early effects of the COVID-19 pandemic on family planning utilisation and termination of pregnancy services in Gauteng, South Africa: March–April 2020. *Wits J Clin Med* 2020;2:91. doi:10.18772/26180197.2020.v2n2a7.
- [11] Ali M, Bahamondes L, Bent Landoulsi S. Extended effectiveness of the etonogestrel-releasing contraceptive implant and the 20 µg levonorgestrel-releasing intrauterine system for 2 years beyond U.S. Food and Drug Administration PRODUCT LABELING. *Glob Health Sci Pract* 2017;5:534–9. doi:10.9745/GHSP-D-17-00296.
- [12] CNGOF. Activité de contraception en période d'épidémie. National College of the French Gynecologists and Obstetricians 2020. <http://www.cngof.fr/component/rsfiles/apercu?path=Clinique%252Fpreferentiels%252FCOVID-19%252FCONTRACEPTION%2B-%2BIVG%2B-%2BCOVID%252FCONTRACEPTIONCOVID.pdf&i=43096> (accessed May 31, 2021).
- [13] Le Guen M, Rouzaud-Cornabas M, Panjo H, Rigal L, Ringa V, Moreau C, et al. The French pill scare and the reshaping of social inequalities in access to medical contraceptives. *SSM Popul Health* 2020;11:100606. doi:10.1016/j.ssmph.2020.100606.
- [14] Organization WH. COVID-19: operational guidance for maintaining essential health services during an outbreak: interim guidance, 25 March 2020 2020.
- [15] Nanda K, Lebetkin E, Steiner MJ, Yacobson I, Dorflinger LJ. Contraception in the era of COVID-19. *Glob Health Sci Pract* 2020;8:166–8. doi:10.9745/GHSP-D-20-00119.
- [16] Fruzzetti F, Cagnacci A, Primiero F, De Leo V, Bastianelli C, Bruni V, et al. Contraception during Coronavirus-Covid 19 pandemia. Recommendations of the Board of the Italian Society of Contraception. *Eur J Contracept Reprod Health Care* 2020;25:231–2. doi:10.1080/13625187.2020.1766016.

- [17] DeNicola N, Grossman D, Marko K, Sonalkar S, Butler Tobah YS, Ganju N, et al. Telehealth interventions to improve obstetric and gynecologic health outcomes. *Obstet Gynecol* 2020;135:371–82. doi:[10.1097/AOG.0000000000003646](https://doi.org/10.1097/AOG.0000000000003646).
- [18] Stifani BM, Smith A, Avila K, Boos EW, Ng J, Levi EE, et al. Telemedicine for contraceptive counseling: patient experiences during the early phase of the COVID-19 pandemic in New York City. *Contraception* 2021. doi:[10.1016/j.contraception.2021.04.006](https://doi.org/10.1016/j.contraception.2021.04.006).
- [19] Peretti-Watel P, Verger P, Launay O, Study Group COCONEL. The French general population's attitudes toward lockdown against COVID-19: a fragile consensus. *BMC Public Health* 2020;20:1920. doi:[10.1186/s12889-020-10048-1](https://doi.org/10.1186/s12889-020-10048-1).
- [20] Bayefsky MJ, Bartz D, Watson KL. Abortion during the Covid-19 pandemic - ensuring access to an essential health service. *N Engl J Med* 2020;382:e47. doi:[10.1056/NEJMp2008006](https://doi.org/10.1056/NEJMp2008006).
- [21] Lin TK, Law R, Beaman J, Foster DG. The impact of the COVID-19 pandemic on economic security and pregnancy intentions among people at risk of pregnancy. *Contraception* 2021;103:380–5. doi:[10.1016/j.contraception.2021.02.001](https://doi.org/10.1016/j.contraception.2021.02.001).
- [22] UNFPA. Impact of the COVID-19 pandemic on family planning and ending gender-based violence, female genital mutilation and child marriage n.d. /fr/node/24179 (accessed May 31, 2021).
- [23] Guttmacher Institute. Adding it up: investing in contraception and maternal and newborn health, 2017—estimation methodology 2018. <https://doi.org/10.1363/2018.29523>.
- [24] INSEE. Bilan démographique 2020 - Insee Première - 1834 n.d. <https://www.insee.fr/fr/statistiques/5012724> (accessed June 1, 2021).
- [25] Velter A, Champenois K, Rojas Castro D, Lydié N. Impact perçu de l'épidémie de Covid-19 des hommes ayant des rapports sexuels avec des hommes en France. *Bull Epidemiol Hebd* 2020;33-34:666–72 http://beh.santepubliquefrance.fr/beh/2020/33-34/2020_33-34_3.htm.
- [26] Coombe J, Kong FYS, Bittleston H, Williams H, Tomnay J, Vaisey A, et al. Love during lockdown: findings from an online survey examining the impact of COVID-19 on the sexual health of people living in Australia. *Sex Transm Infect* 2020. doi:[10.1136/sextrans-2020-054688](https://doi.org/10.1136/sextrans-2020-054688).
- [27] Coombe J, Kong F, Bittleston H, Williams H, Tomnay J, Vaisey A, et al. Contraceptive use and pregnancy plans among women of reproductive age during the first Australian COVID-19 lockdown: findings from an online survey. *Eur J Contracept Reprod Health Care* 2021:1–14. doi:[10.1080/13625187.2021.1884221](https://doi.org/10.1080/13625187.2021.1884221).
- [28] Yuksel B, Ozgor F. Effect of the COVID-19 pandemic on female sexual behavior. *Int J Gynaecol Obstet* 2020;150:98–102. doi:[10.1002/ijgo.13193](https://doi.org/10.1002/ijgo.13193).
- [29] French National Agency for the safety of medicines and health products. Dossier thématique - Contraception - ANSM n.d. <https://ansm.sante.fr/dossiers-thematiques/contraception> (accessed November 8, 2021).
- [30] Taine M, Offredo L, Drouin J, Toubiana J, Weill A, Zureik M, et al. Mandatory infant vaccinations in France during the COVID-19 pandemic in 2020. *Front Pediatr* 2021;9:666848. doi:[10.3389/fped.2021.666848](https://doi.org/10.3389/fped.2021.666848).
- [31] Billioti de Gage S, Bertrand M, Grimaldi S, Zureik M. Intravitreal anti-VEGF use in France: a cross-sectional and longitudinal Nationwide observational study. *Acta Ophthalmol* 2021. doi:[10.1111/aos.14929](https://doi.org/10.1111/aos.14929).