

BMJ Open Investigating changes in user and diagnostic patterns in general practice during the COVID pandemic in 2020: a cohort study using Danish patient data from two consecutive years before and during the pandemic

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ABSTRACT

Objectives The COVID-19 pandemic induced significant changes in access policies to general practice (GP) in most countries. This study aimed to compare and discuss changes in the diagnostic patterns and GP procedures before and during the pandemic.

Design and setting A register study including data from 11 Danish GP clinics.

Participants Enlisted patients from GP followed 1 year before (February 2019 to January 2020; n=48 650) and 1 year during (April 2020 to March 2021; n=47 207) the COVID-19 pandemic.

Outcome measures Diagnostic patterns, consultation type (face-to-face, email and phone), contact persons (GP or GP staff) and patient characteristics.

Results The average number of contacts with GP increased from 6.3 contacts per year per patient before the pandemic to 8.3 annual contacts during the pandemic (p<0.01). The proportion of contacts handled face-to-face remained around 53%; however, email contacts more than doubled in number and reached 26% of all contacts during the pandemic. Before the pandemic, GPs handled 36% of all patient contacts. This decreased to 22% during the pandemic, and for some diagnostic groups, the GP staff now handled 90% of the patients. The reduced GP contacts were mainly in email and phone contacts, whereas face-to-face consultations by the GPs seem to have been given priority. No reduction was observed in the absolute number of contacts with diagnoses related to the cardiovascular system or diabetes type 2; however, the proportion of contacts related to skin diseases, upper/lower airway symptoms and preventive care consultations was reduced (p<0.01).

Conclusion Although these findings cannot prove causality, they demonstrate significant changes in diagnostic patterns, balance between different contact types, and responsible contact persons during the pandemic. Changes mean that it has become a significantly different product that GPs offer their patients. The coming years will show whether these changes remain, whether the quality of treatment and care is the same and whether the changed balance in patient

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The inclusion of 48 000 patients in both 2019 and 2020 cohorts, with 41 000 of the patients included in both sampling periods, allows for robust between-group comparisons.
- ⇒ Patient characteristics are similar to the general population, and two full 12-month sampling periods minimise the seasonal influence on data.
- ⇒ Part of the remuneration of general practice (GP) in Denmark is fee for service, and registration of patients' contacts, including clinical activity, is therefore expected to be reported reliably.
- ⇒ The Danish setting and COVID-19 restrictions may differ from other countries, limiting the generalisability.
- ⇒ Contacts without a reported diagnosis cannot be differentiated among contacts without a reason for reporting a diagnosis and contacts where the GPs forgot to report a diagnosis.

handling (GP or GP staff) is experienced as beneficial by the patients.

INTRODUCTION

Following the outbreak of the COVID-19 pandemic, most countries implemented several changes, recommendations and limitations in early 2020 related to general social behaviour and access to primary healthcare. These recommendations and policies were country-specific, dependent on authorities' individual assessment of risk and national healthcare structure and varied over time. With the purpose of not spreading infections and protecting the frailest part of the population in Denmark, most public activities were discontinued, people were advised to practise social distancing and people were advised not to visit their general practice (GP) clinic

physically if COVID-19 was suspected. When societal restrictions were loosened in Denmark, most GP clinics continued to urge social distancing and ask patients with upper airway symptoms to use telehealth solutions if possible. From early on, Danish authorities established central vaccination centres outside the GP domain.

