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The impact of the COVID-19 pandemic on the continuity of care for at-risk patients in Swiss primary care settings: A mixed-methods study

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ABSTRACT

Continuity of care is important for the health of aging individuals with comorbidities. When initial coronavirus mitigation campaigns involved messaging such as “Stay at home—stay safe,” and banned provision of non-urgent care, at-risk patients depending upon regular consultations with general practitioners (GPs) faced confusion about the possibility of seeking non-COVID-19 related healthcare. We employed a sequential explanatory mixed-methods design, consisting of a quantitative component followed by a qualitative component, to understand at-risk patients’ health services use during the COVID-19 pandemic in Switzerland. Quantitatively, we used electronic medical records data from 272 GPs and 266,796 patients. Based on pre-pandemic data, we predicted weekly consultation counts as well as weekly measurement counts (blood pressure, glycated hemoglobin, and low-density lipoprotein cholesterol) per 100 patients that would be expected in 2020 in absence of a pandemic and compared those to actual observed values. Qualitatively, we conducted 23 semi-structured interviews with 24 GPs (~45 min) and 37 interviews with at-risk patients (~35 min). Quantitative results demonstrate a significant decrease in consultation and measurement counts during the first shutdown period, with consultation counts quickly returning to normal and moving within expected values for the rest of 2020. Qualitative data contextualize these findings with GPs describing constantly implementing material, administrative, and communication changes. GPs reported communication gaps with the authorities and noted a lack of clear guidelines delineating how to define “at-risk patients” and what cases were “urgent” to treat during shutdowns. Patient interviews show that patient-level factors, such as fear of contracting coronavirus, perceptions that GPs were overburdened, and a sense of solidarity, influenced patients’ decisions to consult less at the beginning of the pandemic. Findings demonstrate communication gaps during pandemic periods and provide valuable lessons for future pandemic preparedness, particularly the need for contingency plans for the overall healthcare system instead of plans focusing only on the infectious agent itself.

1. Introduction

After the first COVID-19 case was confirmed in Switzerland on February 25, 2020, the Swiss Federal Office of Public Health (FOPH) began implementing various mitigation measures to combat further spread of the virus. These measures were designed to protect people at risk for severe COVID-19-related complications and aimed at assuring

the provision of care and therapeutic products to the public (Deml et al., 2021). In the early pandemic phases in March 2020, the FOPH defined people especially at risk for severe COVID-19 as including those aged ≥ 65 years and those with the following conditions: high blood pressure, diabetes, cardiovascular disease, chronic respiratory diseases, conditions and therapies that weaken the immune system, and cancer (FOPH, 2020).

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In mid-March 2020, due to the increasing coronavirus case rate, Switzerland's federal government tightened the measures by issuing a stay-at-home recommendation for the entire population and a closure of schools, restaurants, and non-essential shops (FOPH, 2020). There was also a ban on providing non-urgent healthcare services (Fedlex, 2020; FMH, 2020). In spring 2020, as the number of COVID-19 cases increased exponentially and the ban on non-urgent healthcare services remained in place, healthcare professionals globally expressed concerns due to decreased health services use and increased missed appointments for chronic disease care in general practice (Wong et al., 2020).

From the end of April 2020 onwards, the FOPH started loosening mitigation measures according to a 3-phase model (Swissinfo.ch, 2021). Furthermore, the second wave of COVID-19 cases in Switzerland in Autumn 2020 caused tightening of the mitigation measures in various forms due to differences between the different cantons (i.e. States), until the federal government passed another set of federal measures at the end of 2020 (Swissinfo.ch, 2021).

1.1. Continuity of care: Crisis and non-crisis settings

Irrespective of the COVID-19 pandemic, at-risk populations make on average more use of healthcare services compared to the general population in Switzerland (Aubert et al., 2019; McPhail, 2016). This is due to their more complex healthcare needs, which require regular chronic disease monitoring and intensive treatment regimens (Cassell et al., 2018). Prior to the COVID-19 pandemic, it was already crucial for at-risk patients to frequently consult with their general practitioners (GPs). For these patients, any delays or referrals of medical appointments could lead to unfavorable health outcomes (Khera et al., 2020; Rachamin et al., 2021).

Research predating the COVID-19 pandemic has focused on these issues by employing the term *continuity of care* (Gray et al., 2003, 2018). A systematic review into the indices for continuity of care pointed to 5 principle ways researchers have operationalized and measured continuity of care: (1) duration of provider relationships, (2) density of visits, (3) dispersion of providers, (4) sequence of providers, and (5) subjective estimates, including qualitative data, patient-rated perceptions of satisfaction and appropriateness of time between visits (Jee and Cabana, 2006). Whereas much scholarship has focused on continuity of care in non-crisis settings, some researchers have pointed to the impact of extenuating circumstances on healthcare service provision not related to the crisis at hand, such as the impacts for those in war zones and those displaced in war settings (El Saghir et al., 2018; Lafta and Al-Nuaimi, 2019), natural disasters, such as Hurricane Katrina (Icenogle et al., 2016; Quast and Mortensen, 2015; Raulji et al., 2018), and other infectious disease outbreaks, such as Ebola. The title of the article "Women and babies are dying but not of Ebola" in *BMJ Global Health* speaks volumes about the impact of the epidemic of Ebola in Sierra Leone in 2014 on the increase in mortality of pregnant women and stillborn babies, due in large part to the weakened healthcare system and the reallocation of already low resources prior to the Ebola pandemic to Ebola-related measures (Jones et al., 2016).

Globally, researchers have examined health services use during the COVID-19 pandemic with both qualitative and quantitative research methodologies. Interestingly, in Ghana, healthcare-seeking behavior increased during the pandemic due to increased health consciousness and regular check-ups (Saah et al., 2021). In contrast, qualitative studies from Argentina and Nepal both showed decreased healthcare-seeking behavior during the pandemic, with researchers describing such decreases in terms of patients' fears of contracting coronavirus, confusion about procedures to follow to continue receiving medical care, and closures of, or reduced opening times of, health facilities (Loza et al., 2021; Singh et al., 2021). For their part, GPs in Belgium have reported drastic changes in healthcare organization, reduction of chronic care activities, and difficulties establishing a systematic approach for the identification and contact of at-risk patients (Danhieux et al., 2020;

Verhoeven et al., 2020).

Quantitative studies have shown reductions in non-COVID-19-related hospital admissions in the United States and in Australia (Birkmeyer et al., 2020; Sutherland et al., 2020), emergency department visits in the Netherlands, England, and Australia (Barten et al., 2020; Fabes, 2020; Sutherland et al., 2020), mental health services use in Australia and Hong Kong (Sutherland et al., 2020; Wong et al., 2020), preventive cardiology care and cancer screening in the United States, and Australia (Khera et al., 2020; Sutherland et al., 2020; Whaley et al., 2020) since the beginning of the pandemic. Other researchers have shown that 20% of the oldest patients with multimorbidity missed medical appointments for chronic disease care since the beginning of the pandemic and with older patients recalling fear of contracting coronavirus as a cause for delayed healthcare-seeking behavior in the Netherlands and Hong Kong (Nab et al., 2021; Wong et al., 2020). A German study that investigated the perceived access to healthcare services showed that for most patients, access to medical care was ensured during the pandemic (Reitzle et al., 2021). Moreover, they observed a large increase in telemedicine, which compensated for the decrease in in-patient visits (Reitzle et al., 2021). In Switzerland specifically, the first shutdown period has led to decreased consultation counts and chronic disease measurements in primary care settings (Rachamin et al., 2021).