The previous literature based on national registers and interviews documents changes during the COVID-19 pandemic in the absolute and relative frequencies of face-to-face, telephone and email consultations. Thus, in some counties, the number of contacts was reduced during the initial lockdown period but subsequently more than caught up and eventually ended up being higher than before the pandemic,^{1–5} whereas a dramatic decrease in the number of consultations during the pandemic was reported in Germany and Hungary.^{6,7}

The distribution between types of consultations also changed. The lockdown urged patients to avoid coming physically to the GP clinics; consequently, the fraction of contacts by phone, email and video increased.^{2–4,8}

Telehealth options were welcomed by most GP clinics during the initial lockdown period,^{8–12} and an Irish study reported that 25% of consultations during the pandemic were teleconsultations⁵; however, the quality of these options was also questioned. Thus, a mixed-method study from New Zealand, which included interviews and questionnaire surveys, revealed that telehealth solutions worked best for routine and familiar health issues and for patients with already established relationships with their GP.^{13,14} Moreover, a Danish study indicated that the willingness to continue using telephone and video diminished when face-to-face consultations were again deemed viable.⁹

An interesting observation from a study in 21 GPs in England was that face-to-face consultations were reduced by 90% for general practitioners but only approximately 50% for practice nurses.¹² A study from Ireland, which employed a similar approach, also demonstrated much stronger changes in consultation types for general practitioners than for practice nurses.¹⁵ However, previous studies have not explored to what extent changes in the balance between the contact person being either the GP or the GP staff are associated with diagnostic patterns and consultation type.

Of absolute importance to patients and society was obviously that patients in need were continually given sufficient access and treatment. A study from New Zealand¹⁶ indicated that a similar proportion by age, sex, presence of multimorbidity and mental health diagnoses appeared at the GP clinics during the period with more restricted access than before. In contrast, a study from Iceland found that although consultations related to maternity and small children were unaffected, changes for 10 more common diagnoses were significant.¹⁰ In contrast, another study from Ireland reported a decrease in the number of non-COVID-19-related visits for young children and patients aged >70,¹⁵ and a Chinese study observed a reduction in contacts to the GP clinic related

to cardiovascular, respiratory, endocrine and gastrointestinal diseases.¹ Recently, a Danish study showed that the contact of patients, who had low educational level, older age and several comorbidities, to the GP clinics were more affected.³ Furthermore, contrasting observations exist with a study from Germany reporting the same number of acute consultations related to airway infections and urinary tract infections during the lockdown.⁶ Thus, there appears to be ambiguity, uncertainty and significant variations across countries and populations related to the degree to which all patients received the relevant and needed care during the COVID-19 pandemic.

Eventually, patient populations in most countries are characterised by 5%–10% of patients being frequent attenders. On average, this group of patients visits their GP clinics monthly and often more frequently.¹⁷ They are generally older persons with +10 diagnoses, and evaluating how the implemented changes in access to primary healthcare affected this specific group of patients appears relevant.¹⁷

In Denmark, healthcare data from GPs includes information on changes in diagnostic patterns as well as the responsible caretaker in GP. This is relevant because the degree to which GP clinics offered frail patients with more chronic diseases the same care as before the pandemic period has been questioned by patients and media.

This study aimed to use a semi-longitudinal approach to document and discuss changes in diagnostic patterns, consultation type, contact persons and patient patterns before and during the COVID-19 pandemic.

METHODS

Study population

We had access to data on all patients (95 683) from 20 Danish GPs belonging to one central administrative unit (AU). This AU had GP clinics distributed in four out of five Danish regions, including rural and more populated areas. GPs in Denmark are funded by a combination of capitated funding and fee for service, and funding includes all types of contacts; however, remuneration varies.

Inclusion criteria

The inclusion criteria were as follows: data on patients registered and data on patient contacts should for each 1-year period (before and during the COVID-19 pandemic, respectively) cover the entire 1-year period (online supplemental figure 1).

Design

A semi-longitudinal design was used as the 41 587 patients were the same in both cohorts, with about 15% exchange between the 2 years.

Data

Data were provided by the central AU Alles Lægehus. For each clinic, two datasets were given: a list of registered

patients at the clinic and a dataset with patient contacts to the clinic. Patients could be identified by their personal identification number (CPR) in the patient list and data for patient contacts. CPR is a unique number given to Danish citizens or citizens with a residence permit. In the patient contact dataset, information on sex, age at contact, contact pattern to their GP including the type of contact (face-to-face, telephone, email and video) and the contact person (GP or GP staff) and one or more diagnoses (ICPC-2 coding given by the individual GP) in some cases was recorded.

Analyses

Descriptive statistics were presented as counts (N) and proportions (%). A Pearson's chi-squared test was used to test for the independence of the population characteristics and independence for the grouped diagnoses before and during the COVID-19 pandemic. Analyses were performed using Stata version 18 (StataCorp LP, College Station, TX, USA).

Patient and public involvement

None.

RESULTS

Data on 95 683 patients were received from the AU responsible for the 20 clinics. To study the effect of the Danish COVID-19 restriction, data were split into two periods of equal length, each period encompassing 1 year (February 2019 to January 2020 and April 2020 to March 2021). That meant including only patient visits within the two intervals, which led to the exclusion of 31 498 patients in the first interval and 19 749 in the second interval, since they only had visits with the GP outside the two periods (right side on online supplemental figure 1). The second criterion was only to include GP clinics that were part of the AU in the specific sampling years (left side on online supplemental figure 1), which led to the exclusion of five and three clinics (and their registered patients), respectively. Lastly, the patients were registered at the clinic they visited, which meant an additional 15 535 were excluded from the first period and 28 727 from the second period.

Eventually, 11 GP clinics with 48 650 enlisted patients in year 1 and 47 207 in year 2 were included, and among these patients, 41 587 were the same in both 1-year periods (online supplemental figure 1).

Approximately 80% of our patient population were in contact with their GP clinics during the initial year, and this increased to 85% during the COVID-19 pandemic (table 1). No changes were observed in age and sex distribution from one period to the next. The unchanged average age (43.2–43.4 years) of the two groups demonstrated that some older individuals left the first group, whereas some younger were entered. Compared with the Danish population, men were slightly over-represented.

The Lorenz plot (figure 1) demonstrates that the overall distribution of patient contacts with the GP

Table 1 Characteristics for the population at each period [N (%)]

Participant*	Before 48 650 (100)	During 47 207 (100)	P value
With at least one contact	38 874 (79.9)	39 895 (84.5)	
With zero contacts	9 776 (20.1)	7 312 (15.5)	
Sex*			0.2546
Female	23 279 (47.8)	22 415 (47.5)	
Male	25 371 (52.2)	24 792 (52.5)	
Age*			0.0925
Mean age	43.2	43.4	
0–14	6 649 (13.7)	6 505 (13.8)	
15–24	6 396 (13.1)	5 891 (12.5)	
25–34	6 528 (13.4)	6 375 (13.5)	
35–44	5 305 (10.9)	5 122 (10.9)	
45–54	6 146 (12.6)	5 937 (12.6)	
55–64	6 799 (14.0)	6 723 (14.2)	
65–74	5 900 (12.1)	5 727 (12.1)	
≥75	4 927 (10.1)	4 927 (10.4)	
Contact type†			
Physical	35 455 (91.2)	35 868 (89.9)	<0.001
Phone	28 574 (73.5)	27 102 (67.9)	<0.001
Email	13 430 (34.5)	22 268 (55.8)	<0.001
Point of contact‡			
GP	30 932 (63.6)	27 180 (57.6)	<0.001
Staff	34 935 (71.8)	38 498 (81.6)	<0.001
Clinic size *			<0.001
Small (<2000)	9 446 (19.4)	9 674 (20.5)	
Middle (2000–5999)	17 552 (36.1)	16 745 (35.5)	
Large (≥6000)	21 652 (44.5)	20 788 (44.0)	

Patients can appear in one or more of physical, phone and email but only once in each. A frequent attender, who has had more than one physical contact, will therefore only be counted once in physical contact. A frequent attender with more than one physical contact and more than one phone consultation will similarly be counted once in physical contact and once in phone contact.

*Based on the number of patients.

†Each patient is calculated once if they have had a given contact.

‡

GP, general practice.

clinics was identical before and during the pandemic. 20% of frequent attenders (≥12 annual contacts) were responsible for approximately 50% of all contacts to the GP clinics, and 60% of the patient population with the least contact was responsible for approximately 25% of all contacts to GP clinics (figure 1). Overall, the patient populations from periods 1 and 2 were very similar.