However, research up until now has generally focused on the general population and there has been a lack of a more detailed analysis of health services use in at-risk groups. We therefore have analyzed quantitative data regarding the trends of the intensity, or the number of healthcare services used, of healthcare use for the total general practice population and for at-risk patients in Switzerland. Additionally, we analyzed trends for disease-specific measurements commonly used in monitoring, namely blood pressure (BP), glycosylated hemoglobin (HbA1c), and low-density lipoprotein cholesterol (LDL-C), as a proxy for in-patient visits and regular care as opposed to COVID-19 related care (e.g., testing, treatment, etc.). We then conducted semi-structured qualitative interviews with GPs and some of their at-risk patients concerning continuity of care and experiences with primary care services during the pandemic.

1.2. Research objective and research questions

The overall objective of this study was to study the healthcare services use of at-risk patients during the first year of the COVID-19 pandemic in Switzerland with a mixed-methods approach. To the best of our knowledge, this is the first mixed-methods study conducted on the health services use of at-risk patients during the pandemic. We asked the following research questions:

- 1) To what extent did the pandemic affect the health services use and provision of at-risk patients in the primary care setting throughout 2020?
- 2) How did GPs in Switzerland provide continuity of care for at-risk patients throughout 2020?
- 3) What challenges did at-risk patients and GPs face in ensuring continuity of care, for themselves or for their patients, respectively, throughout 2020 and how did they address them?

Given the above-mentioned considerations of continuity of care, we have pragmatically operationalized the concept as follows: in the study's quantitative component, it was assessed by analyzing the intensity of health services utilization, namely consultation counts and measurement counts. In the study's qualitative component, it was assessed by asking participants about perceived changes in the provision/reception of health services during the first year of the pandemic.

2. Methods

2.1. Research design

This study used a sequential explanatory mixed-methods design, which consists of an initial quantitative component followed by a qualitative component (Creswell and Plano Clark, 2011). The goal of this mixed-methods study design was that the qualitative findings help us to better explain and understand the results of the quantitative component. The quantitative data used for this analysis were collected from the FIRE project (“Family medicine Research using Electronic medical records”) (Chmiel et al., 2011). The qualitative interviews were conducted between January and March 2021.

2.2. Quantitative study component

2.2.1. Design, setting, and participants

Quantitative data were collected by GPs participating in the FIRE project (Chmiel et al., 2011). Since the start of the FIRE project in 2009, routine data from electronic medical records of over 700 GPs treating over 900,000 patients were collected (as of April 2021). Data involves consultations, medication prescriptions, laboratory and vital sign measurements, and reasons of encounter according to the International Classification of Primary Care, 2nd edition (ICPC-2), linked to the patient, GP, and practice.

In this study sample, we include GPs that joined the FIRE project prior to the year 2019 and were still participating in 2021. We exclude GPs that did not export data in at least 10 of 12 months in both 2019 and 2020 or did not export laboratory or vital sign measurement over the whole observation period. We below refer to this as “insufficient data export”. We built two patient cohorts, one in 2019 and one in 2020. Patients were included if they had at least two consultations: one before and one during the year of observation (2019 for cohort of 2019 and 2020 for cohort of 2020) to ensure sufficient baseline data and continuity of care before the pandemic. The study flowchart is shown in Fig. 1.

2.2.2. Definition of pandemic periods

In Switzerland, there was no “lockdown period” in spring 2020 but rather a stay-at-home recommendation, which was coupled with the closure of non-essential businesses and schools. We refer to this period as the “shutdown period”. Due to a decline in the number of COVID-19 cases, measures began loosening at the end of April 2020 so that during summer 2020, only few measures were still in place. When the number of cases began increasing again in Autumn 2020, the measures again became more stringent. Since Switzerland’s healthcare system is largely shaped by the country’s federalism whereby the Federal government delegates tasks and responsibilities to the cantons (i.e. states), there were periods of time during which the measures in some cantons were more stringent than in others. Some measures were, particularly at the beginning, implemented coherently at a federal level, whereas other measures were canton specific (Deml et al., 2021). Overall, despite the differences mainly in fall 2020, the stringency of the mitigation measures was comparable throughout 2020 (Pleninger et al., 2021). The discordance in federal and cantonal level mitigation measures at different periods of time throughout 2020 required us to make some assumptions when defining clearly distinct analytic time periods. For the purpose of our analyses, we defined four periods, which are based on federally consistent mitigation measures: (1) Pre-pandemic Period: Control year 2019 and beginning of the year 2020, up to 16 March 2020 (closure of schools and non-essential businesses); (2) First Wave and Shutdown Period: 17 March 2020–11 May 2020 (relief of most mitigation measures with a reopening of many non-essential businesses); (3) Summer 2020 Period: 12 May 2020–19 October 2020, and (4) Second Wave Period: 20 October 2020 until the end of the year 2020 (end of observation period).

2.2.3. Quantitative data extraction and analysis

We extracted data on practice, GP, and patient level. For practices, we extracted type (group vs. single practice and urban vs. non-urban/rural) (OFS, 2019). For GPs, we extracted age and sex. For patients, we extracted dates of consultations, presence of morbidities/factors classifying them as at-risk patients in the beginning of the year of

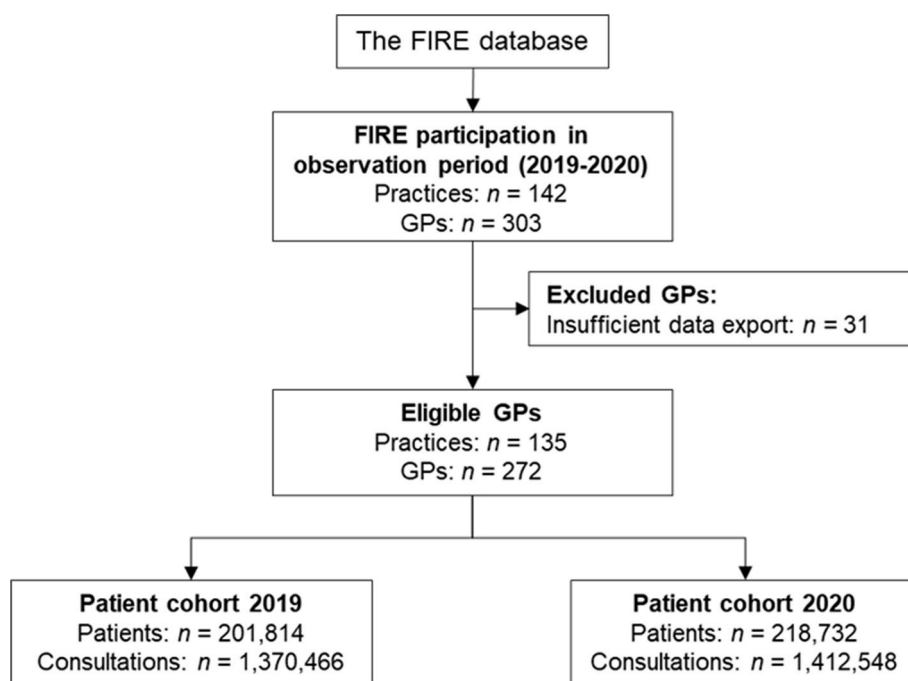


Fig. 1. Flowchart of GP and patient selection for the quantitative component. **Legend:** Patients of eligible GPs were included in the 2019 and/or 2020 cohort if had at least one consultation before and one consultation during the year of observation (2019 or 2020, respectively). Abbreviations: GP, general practitioner, FIRE, Family medicine Research using Electronic medical records.

observation (for operationalization in the FIRE database, see [supplementary eTable 1](#)), and dates and values of measurements of HbA1c, BP, and LDL-C.

Quantitative data analyses were performed using the R software version 4.0.0 (R Core Team, 2019). Data was described by counts (n) and/or proportions (%), respectively medians and interquartile ranges (IQRs). Groups were compared using the chi-square test or the Wilcoxon rank-sum tests as appropriate. The analyses of the impact of the pandemic on consultation and measurement counts were built on the work of [Rachamin et al. \(2021\)](#) but extended to the whole year 2020. Consultation/measurement counts were aggregated by calendar week and year, normalized to the total number of patients in the cohort and reported as consultation/measurement counts per 100 patients. Based on these weekly consultation/measurement counts, we built a linear regression model with the year (2020 vs. 2019), a seasonal predictor (accounting for holidays and other seasonal variation, for definition see [supplementary eTable 2](#)), and the period (Pre-pandemic, First wave and Shutdown, Summer 2020, and Second Wave) as independent variables. 95% confidence intervals (CI) and p -values were reported. The model was used to predict weekly consultation/measurement counts in 2020 that would be expected in absence of a pandemic. Fitted values with 95% prediction intervals (PI) were plotted and observed weekly consultation/measurement counts in 2020 were considered significantly different from expected values if they lay outside the PI. These analyses of the total general practice population were repeated for different at-risk subgroups (all that could be identified in the database, i.e., patients aged ≥ 65 years, with hypertension, diabetes, obstructive lung disease, cardiovascular disease, or cancer).

Moreover, the Swiss stringency index was plotted on the graphs to help the interpretation of the model ([Pleninger et al., 2021](#)). The stringency index is a composite measure of nine response metrics (school closures, workplace closures, cancellation of public events, restrictions on public gatherings, closures of public transport, stay-at-home requirements, public information campaigns, restrictions on movements within countries and international travel controls) that records the strictness of government policies on a scale between 0 and 100 (100 = most strict measures) ([Hale et al., 2021](#); [Pleninger et al., 2021](#)).

To investigate GP variation in the impact of the pandemic on consultation counts, only GPs who treated over 300 different eligible patients per year were considered. We aggregated consultation counts by GP, week, and year. The model used for prediction was adapted to include random GP effects and an interaction term between the random GP effect and the period (multilevel linear regression). We visualized the difference between the GPs' actual consultation counts and their expected non-pandemic consultation counts, normalized to the expected counts (% difference).

2.3. Qualitative study component

2.3.1. Design, setting, and participants

We collected qualitative data in the German- and French-speaking parts of Switzerland (Cantons of GE, VD, FR, BE, VS, and AG) by conducting 23 semi-structured qualitative interviews (2 GPs from the same practice opted to be interviewed together) with GPs ($n = 24$) and 37 semi-structured interviews with at-risk patients. Data gathered during the interviews allowed comparison of their experiences during the COVID-19 pandemic with regards to health services use in the primary care setting. We recruited GPs through the research networks of the Institutes of Primary Health Care of the University of Bern, Zurich, and Fribourg, other personal contacts and through snowball sampling. We sent recruitment letters and study flyers via e-mail. To be eligible for study participation, GPs had to be providing primary care services in the period from March 2020 to the moment of the interview (January–March 2021). Patients were recruited through their GPs. For this, GPs first screened for eligible at-risk patients. Although the definition of at-risk group changed over time, we worked with the definition from

March 2020 (when the study was designed) ([FOPH, 2020](#)). To be eligible for interviews, patients therefore had to be either ≥ 65 years old, have cancer, cardiovascular disease, chronic respiratory diseases, a condition weakening the immune system, diabetes, or high blood pressure.

2.3.2. Data collection

Interviews were conducted by a psychology Master student from the University of Bern (Swiss German interviews) and six sociology Master students from the University of Geneva (French-speaking interviews). Interviews with patients and GPs were conducted via Zoom or by phone to respect the spatial distancing required by COVID-19 mitigation measures. Interviews with GPs lasted between 21 and 95 min and lasted 45 min on average. Interviews with patients lasted between 18 and 63 min and lasted 35 min on average. Data collection was conducted until qualitative data saturation had been attained. This was determined through continuous discussion between the data collectors and study leaders.

For interviews with GPs and patients, qualitative interview guides were collectively drafted based on scientific literature, feedback from research team members who work as GPs, critically reviewed, and finalized after several iterations among research team members. The interview guide for GPs included open-ended questions allowing respondents to answer in their own words and covered questions concerning: (1) GPs' background, training, and working environments, (2) information they consulted about COVID-19, (3) work experiences during the pandemic, (4) treatment of at-risk patients during the pandemic, and (5) recommendations to improve practices and lessons learned. The interview guide for patients included open-ended questions covering: (1) patients' background and health status, (2) health services use during the pandemic, and (3) experiences as at-risk patient during the pandemic in their interactions with healthcare professionals and the health system. The guides were tested among data collectors with eligible members from their social networks prior to data collection and revisited for clarity and coherence. Interviews were digitally audio-recorded and transcribed verbatim in French. Study participants were compensated for their time and participation in the study. GPs received 150 CHF (~160 USD) and patients received 50 CHF (~54 USD) (mean hourly wage in Switzerland is ~67 USD ([Federal Statistical Office, 2020](#))).

2.3.3. Data analysis

After compiling interview transcripts, several rounds of in-depth readings of the data, and discussions with the research team, we developed two coding schemes. For GP interviews, the coding scheme allowed data to be coded into these main groupings: (1) overall reorganization of work practices during the pandemic, (2) reorganization of healthcare for at-risk groups, (3) GP-patient relationships, and (4) categorization of at-risk patients. For patient interviews, the coding scheme involved the following main groupings: (1) information sources, (2) health status over time, (3) resilience mechanisms for maintaining health, (4) health services use, and (5) GP-patient relationships. Coding the data into these categories allowed us to better organize our subsequent team discussions and to identify the most salient themes in relation to the study's research questions, both from GP and at-risk patient perspectives. Qualitative data coding was led by two sociology Master students and a psychology Master student, and any discrepancies in the coding were discussed iteratively within the team.

Given the interdisciplinary nature of our research team, the range of backgrounds (epidemiology, public health, family medicine, sociology, and anthropology), and professional and research experiences, we analyzed the qualitative data in line with the Framework Method, as described by [Gale et al. \(2013\)](#) with MAXQDA software ([VERBI, 2019](#)). Throughout this process we had regular research team discussions, which allowed us to think about how our different backgrounds, previous experiences, beliefs, and knowledge may have affected the analysis of the results and the conclusions we drew. For this article, we

translated supporting evidence, such as quotes from interviews, into English. We have used pseudonyms for all study participants.

Ethical approval

The Ethics committee of the Canton of Bern provided a waiver for the qualitative part of the study (BASEC Nr. 2020–02288). The local Ethics Committee of the Canton of Zurich, where the FIRE project is located, approved studies within the FIRE project (BASEC-Nr. Req-2017-00797) and waived the requirement to obtain patients' informed consent since the FIRE project is outside the scope of the Swiss Human Research Act (HRA, 2011).

3. Results

3.1. Quantitative component

272 GPs were eligible. The median age of GPs was 52 years (IQR 45–58, missing in 2.9%). Of the GPs 36.8% were female, 87.1% worked in a group practice, and 74.3% worked in urban areas. From those GPs, we included 201,814 patients into the 2019 cohort and 218,732 into the 2020 cohort. 57.6% of patients were part of both cohorts (total: 266,796 patients). The patient characteristics from the two cohorts are shown in Table 1.

As shown in Fig. 2, there was a significant decline in weekly consultation counts during the shutdown period in spring 2020 (see supplementary eTable3 for regression results). The weekly consultation counts, however, returned to the prediction interval for the remainder of the year 2020, including the second wave, for both the total general practice population (part A) and at-risk patients (part B; patients belonging to any at-risk group). The same trend can be seen in supplementary eFigure1, which displays graphs by individual at-risk patient group, namely patients aged 65 years and over, patients with hypertension, diabetes, obstructive lung disease, and cardiovascular disease.