The average number of contacts per patient per month to the GP clinics steadily increased during the pandemic,

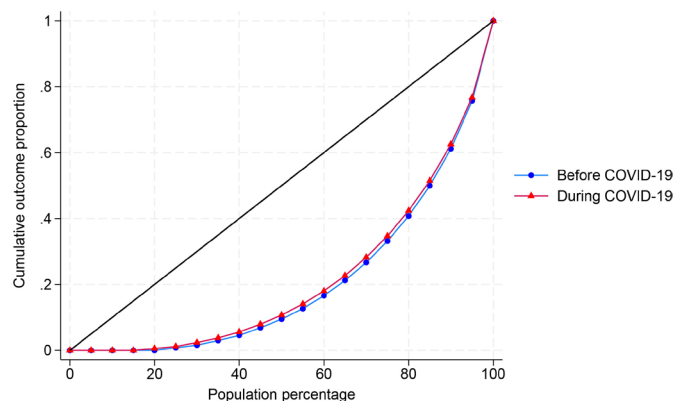


Figure 1 Lorenz plot; the percentage of the population responsible for the proportion of contacts.

that is, from an average of 6.3 contacts per year before the pandemic to 8.3 annual contacts during the pandemic in year 2 (table 2). Both the number of physical consultations at the GP clinic and email contacts increased (email more than doubled), whereas the number of phone contacts was unchanged (table 2).

Both before and during the COVID-19 pandemic, there was significant variability between health professionals (GP or GP staff) handling patients from different diagnostic groups (figure 2). Except for 3 out of 11 diagnostic groups, the GP staff was responsible for handling between 50% and 80% of all patient contacts. During the pandemic, these numbers further increased and reached +90% for contacts related to atrial fibrillation, disease prevention/health promotion, cuts and lacerations and vaccinations (figure 2). Only for diagnoses related to the musculoskeletal system was the GP responsible for handling a higher fraction of the patients compared with practice staff (figure 2). Worth noting in relation to the pandemic during the second period is that an increased

fraction of contacts for diagnoses related to coughing and airways was handled by the GP.

The diagnostic pattern during the lockdown changed (table 3), and the relative frequency of contacts related to vaccinations increased significantly from 0.51% to 1.15% of all contacts, whereas contact frequencies related to diabetes type 2 or the urinary tract (including infections) were more or less unchanged between the two observation periods (table 3). Contacts related to preventive care consultations, cardiovascular area, musculoskeletal system, and skin and unspecific contacts were relatively slightly reduced during the pandemic but did not decrease in the absolute number of contacts. More pronounced reductions during the COVID-19 pandemic were registered in patient contacts related to the upper/lower airways (table 3).

Besides a 27% increase in the number of patient contacts during the COVID-19 pandemic, the contact pattern to GPs also changed significantly. Although approximately 90% of all patients in contact with their GP clinic still had at least one physical consultation before and during the COVID-19 pandemic, the relative frequency of phone consultations decreased by 5% and the number of patients having at least one email contact to their GP clinic increased from 34.5% to 55.8% (table 1). In absolute numbers, email contacts increased from 43 159 contacts per year before the pandemic to 101 700 contacts annually during the pandemic (from 14% to 26% of all contacts) (table 2). Phone contacts were reduced in number as well as frequency (table 2). The above-described changes in the contact type related to the reduced number of physical and phone consultations were significantly less pronounced among children aged 0–14 years and among patients aged >74 years (table 4). It appeared as if physical consultations were prioritised for children and the oldest group of patients during the pandemic. No sex difference was noted in the contact type, neither before nor during the COVID-19 pandemic (table 5).