Fig. 3 shows the variation in consultation counts among GPs in the first half of the year 2020, which includes the period of the first shutdown due to the COVID-19 pandemic. The GP variation in consultation counts stayed relatively constant in the first half of 2020, even during the shutdown period.

Fig. 4 shows the weekly measurement counts of BP, HbA1c, and LDL-C per 100 patients in 2020 for the total general practice population and for patients with hypertension, diabetes, and cardiovascular disease, respectively. For both the total general practice population and at-risk

Table 1
Patient characteristics.

	Cohort 2019 (n = 201,814)	Cohort 2020 (n = 218,732)	p-value
Median age at baseline (IQR)	54 (38–69)	54 (38–69)	<0.001
% female	53.8	53.4	0.130
At-risk groups			
% in any at-risk group	45.4	45.5	0.520
% ≥65 years of age	31.7	31.3	0.047
% with hypertension	22.0	22.9	<0.001
% with obstructive lung disease ^b	8.1	8.3	0.018
% with diabetes mellitus	6.8	7.1	<0.001
% with cardiovascular disease ^a	8.9	8.7	0.026
% with cancer	0.7	0.6	<0.001

Abbreviations: IQR, Interquartile range.

^a obstructive atherosclerotic disease (including coronary, cerebral, and peripheral arteries), and heart disease (including rhythmogenic and congestive disease).

^b including asthma, chronic obstructive pulmonary disease and chronic bronchitis). Definition of morbidities are given in eTable 1.

patients, there was a significant decrease in the number of measurement counts (BP, HbA1c, and LDL-C) during the shutdown period in spring 2020 (see supplementary eTable3 for regression results). BP and HbA1c measurements increased back to the prediction interval during summer 2020 before slightly decreasing again during the second wave, whereas LDL-C measurements were higher than expected in the remainder of 2020.

3.2. Qualitative component

The characteristics of patients and GPs interviewed are shown in the supplement in eTable4 and eTable5. GP and patient accounts of their experiences in the primary care setting are in line with the quantitative data analyzed above showing a reduction in consultation and chronic disease measurement counts during the shutdown period in spring 2020 and a subsequent return to pre-pandemic levels during the remainder of 2020. Qualitative interviews help explain how GPs strove to provide continuity of care to their patients throughout 2020 and the multitude of challenges they faced in this regard. Interestingly, the patients we interviewed did not report a perceived discontinuity in their primary care particularly due to potential barriers at the health system level. Rather, at-risk patients explained how their GPs went out of their way to communicate availability for necessary consultations. Furthermore, patients described reasons they may have avoided medical consultations, such as fear of contracting coronavirus outside of the home, perceptions that their GPs were overburdened, and a sense of solidarity due to public health messaging encouraging individuals to stay at home. In the next sections, we first describe the qualitative data we collected from GPs and then from the patients regarding primary care for at-risk patients during the COVID-19 pandemic.

3.2.1. GPs faced increased workloads due to continuous adaptations

Most GPs experienced the COVID-19 pandemic as an intense period and reported an incessant cycle of adaptations. One GP explained these changes, “Let’s just say that it was a perpetual series of adaptations. It felt like I did when I was a new parent, like when the children were a few years and even a few months old. I felt like I was constantly putting out fires. I had to figure out how to reorganize my work-life and my schedule to care for both my patients and my children at home” (Dr. Manzoni, Geneva, female). In the following paragraphs, we describe the adaptations GPs implemented and challenges they faced in primary care provision throughout 2020.

GPs described work overload due to the non-stop adaptations to work practices, which included constantly obtaining, understanding, and communicating information related to COVID-19. The increased workload was multifaceted. There was an additional bureaucratic workload, for instance, to prepare lists of at-risk patients as a preparedness strategy and to issue certification to at-risk patients to excuse their absences from work. One GP explained, “So, for more than a year and half, let’s just say that I was working at 120%. I work every day of the week, between the visits and all the paperwork. There is a lot, a lot of paperwork” (Dr. Paccot, Geneva, female). Another GP told us, “With all these guidelines, the medical certificates, work absence paperwork, quarantine or not, shutdown or no shutdown, medical certificates for family members. I’ll admit that it created a giant work overload” (Dr. Duvanel, Geneva, female).

GPs reported the pressure and professional responsibility related to being the only open healthcare provider during the initial weeks of the shutdown in spring 2020, especially when all specialist consultations and elective hospital visits had been cancelled. Providing primary care services was also challenging in a context in which personal protective equipment (PPE) was scarce at the initial stages of the pandemic. Several GPs described doing anything in their power to keep patients out of the hospital to avoid excess strain on hospital contexts. Others discussed the issue of patients refusing to go to the hospital due to fears of contracting coronavirus in hospital settings. One GP, for example, recounted, “I had

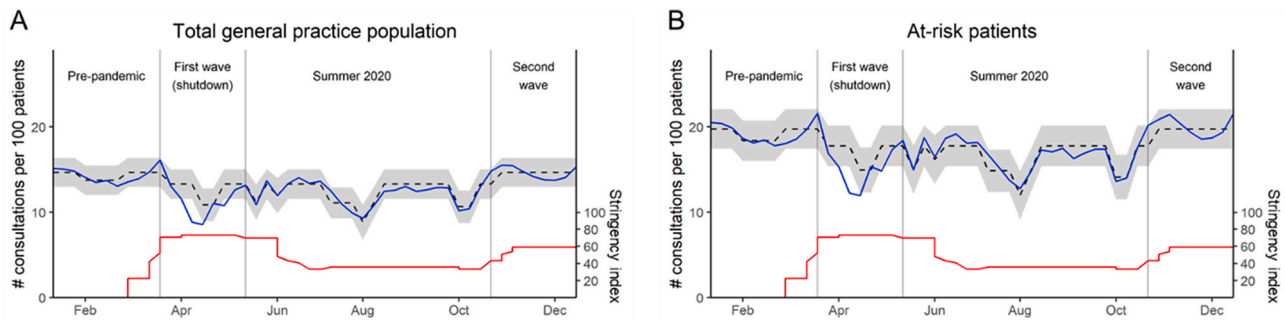


Fig. 2. Weekly consultation counts per 100 patients in 2020 for the total general practice population (A, $n = 218,732$) and patients at risk for severe COVID-19 (B, $n = 99,553$). **Legend:** The black dashed lines represent the expected values in absence of a pandemic, with 95% prediction interval (grey area; temporary decreases in expected consultation counts are attributable to seasonal variation, e.g. holidays.). The blue lines represent the observed values, the red lines represent the stringency index, and the grey vertical lines separate the different pandemic periods.

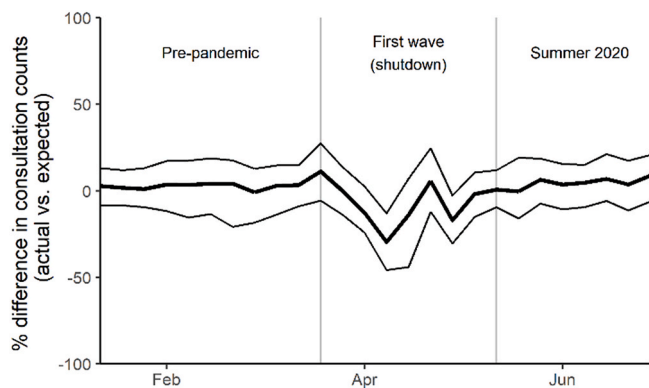


Fig. 3. Variation in consultation counts among GPs, January–June 2020. **Legend:** Median (thick black line) and IQR (thin black lines) of proportional differences between the different GPs' actual consultation counts and the expected consultation counts in absence of a pandemic. Only GPs with over 300 patients per year were considered (GPs: $n = 268$). Grey vertical lines separate pandemic periods. Abbreviations: GP, general practitioner; IQR, interquartile range.

a patient who refused to go to the hospital. So, I had to treat her clavicle fracture at her home. She was 97 years old" (Dr. Paccot, Geneva, female).