The increased number of contacts during the COVID-19 pandemic was mainly handled by the practice staff. Thus, the number of patient contacts handled by the GPs was reduced, most significantly for email and phone contacts (tables 2 and 6). The year before the outbreak, GP staff handled 64% of all contacts, and this number increased to an average of 78% during the COVID-19 pandemic (table 2). The distribution of contact types among GPs and GP staff is clearly different, with a significantly higher fraction of patient contacts of the GP being physical consultations (table 6). This priority to spend time on physical consultations rather than on email and phone consultations was despite a lower total number of GP consultations during the COVID-19 pandemic. Consequently, GP staff had increased number of physical consultations from 90 895 before the pandemic to 135 609 patients during the pandemic (table 6). Children have the highest proportion of face-to-face/physical consultations, reaching 68% during the pandemic compared

Table 2 Point of contact and modes of contact by the number of contacts for each period [N (%)]

	Before	During
All*	306 845 (100)	390 190 (100)
Mean contacts per patient† (mean (SD))	6.31 (7.88)	8.27 (9.84)
Median (median (p25; p75))	4 (1;9)	5 (2;12)
Contact type		
Physical *	168 359 (54.87)	206 084 (52.82)
Email	43 159 (14.07)	101 700 (26.06)
Phone	95 327 (31.07)	82 406 (21.12)
Point of contact		
GP	109 495 (35.68)	84 231 (21.59)
Staff	197 350 (64.32)	305 959 (78.41)

*Included 122 online in 'During'.
†mean calculated using both patients with and without contacts. GP, general practice.

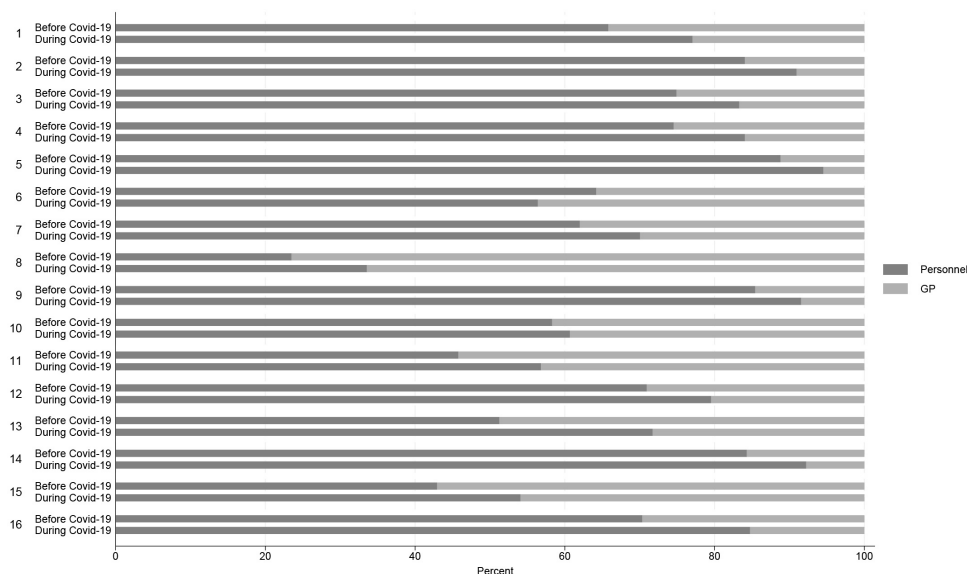


Figure 2 Point of contact (GP or GP staff (personnel)) before and during the pandemic related to patient diagnosis. The diagnosis is indicated by numbers corresponding to those found in [table 3](#).

with 51%–54% in the other age groups ([table 4](#)). Before the pandemic, the fraction of older patients (aged ≥ 65 years) handled by the GP was 32%–33%, but this changed during the pandemic, where less than 20% of the eldest's contacts were handled by the GPs ([table 4](#)). There was no sex difference in the point of contact, neither before nor during the COVID-19 pandemic ([table 5](#)).

DISCUSSION

This study indicates that during the pandemic, there was no significant decrease in the number of contacts to GP

clinics for chronic conditions like cardiovascular diseases and type 2 diabetes. However, these contacts were less frequently with a GP. The present findings generally demonstrate significant changes in diagnostic patterns, balance between different contact types (face-to-face, email and phone) and responsible contact person (GP or GP staff) during the COVID-19 pandemic.

The increased contact to GP clinics was to some extent surprising given that the authorities urged people not to visit their GP unless it was absolutely needed. However, other studies from Denmark as well as other countries

Table 3 Frequency of diagnoses (ICPC-2) by contacts (N) and percentage of diagnoses based on total contacts for the period (%)

Diagnoses	Diagnosis number	Before	During	P value for Pearson's χ^2
		Contacts (N (%))	Contacts (N (%))	
General, unspecified*	1	16 760 (5.46)	20 494 (5.16)	<0.01
Cardiovascular system†	2	15 636 (5.10)	18 030 (4.54)	<0.01
Urinary tract including infections	3	6 049 (1.97)	7 584 (1.91)	0.41
Diabetes type 2	4	5 110 (1.67)	6 173 (1.55)	0.04
Prevention and health promotion	5	10 611 (3.46)	10 384 (2.61)	<0.01
Upper/lower airways	6	11 504 (3.75)	7 257 (1.83)	<0.01
Musculoskeletal system	7	16 550 (5.39)	17 611 (4.43)	<0.01
Laceration/wounds/cuts	8	1 228 (0.40)	1 707 (0.43)	0.02
Skin	9	11 571 (3.77)	11 507 (2.89)	<0.01
Vaccination (A98)	10	1 555 (0.51)	4 583 (1.15)	<0.01
Others	11	33 113 (10.79)	35 007 (8.81)	<0.01
No diagnoses given	12	185 561 (60.47)	260 047 (65.42)	<0.01

Multiple diagnoses can be given at the same contact, resulting in total percentages exceeding 100%. Same diagnosis numbers are used in [figure 2](#).

*ICPC-2 A-codes except A44 (vaccinations).

†Atrial fibrillation, hypertension and other cardiovascular diseases.

Table 4 Point of contact and modes of contact by the number of contacts for each period and patient age, [N (%)]

Age	Period	Contacts	Contact type			Point of contact	
		All*	Physical	Email	Phone	GP	GP staff
0–14	Before	16 889 (100)	10 934 (64.74)	509 (3.01)	5446 (32.25)	6805 (40.29)	10 084 (59.71)
	During	19 434 (100)	13 179 (67.81)	1367 (7.03)	4888 (25.15)	4698 (24.17)	14 736 (75.83)
15–24	Before	26 160 (100)	14 884 (56.90)	2767 (10.58)	8509 (32.53)	9290 (35.51)	16 870 (64.49)
	During	30 807 (100)	16 509 (53.59)	7622 (24.74)	6676 (21.67)	6851 (22.24)	23 956 (77.76)
25–34	Before	31 327 (100)	17 050 (54.43)	4219 (13.47)	10 058 (32.11)	11 261 (35.95)	20 066 (64.05)
	During	41 081 (100)	21 264 (51.76)	11 627 (28.30)	8190 (19.94)	9560 (23.27)	31 521 (76.73)
35–44	Before	28 517 (100)	15 789 (55.37)	3604 (12.64)	9124 (31.99)	11 277 (39.54)	17 240 (60.46)
	During	36 354 (100)	19 118 (52.59)	10 245 (28.18)	6991 (19.23)	8520 (23.44)	27 834 (76.56)
45–54	Before	38 890 (100)	21 133 (54.34)	5030 (12.93)	12 727 (32.73)	15 140 (38.93)	23 750 (61.07)
	During	49 550 (100)	25 210 (50.88)	14 305 (28.87)	10 035 (20.25)	11 535 (23.28)	38 015 (76.72)
55–64	Before	48 532 (100)	26 768 (55.16)	6660 (13.72)	15 104 (31.12)	17 937 (36.96)	30 595 (63.04)
	During	65 494 (100)	33 180 (50.66)	19 054 (29.09)	13 260 (20.25)	14 017 (21.40)	51 477 (78.60)
65–74	Before	21 476 (27.07)	30 406 (56.20)	7216 (13.34)	16 484 (30.47)	18 099 (33.45)	36 007 (66.55)
	During	68 122 (100)	36 869 (54.12)	16 004 (23.49)	15 249 (22.38)	13 559 (19.90)	54 563 (80.10)
≥75	Before	62 424 (100)	31 395 (50.29)	13 154 (21.07)	17 875 (28.63)	19 686 (31.54)	42 738 (68.46)
	During	79 348 (100)	40 755 (51.36)	21 476 (27.07)	17 117 (21.57)	15 491 (19.52)	63 857 (80.48)