Many GPs described a shift towards time-consuming phone-based work, which involved telephone consultations to respond to requests and provide advice as well as being reachable for patients. Many GPs talked about the need to reorganize their practices, which involved logistical considerations, such as installing separate waiting rooms, plexiglass, removal of magazines and toys from the waiting room (Fig. 5).

Some GPs reported actively contacting patients to provide them with information or to ensure continuity of care. GPs reported instituting new work practices to reduce direct patient contacts, such as sending prescriptions directly to the pharmacy. Some GPs described the difficulty of accessing patient medical records from home when they were not working from their practices. GPs also had to continuously keep updated on the shifting medical guidance and measures to best inform and treat patients. GPs did not only provide medical advice, but also replied to COVID-19-related questions and questions about the mitigation measures. Many GPs reported how the latter led to longer consultation times.

GPs did not report giving preferential treatment to at-risk patients who were at an increased risk of severe complications due to COVID-19 disease as compared to their other patients. With patients visiting their offices in person, GPs described providing the same amount of attention and protection to mitigate potential exposures (i.e., use of PPE, spatial distancing) for at-risk patients as they gave to patients not at risk.

However, some GPs tried to figure out how many of their patients were at high risk. One GP described this, "I didn't call all my patients. That would have been a lot of work to manage all the calls. I didn't actively contact all at-risk patients. Though we did draw up a list of at-risk patients in Excel so that we could contact them if necessary" (Dr. Duvanel, Geneva, female).

3.2.2. GPs faced information overload

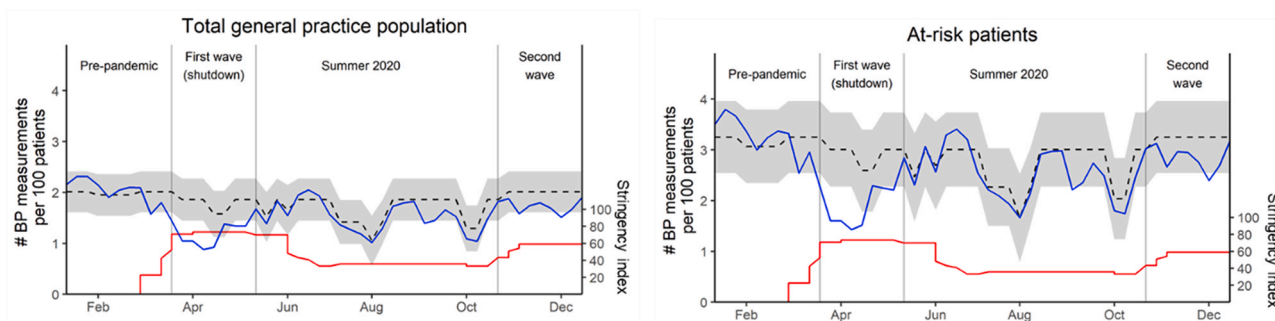
A main concern for GPs involved uncertainty on how to translate the official guidance into practice. Some of the questions that were frequently voiced by GPs during interviews were: *What cases are actually "urgent"? Which patients should we still see during the COVID-19 pandemic? Which ones should we avoid seeing in person? Who actually falls into the "at-risk" category? How shall the categories of the Swiss Federal Office of Public Health about the at-risk groups be interpreted?*

In particular, the question about the urgency of consultations was challenging for many GPs, as they reported a lack of guidance from the authorities on this issue. One interviewed GP explained this frustration, "For the definition of 'urgent,' we realized only later that it was interpreted differently by different colleagues and different institutions. But we really didn't have any press release or any official communication on that matter" (Dr. Manzoni, Geneva, female). The issue about properly defining "at-risk patients" throughout the various stages of the pandemic was also raised by GPs during interviews. One GP explained how much of this information was not directly communicated to healthcare professionals. When talking about the definition of at-risk patients, she explained, "This information came to us passively. We had to go find it in the Federal Office of Public Health's guidelines" (Dr. Dubey, Fribourg, female).

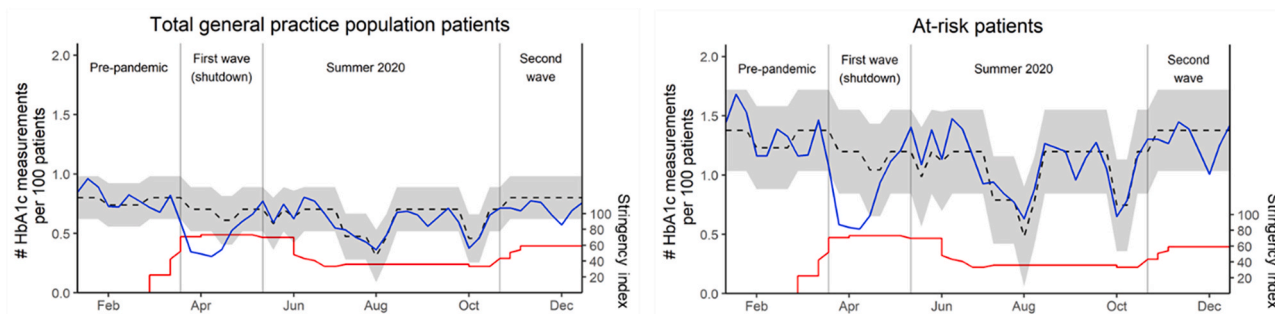
Some GPs reported not having had the time to keep up with the information. One told us, "I just didn't have the time. It was too complicated. My husband, who was at home, would look at the statistics and things like that. From time to time, he would inform me about two or three things. I just didn't have the time to keep up. I was too busy working as a soldier on the front lines" (Dr. Paccot, Geneva, female). GPs reported struggling with the fact that they learned new guidance at the same time as the public, such as the availability of SARS-CoV-2 tests in GP offices, which sometimes put them into a difficult position as arbiters of medical information and as the face of the response to the pandemic. One GP described this, "The best example of this was about rapid antigen testing. On a Friday evening, the Federal Council announced that rapid tests would be available in all cantons on the upcoming Monday. Everyone was sure that GPs already had the tests at their disposal, whereas on the same Friday, we saw on the news and learned at the same time as everyone else. The whole pandemic has been like this" (Dr. Wicht, Vaud, male).

GPs reported being uncertain about where to find reliable and trustworthy information. They faced contradictory information. There

A BP measurements



B HbA1c measurements



C LDL-C measurements

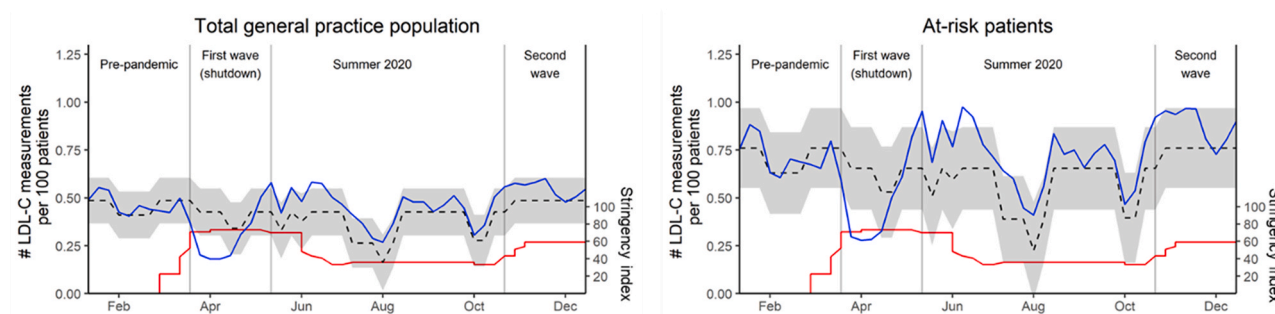


Fig. 4. Weekly measurement counts of BP (A), HbA1c (B), and LDL-C (C) per 100 patients in 2020 for the total general practice population (left, $n = 218,732$) and patients at risk for severe COVID-19 (right, $n = 99,553$). **Legend:** The black dashed lines represent the expected values in absence of a pandemic, with 95% prediction interval (grey area temporary decreases in expected consultation counts are attributable to seasonal variation, e.g. holidays). The blue lines represent the observed values, the red lines represent the stringency index, and the grey vertical lines separate the different pandemic periods.