*Included 122 online in all and during.
GP, general practice.

have reported that an initial reduction during the societal lockdown in many countries was followed by an increased request for GP contacts.^{1–4} The generally increased focus on health and disease in the public media may have created more uncertainty among the population and triggered an increased need for being assured nothing was wrong, and the finding that the number of contacts without a specific diagnosis increased by around 75 000 within our patient group of 47 207 patients supports this notion. Another explanation could be clinical uncertainty among the GP/GP staff following phone or email consultations, where the clinical staff to a larger extent than following a physical consultation may have asked the

patient to contact the GP clinic again, either as a follow-up email contact or a face-to-face consultation.

Patients with symptoms related to upper airways, that is, potentially COVID-19, were strongly advised not to contact their GP clinics physically but to stay at home and take a self-test. This advice was given to reduce the risk of spreading COVID-19 to other patients at the GP clinic, who were already frailer due to other reasons. This preventive initiative from the authorities appears to have been adhered to, as contacts to GP clinics related to coughing and airway infections dropped by 50%. An equally relevant explanation could be that the general advice from authorities during the pandemic to keep

Table 5 Point of contact and modes of contact by the number of contacts for each period and patient sex [N (%)]

	Before		During	
	Female	Male	Female	Male
All	176 446 (100)	130 399 (100)	222 976 (100)	167 214 (100)
Contact type				
Physical *	93 848 (53.19)	74 511 (57.14)	116 042 (52.04)	90 042 (53.85)
Email	25 697 (14.56)	17 462 (13.39)	59 784 (26.81)	41 916 (25.07)
Phone	56 901 (32.25)	38 426 (29.47)	47 150 (21.15)	35 256 (21.08)
Point of contact				
GP	62 876 (35.63)	46 619 (35.75)	47 536 (21.32)	36 695 (21.94)
Staff	113 570 (64.37)	83 780 (64.25)	175 440 (78.68)	130 519 (78.06)

*Included 122 online in during and all.
GP, general practice.

Table 6 Modes of contact by the number of contacts for each period and point of contact [N (%)]

	Before		During	
	Staff	GP	Staff	GP
All	197 350 (100)	109 495 (100)	305 959 (100)	84 231 (100)
Contact type				
Physical *	90 895 (46.06)	77 464 (70.75)	135 609 (44.32)	70 475 (83.67)
Email	32 382 (16.41)	10 777 (9.84)	94 503 (30.89)	7 197 (8.54)
Phone	74 073 (37.53)	21 254 (19.41)	75 847 (24.79)	6 559 (7.79)
*Included 122 online in during and al. GP, general practice.				

a social distance from other people would generally reduce the spread of all airborne infections. This observation contrasts with the result of a study from Germany reporting the same number of acute consultations related to airway infections.⁶

A recurrent point of awareness during the restrictions related to visiting the GP was the risk that patients with chronic conditions could be under-serviced and not get the needed treatment. This means that patients with undiagnosed serious diseases, such as cancer, would be diagnosed later than normal. We do not have data on cancer diagnostics from general practice; however, for chronic conditions, such as cardiovascular diseases and type 2 diabetes, there does not appear to have been any significant reduction in contacts to GP clinics. Contacts to GP clinics related to urinary tract symptoms, including urinary tract infections, that generally do not have any direct association with COVID-19, took up the same fraction of total contacts before and during the COVID-19 pandemic. Thus, there does not appear to be strong evidence from our Danish numbers that the restrictions have negatively influenced the healthcare offered by GPs to the public on prevalent diseases. This finding agrees with the result of a study from New Zealand¹⁷ but contrasts with those of studies from China, UK, Spain and Iceland where contacts were reduced for patients with more chronic and well-diagnosed diseases.^{1 10 18 19}

A potential worry was that the fraction of contacts related to preventive care consultations on health behaviour and health promotion decreased significantly during the lockdown. The worry is attributed to the increased food consumption and reduced physical activity reported during the COVID-19 pandemic, potentially triggering different lifestyle diseases. A fraction of this group may also be those contacting their GP clinics to discuss prevention or health promotion, who, as our present data show (table 3), further decreased their number of contacts to their GP clinics. In Spain and the UK, a reduced number of consultations for preventive consultations related to type 2 diabetes, hypertension, cardiovascular disease and screening offers were observed.^{18 19} This would therefore be an area needing an increased focus from society as well as GP clinics catching up on this group of patients perhaps not yet troubled with prevalent disease and diagnoses,

considering how to handle this group of people if a similar pandemic situation should occur again.

The number of email contacts increased from 43 159 contacts per year before the pandemic to 101 700 annually during the pandemic (from 14% to 26% of all contacts) alongside a fractional decline in phone contacts. This is a dramatic change in the organisation and structure of the service offered by GP clinics. Whether it was intentionally planned or because staff resources were scarce is difficult to say, although the size of the change indicates that it most probably includes some degree of managerial decisions, such as changed economic incentives. Another Danish study⁹ indicated that telehealth solutions were welcomed at the beginning of the COVID-19 pandemic; however, following the lifting of COVID-19 restrictions, the formerly used contact patterns slowly returned. Economic incentives were offered for video consultations during the early phases of the COVID-19 pandemic; however, following a short increase, they never really took off in Denmark, and video consultations remained in <1% of contacts.²⁰ It will be interesting to follow what will happen during the coming years. A more qualitative research approach may be needed to better understand whether, for example, establishing and keeping the relational contact between patients and the GP/GP staff is challenged by some of the telehealth solutions, either generally or related to specific diagnostic areas.¹³ Moreover, a fraction of the patient population may, due to lower information technology competencies, be more challenged than others.

Although more patients were contacting GP clinics during the COVID-19 pandemic, fewer patients were seen by a GP than before the pandemic, and most patient contacts were handled by the GP staff. Such a change was also observed in a recent study from England.¹² This is a clear change in the service offered to patients. Basically, among the 11 GPs included in this study, the number of patients handled by the practice staff increased by more than 50% during the COVID-19 pandemic, whereas the number of patients handled by the GPs decreased by approximately 25%. Whether this change is solely due to the pandemic will have to await more data from the following years. An indication that the observed changes could also be part of a managerial prioritisation is that

a higher fraction of GP contacts during the second period were physical consultations, with the practice staff handling an increasing fraction of email and phone contacts. Another change observed during the second period was an apparent increased GP focus on patients with less frequent previous contact and patients within diagnostic areas clearly outside the more confined competencies of the practice staff (eg, musculoskeletal diseases).

This study is not without limitations. The Danish setting and COVID-19 restrictions may differ from other countries, limiting the generalisability. Additionally, contacts without a reported diagnosis cannot be differentiated between contacts without a reason for reporting a diagnosis and contacts where the GPs forgot to report a diagnosis.

CONCLUSION

The changes described in this paper mean that it is now a significantly different product that GPs offer their patients. The coming years will show whether these changes in diagnostic patterns and type of contact to GP clinics remain, whether the quality of treatment and care is the same, and whether the changed balance in patient handler (GP or GP staff) is experienced as beneficial by patients.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants but the Region of Southern Denmark granted access (journal # 20/62851) to all patient data and exempted us from obtaining informed consent as they deemed it impossible given that we reviewed medical records from more than 75 000 people.

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