was much data and guidance for hospital settings but not for primary care settings. One GP explained, “There were all these scientific articles and everything. But it wasn’t at all about how to get organized at work. It was about clinical information for patient treatment and testing” (Dr. Manzoni, Geneva, female). Additionally, much of the information focused on treating patients with COVID-19 or patients with a suspected infection, but not other patients who required care during the pandemic. Regional and national medical associations filled this information gap and proved to be channels for GPs to receive recommendations that took regional differences into account.

3.2.3. Patients did not perceive discontinuity of care, but some chose to reduce or avoid medical consultations

No interviewed at-risk patients reported any perceived discontinuity in their primary care during the pandemic. Rather, they noted how GPs made it clear that they were available should the need to consult arise. Interviews with at-risk patients provided insight into how some individual patient factors may have reduced the overall intensity of primary care use during the first wave of the pandemic that we describe in section 3.1.

Patients described various reasons not to consult with their GP during the pandemic. One reason was that patients did not consider their medical issues to be “urgent.” Other patients thought their GP offices were probably overburdened and did not want themselves to add to this imagined burden by consulting with their GP. Ms. Cossy, a 68-year-old considered at-risk by her GP due to her age from Vaud, for example, explained this thought, “During the different waves, I didn’t really see him often because I imagined they were overrun and overworked in their offices.” Others reported not knowing if their GPs’ practices were open in the early phase of the pandemic, assuming that they were closed. Some patients described a desire to have solidarity with society and wished to adhere to public health messaging campaigns with slogans such as “Stay home. Stay safe.” Patients also reported different levels of uncertainty about whether they were at risk or not, which is why they sometimes consulted their GPs. One participant explained, “I asked my GP if I was at risk. He confirmed that I did indeed belong to at-risk category” (Ms. Thorens, Vaud, 55-years-old, rheumatism).

Patients described different fears and comfort levels of spaces they associated with contracting the coronavirus. Patients reported views about what medical spaces were “safe,” with many discourses depicting



Fig. 5. A GP office during COVID-19 reorganization and before the installation of a plexiglass barrier. March 25, 2020.

hospitals as unsafe and zones of contamination and GP offices as sanitized and safe. Most patients had a strong desire to avoid hospitals but felt safe in their GPs' offices for medical consultations. Ms. Vari, a 39-year-old from Geneva with cystic fibrosis and hypertension, described why she was not afraid to consult in her GP's office in the early days of the pandemic, "In my GP's office, I couldn't get infected with COVID-19, whereas it was possible in hospitals. People were only getting sick at the hospital." These perceived risky spaces were often explained by patients in terms of the unknown (hospital settings) and the familiar (trustworthy GPs and their familiar office spaces). Ms. Barillon, a 22-year-old from Geneva with asthma and considered obese by her GP, for example, explained her feeling of safety in her doctor's office in terms of familiarity, "I know my doctor quite well, and I know that he hires people who take care to properly sanitize the office. So, I know those people personally and I know that everything is taken care of."

Overall, sampled at-risk patients did not perceive a discontinuity of care during the COVID-19 pandemic. Patients felt that they could get consultations, when necessary, in person or by phone. Most patients reported that they felt reassured, even in instances when they could not see their GP in person, since they were able to communicate by phone. One patient explained, "Everything worked for me because I could always call. If that wasn't doable by phone, I knew I could always stop by the doctor's office" (Ms. Aeschlimann, Bern, 79 years old, diabetes mellitus and hypertension).

4. Discussion

With support from a mixed-methods study design, our results have provided insights into the continuity of care for at-risk patients in Switzerland during the COVID-19 pandemic in 2020. Primarily, the quantitative results have shown a significant reduction in consultations at the onset of the COVID-19 pandemic during the shutdown in spring 2020 and a return to normal consultation counts in the second half of 2020 and even during the second wave in autumn 2020. Quantitative results showed a similar reduction in measurement counts (BP, HbA1c, and LDL-C) during the shutdown period in spring 2020 and some counts returning to normal values in the second half of 2020. Analysis of the GP variation of documented consultations shows that consultation fluctuations were similar for different GPs in the first six months of 2020. Interestingly, there is no evidence for a surplus of consultations in the aftermath of the shutdown to compensate cancelled consultations.

The explanatory value of the qualitative data provides a more complete picture into efforts GPs underwent to ensure continuity of care for their patient and into patient-level factors that were not captured in the

quantitative data. Although GPs saw less patients and provided less services in the early phases of the pandemic, GPs described an increased workload caused by the need to constantly implement adaptations throughout 2020 as the COVID-19 pandemic and associated measures continued to evolve. They were doing much work to fulfill their professional responsibilities that was not captured by the quantitative analysis of consultation/measurement counts, such as material, administrative, and communication adaptations. For instance, phone counseling and being reachable for patients are measures that add to the workload but are not usually considered when measuring continuity of care in the primary care setting. Studies are now beginning to point to the challenges GPs have faced during the COVID-19 pandemic, for example in Switzerland (Cohidon et al., 2021), Australia (Copp et al., 2021), and from international perspectives (Tsopra et al., 2021).

For their part, at-risk patients sampled for the qualitative component did not perceive any discontinuity of their care with their GPs. They overall reported GPs being easily available. Interestingly, interviews showed how some patients themselves chose to reduce healthcare seeking behaviors during the pandemic due to fears around contracting coronavirus, perceptions that GPs were overburdened, and a sense of solidarity. It is important to mention how patients' experiences of trust and familiarity with their GPs seemed to be determinative factors for them, in times of an infectious disease pandemic, in deciding to opt to consult with their GPs in lieu of pursuing treatment with unfamiliar specialists and/or what they considered to be "risky" hospital settings. Such findings find support from previous research showing how trust and familiarity are factors ensuring that patients continue to seek health services from providers (Crocker et al., 2013; Mainous et al., 2001; Schers et al., 2005) and will be important moving forward.

Our project is strengthened by the mixed-methods approach which allowed us to capture similar phenomena with different methodologies. The quantitative data come from a large database covering 10% of Swiss GPs and around 10% of the Swiss population and spanning all of 2020, while many published studies focused solely on the first wave. The qualitative data particularly sheds light onto issues the quantitative alone could not capture, such as an increased workload for GPs, despite the quantitative data suggesting a lower intensity of primary care service use during the initial stages of the pandemic. The qualitative component also suggests that, despite an apparent potential for a discontinuity in care for at-risk patients, at-risk patients did not perceive any discontinuity in their care provision in the primary care sector but rather remarked a high-level of availability of their GPs during the pandemic. Another strength lies in the different perspectives captured through inclusion of both GPs and patients in qualitative interviews.

Our results have several limitations. First, the quantitative analyses based on the FIRE data are not fully representative of Swiss GPs and their patients. The FIRE project is mostly limited to the Swiss German speaking part of Switzerland, and it is not a random sample, as GPs self-select into the project by voluntary participation. However, a recent study showed that the GPs participating in the FIRE project are comparable to the entire GP workforce in Switzerland in terms of age, work experience, sex, and work percentage (Jungo et al., 2021). Despite this, since GPs self-select to join the FIRE project, we would like to highlight that there may be several unmeasured differences between the GPs who participate in the FIRE database and those who do not. This may have had an impact on our study results. However, nowadays the question of whether GPs join the FIRE project or not has become mainly a question of compatibility of the electronic medical records systems used in the GP office with the FIRE project, rather than one of personal preferences. Second, we were unable to distinguish between virtual and in-person consultations in the FIRE data. Based on our discussions with GPs, however, we learned that all consultations – irrespective of their format – would be recorded in electronic medical records. We thus assumed that every consultation recorded in the electronic medical records allowed us to reliably capture the health services use by patients, and that the chronic disease measurement counts were presumably performed in

(and are thus indicative of) in-person practice visits. Third, there are limitations inherent to database studies with electronic medical records, such as missing data for vital signs and laboratory measurements, as data is only recorded in electronic medical records when clinically relevant. Fourth, while the FIRE database mostly contains information from the Swiss German speaking part of Switzerland, we conducted interviews in both the Swiss German speaking part of Switzerland and the French speaking part of Switzerland in the qualitative part of the study. However, since we did not observe major regional differences in the qualitative part of the study, we decided to present the results as they are. Finally, the qualitative data was likely biased by social desirability bias, from both GPs and their patients, and by selection bias, since the recruitment approach allowed GPs to invite eligible at-risk patients who were likely to be willing to participate in the study. Since GPs invited eligible patients to participate, they may have selected patients they believed more likely to recount favorable patient-provider experiences. This recruitment strategy also limited the qualitative study sample to patients who were in contact with their GPs, which may have limited our study sample to study participants who experienced higher levels of continuity of care during the first year of the pandemic.

5. Conclusion

In pandemic settings, it is of fundamental importance to implement measures to mitigate potential for further spread of infectious disease. That said, as the COVID-19 pandemic and social consequences of the mitigation measures become clearer, it is increasingly apparent that we need to have a more complete grasp on the reach of the pandemic in other areas of the healthcare sector that are not directly related to COVID-19 treatment. For a virus that particularly poses risks for certain subpopulations who are older, biologically vulnerable, and already depended on reliable continuity of care from GPs prior to the pandemic, our results provide several salient lessons learned as we take stock of the impacts of the COVID-19 pandemic on the continuity of care for at-risk patients in Swiss primary care settings. First, there were serious communication gaps reported by GPs, including a need for clear and consistent guidance from the authorities. GPs particularly reported on frustrations on this issue since they were among the frontline workers who were at a loss in knowing how to respond to at-risk patients who had questions during times of uncertainty. Such communication gaps point to the decentralized nature of the organization of GPs' working practices in Switzerland, and such gaps were sometimes filled by regional and linguistically specific professional networks and associations. Second, it was unclear, for GPs and patients alike, about what constituted "at-risk" categories and "urgent" reasons necessitating care. During crisis settings when developing guidelines are constructed around such concepts, it is important that new and developing categories remain as explicit and unambiguous as possible. Finally, it is important to recognize how, despite the unforeseen challenges faced during this pandemic, healthcare professionals and patients alike did their best, often based upon mutual trusting relationships and social interactions, to ensure continuity of care during unprecedented times. This last point underscores the potential for adaptability of the Swiss health system and how the pandemic may have served as a catalyst to expand upon certain services, such as telemedicine, when in-person consultations are not feasible. From a policy perspective, this study's findings suggest a need for mechanisms allowing for early and continued dialogue between health authorities, healthcare workers, and concerned patients during ongoing crises.

Author contributions

Conceptualization, Methodology, and study design: MJD, OS, SS, YR, JD, KTJ; Data curation: MJD, YR, KTJ; Data Formal analysis and interpretation: All authors; Visualization (figures and tables): JM, YR, KTJ.; Writing and editing: MJD, YR, JM, and KTJ wrote the first draft. All

authors provided several rounds of feedback and edited the manuscript; Funding acquisition: MJD, KTJ.

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Ethics statement

The Ethics Committee of the Canton of Zurich approved studies within the FIRE project (BASEC-Nr. 2017-00797) and waived the requirement to obtain patients' informed consent since the FIRE project is outside the scope of the Human Research Act. The qualitative part of the project was waived by the Ethics Committee of the Canton of Bern (BASEC-NR. 2020-02288).

Data availability statement

The qualitative data from this study is available on request from the corresponding author. The quantitative data analyzed in this study is subject to the following licenses/restrictions: The data was gathered within the ongoing FIRE project. The FIRE database can be accessed at any time by the scientific team of the institute. Requests to access these datasets should be directed to Thomas Rosemann, thomas.rosemann@usz.ch.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2022.114858>.

References

- Aubert, C.E., Fankhauser, N., Marques-Vidal, P., Stirnemann, J., Aujesky, D., Limacher, A., et al., 2019. Multimorbidity and healthcare resource utilization in Switzerland: a multicentre cohort study. *BMC Health Serv. Res.* 19, 708.
- Barten, D.G., Latten, G.H., Van Osch, F.H., 2020. Reduced emergency department utilization during the early phase of the COVID-19 pandemic: viral fear or lockdown effect? *Disaster Med. Public Health Prep.* 1-4.
- Birkmeyer, J.D., Barnato, A., Birkmeyer, N., Bessler, R., Skinner, J., 2020. The Impact of the COVID-19 Pandemic on Hospital Admissions in the United States: study

- examines trends in US hospital admissions during the COVID-19 pandemic. *Health Aff.* 39, 2010–2017.
- Cassell, A., Edwards, D., Harshfield, A., Rhodes, K., Brimicombe, J., Payne, R., et al., 2018. The epidemiology of multimorbidity in primary care: a retrospective cohort study. *Br. J. Gen. Pract.* 68, e245–e251.
- Chmiel, C., Bhend, H., Senn, O., Zoller, M., Rosemann, T., 2011. The FIRE project: a milestone for research in primary care in Switzerland. *Swiss Med. Wkly.* 140, w13142.
- Cohidon, C., El Hakmaoui, F., Senn, N., 2021. The role of general practitioners in managing the COVID-19 pandemic in a private healthcare system. *Fam. Pract.*
- Copp, T., Isautier, J.M.J., Nickel, B., Pickles, K., Tracy, M., Doust, J., et al., 2021. COVID-19 challenges faced by general practitioners in Australia: a survey study conducted in March 2021. *Aust. J. Prim. Health.*
- Creswell, J., Plano Clark, V., 2011. *Designing and Conducting Mixed Methods Research*. SAGE, Los Angeles.
- Croker, J.E., Swancutt, D.R., Roberts, M.J., Abel, G.A., Roland, M., Campbell, J.L., 2013. Factors affecting patients' trust and confidence in GPs: evidence from the English national GP patient survey. *BMJ Open* 3, e002762.
- Danhieux, K., Buffel, V., Piron, A., Benkheil, A., Remmen, R., Wouters, E., et al., 2020. The impact of COVID-19 on chronic care according to providers: a qualitative study among primary care practices in Belgium. *BMC Fam. Pract.* 21, 255.
- Deml, M.J., Dupras, A., Clerc, J., Kompani, K., Kroepfli, C., Comrie, E., et al., 2021. Switzerland Country Report. UNIVERSITÄT I STAVANGER.
- El Saghir, N.S., Soto Pérez de Celis, E., Fares, J.E., Sullivan, R., 2018. *Cancer Care for Refugees and Displaced Populations: Middle East Conflicts and Global Natural Disasters*. American Society of Clinical Oncology Educational Book, pp. 433–440.
- Fabes, S., 2020. My A&E Department Is Eerily Quiet. I'm Worried the Very Sick Are Staying Away.
- Federal Statistical Office, 2020. *Coûts de la main-d'oeuvre en 2018: Coût du travail en Suisse: les différences restent marquées selon les branches économiques et la taille des entreprises*.
- Fedlex, 2020. [SR 818.101.24] Ordinance 3 of 19 June 2020 on Measures to Combat the Coronavirus.
- FMH, S.m.a., 2020. *Non-urgent Treatments According to COVID-19 Regulation*.
- FOPH, 2020. *Coronavirus: Measures and Ordinances*.
- Gale, N.K., Heath, G., Cameron, E., Rashid, S., Redwood, S., 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med. Res. Methodol.* 13, 117.
- Gray, D.P., Evans, P., Sweeney, K., Lings, P., Seamark, D., Seamark, C., et al., 2003. Towards a theory of continuity of care. *J. R. Soc. Med.* 96, 160–166.
- Gray, D.P., Sidaway-Lee, K., White, E., Thorne, A., Evans, P.H., 2018. Continuity of care with doctors—a matter of life and death? A systematic review of continuity of care and mortality. *BMJ Open* 8, e021161.
- Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., et al., 2021. A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nat. Hum. Behav.* 5, 529–538.
- HRA, 2011. *Federal Act on Research Involving Human Beings (Human Research Act, HRA)*.
- Icenogle, M., Eastburn, S., Arrieta, M., 2016. Katrina's legacy: processes for patient disaster preparation have improved but important gaps remain. *Am. J. Med. Sci.* 352, 455–465.
- Jee, S.H., Cabana, M.D., 2006. Indices for continuity of care: a systematic review of the literature. *Med. Care Res. Rev.* 63, 158–188.
- Jones, S.A., Gopalakrishnan, S., Ameh, C.A., White, S., van den Broek, N.R., 2016. 'Women and babies are dying but not of Ebola': the effect of the Ebola virus epidemic on the availability, uptake and outcomes of maternal and newborn health services in Sierra Leone. *BMJ Glob. Health* 1, e000065.
- Jungo, K.T., Meier, R., Valeri, F., Schwab, N., Schneider, C., Reeve, E., et al., 2021. Baseline characteristics and comparability of older multimorbid patients with polypharmacy and general practitioners participating in a randomized controlled primary care trial. *BMC Fam. Pract.* 22, 123.
- Khera, A., Baum, S.J., Gluckman, T.J., Gulati, M., Martin, S.S., Michos, E.D., et al., 2020. Continuity of care and outpatient management for patients with and at high risk for cardiovascular disease during the COVID-19 pandemic: a scientific statement from the American Society for Preventive Cardiology. *Am. J. Prev. Cardiol.* 1, 100009.
- Lafta, R.K., Al-Nuaimi, M.A., 2019. War or health: a four-decade armed conflict in Iraq. *Med. Conflict Surviv.* 35, 209–226.
- Loza, C.A., Baez, G., Valverdi, R., Pisula, P., Salas Apaza, J., Discacciati, V., et al., 2021. A Qualitative Study on the Elderly and Accessibility to Health Services during the COVID-19 Lockdown in Buenos Aires, Argentina-Part 2, vol. 21. Medwave.
- Mainous, A.G., Baker, R., Love, M.M., Gray, D.P., Gill, J.M., 2001. Continuity of care and trust in one's physician: evidence from primary care in the United States and the United Kingdom. *Fam. Med.* 33, 22–27.
- McPhail, S.M., 2016. Multimorbidity in chronic disease: impact on health care resources and costs. *Risk Manag. Healthc. Pol.* 9, 143–156.
- Nab, M., van Vehmendahl, R., Somers, I., Schoon, Y., Hesselink, G., 2021. Delayed emergency healthcare seeking behaviour by Dutch emergency department visitors during the first COVID-19 wave: a mixed methods retrospective observational study. *BMC Emerg. Med.* 21, 1–9.
- OFS, 2019. *Niveaux Géographiques*.
- Pleninger, R., Streicher, S., Sturm, J.-E., 2021. Do COVID-19 containment measures work? Evidence from Switzerland. *KOF Work. Pap.* 494, 1–50.
- Quast, T., Mortensen, K., 2015. Diabetes care provided to children displaced by Hurricane Katrina. *Disaster Med. Public Health Prep.* 9, 480–483.
- R Core Team, 2019. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria.
- Rachamin, Y., Senn, O., Streit, S., Dubois, J., Deml, M., Jungo, K., 2021. Impact of the COVID-19 pandemic on the intensity of health services use in general practice: a retrospective cohort study. *Int. J. Publ. Health* 66.
- Raulji, C., Velez, M.C., Prasad, P., Rousseau, C., Gardner, R.V., 2018. Impact of Hurricane Katrina on healthcare delivery for New Orleans patients, 2005–2014. *Pediatr. Blood Cancer* 65, e27406.
- Reitzle, L., Schmidt, C., Färber, F., Huebl, L., Wieler, L.H., Ziese, T., et al., 2021. Perceived access to health care services and relevance of telemedicine during the COVID-19 pandemic in Germany. *Int. J. Environ. Res. Publ. Health* 18, 7661.
- Saah, F.I., Amu, H., Seidu, A.-A., Bain, L.E., 2021. Health knowledge and care seeking behaviour in resource-limited settings amidst the COVID-19 pandemic: a qualitative study in Ghana. *PLoS One* 16, e0250940.
- Schers, H., van den Hoogen, H., Bor, H., Grol, R., van den Bosch, W., 2005. Familiarity with a GP and patients' evaluations of care. A cross-sectional study. *Fam. Pract.* 22, 15–19.
- Singh, D.R., Sunuwar, D.R., Shah, S.K., Karki, K., Sah, L.K., Adhikari, B., et al., 2021. Impact of COVID-19 on health services utilization in Province-2 of Nepal: a qualitative study among community members and stakeholders. *BMC Health Serv. Res.* 21, 1–14.
- Sutherland, K., Chessman, J., Zhao, J., Sara, G., Shetty, A., Smith, S., et al., 2020. Impact of COVID-19 on Healthcare Activity in NSW, Australia, vol. 30. *Public Health Research & Practice*.
- Swissinfo, ch, 2021. *Coronavirus: the Situation in Switzerland*.
- Tsopra, R., Frappe, P., Streit, S., Neves, A.L., Honkoop, P.J., Espinosa-Gonzalez, A.B., et al., 2021. Reorganisation of GP surgeries during the COVID-19 outbreak: analysis of guidelines from 15 countries. *BMC Fam. Pract.* 22, 96.
- VERBI, S., 2019. *MAXQDA 2020 [computer Software]*. VERBI Software, Berlin, Germany. Available from: <https://www.maxqda.com>.
- Verhoeven, V., Tsakitzidis, G., Philips, H., Van Royen, P., 2020. Impact of the COVID-19 pandemic on the core functions of primary care: will the cure be worse than the disease? A qualitative interview study in Flemish GPs. *BMJ Open* 10, e039674.
- Whaley, C.M., Pera, M.F., Cantor, J., Chang, J., Velasco, J., Hagg, H.K., et al., 2020. Changes in health services use among commercially insured US populations during the COVID-19 pandemic. *JAMA Netw. Open* 3, e2024984–e2024984.
- Wong, S.Y.S., Zhang, D., Sit, R.W.S., Yip, B.H.K., Chung, R.Y.-n., Wong, C.K.M., et al., 2020. Impact of COVID-19 on loneliness, mental health, and health service utilisation: a prospective cohort study of older adults with multimorbidity in primary care. *Br. J. Gen. Pract.* 70, e817–e824.