



# Paediatric primary care in Germany during the early COVID-19 pandemic: the calm before the storm

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## ABSTRACT

**Objectives** Globally, the COVID-19 pandemic has a major impact on healthcare provision. The effects in primary care are understudied. This study aimed to explore changes in consultation numbers and patient management during the COVID-19 pandemic, and to identify challenges for patient care.

**Design** Survey of paediatric primary care practices on consultation numbers and patient management changes, and semistructured interviews to identify challenges for patient care. Surveys and interviews were partially linked in an explanatory sequential design to identify patient groups perceived to be at higher risk for worse care during the pandemic.

**Setting** In and around Düsseldorf, a densely populated area in Western Germany. The primary care facilities are spread over an area with approximately 2 million inhabitants.

**Participants** Primary care in Germany is provided through practices run by self-employed specialist physicians that are contracted to offer services to patients under public health insurance which is compulsory to the majority of the population. The sample contained 44 paediatric primary care practices in the area, the response rate was 50%.

**Results** Numbers of consultations for scheduled developmental examinations remained unchanged compared with the previous year while emergency visits were strongly reduced (mean 87.3 less/week in March–May 2020 compared with 2019, median reduction 55.0%). Children dependent on developmental therapy and with chronic health conditions were identified as patient groups receiving deteriorated care. High patient numbers, including of mildly symptomatic children presenting for health certificates, in combination with increased organisational demands and expected staff outages are priority concerns for the winter.

**Conclusions** Primary care paediatricians offered stable service through the early pandemic but expected strained resources for the upcoming winter. Unambiguous guidance on which children should present to primary care and who should be tested would help to allocate resources appropriately, and this guidance needs to consider age group specific issues including high prevalence of respiratory symptoms, dependency on carers and high contact rates.

## Key points

- Question: How did paediatric primary care change in the beginning of the COVID-19 pandemic in Germany and what are the perceived challenges providers of care face?
- Finding: Emergency visits in primary care were strongly reduced, while scheduled visits for routine developmental examinations continued largely unchanged. Care providers perceived children with delayed development and with chronic health conditions as being at higher risk for worse care. High organisational pressure combined with increased patient numbers was the main challenge expected for the winter season.
- Meaning: Increased awareness of which patient groups may need more support through the pandemic may be useful to focus primary care providers' attention. In turn, these providers may benefit from clear guidance on patient management strategies.

## INTRODUCTION

Crises have been shown to result in decreased healthcare utilisation and increased complications from chronic health conditions like diabetes.<sup>1 2</sup> Studies on indirect health effects from infectious disease epidemics have focused on low-resource settings and have shown that disruption of routine healthcare likely resulted in similar mortality as the infectious disease itself and significant additional morbidity from chronic conditions.<sup>3 4</sup> Although effects from changed healthcare seeking behaviour are likely to be less pronounced in high-resource settings, concerns about missed regular follow-up visits and an expected increase in complications for children with chronic health conditions have also been voiced.<sup>5</sup>

In the context of COVID-19, multiple studies have shown that unscheduled patient presentations were reduced during the first wave of the pandemic in hospital emergency

departments,<sup>6</sup> but it is unclear if non-hospital providers were partially compensating for this.

The Düsseldorf area in Western Germany was among the first regions in Europe seeing high COVID-19 case numbers.<sup>7</sup> In Europe, the ongoing COVID-19 pandemic has shown a lingering course with multiple peaks.<sup>8</sup> In most European countries, distancing measures to break a first wave of cases between March and June 2020 were attenuated afterwards and stricter measures only re-implemented in late autumn, resulting in a second higher peak in the winter. Germany in particular never introduced strict lockdown measures, that is, movement was largely unrestricted with the exception of some popular leisure and holiday destinations within the country, but businesses and schools had to close. Paediatric case numbers were low in the first pandemic wave and only seven patients were hospitalised at the local paediatric referral hospital, mostly with mild courses (unpublished data held by the authors).

Primary care in Germany is provided through practices run by self-employed specialist physicians that are contracted to offer services to patients under public health insurance which is compulsory to the majority of the population. Under the terms of public insurance, paediatric specialists can only treat patients until their 18th birthday. Public health insurance covers a set of 11 developmental examinations between birth and 14 years of age (6 in the first year of life, 5 afterwards) for all children and uptake of these examinations is close to complete.

The aim of this study was to identify changes observed in paediatric primary care during the first wave of the COVID-19 pandemic and challenges for the upcoming winter season.

## METHOD

The study consisted of a survey sent to paediatric practices in the academic teaching network and a subsequent set of interviews with paediatricians working in these practices. The academic teaching network consists of primary care practices that volunteered to offer short-term intern placements to medical students but otherwise do not differ from practices outside the network, that is, are located in both high-income and low-income areas of the region and may have one self-employed paediatrician or multiple paediatricians as partners and several employees. Half of practices in the teaching network are located within the city limits of Düsseldorf, the remainder are scattered over nearby municipalities. The surveyed sample constituted 59% of paediatric practices in the city of Düsseldorf, 67% in the neighbouring municipality of Hilden, 50% in the municipality of Meerbusch and 33% in the towns of Velbert and Neuss. Single practices were located in nine other towns and municipalities. All practices in the teaching network were contacted for the survey.

The survey forms and interviews contained some separate items (eg, test numbers and definitions of suspect cases for the surveys, worries for the next winter season in the interviews) and items linked in an explanatory sequential design (consultations numbers and cancelled visits on the surveys and patient groups receiving worse care during the pandemic on the interviews).<sup>9</sup>

The study was set after the end of the first pandemic wave, at a time when case numbers were low but public health professionals already communicated the expectation of rising case numbers in the winter.

## Survey

Between 26 June and 3 July, 44 paediatric primary care practices in the Düsseldorf area in Western Germany were asked to complete an anonymised survey on patient management strategies and consultation numbers during the months of February through May. The survey contained five initial brief items on the practice itself (eg, number of staff), followed by four closed-ended questions on the definition of a COVID-19 suspect case and on SARS-CoV-2 testing strategy in use at the practice, one question on numbers of tested patients and one closed-ended question on if and how the patient flow at the practice was changed in response to the pandemic. The next section contained five closed-ended questions asking about scheduling and cancellation of appointments, one question on if the practice needed to close during the pandemic for any reason and survey participants were asked to estimate total consultation numbers during the survey period compared with previous years. Next, precise consultation numbers were collected separately for scheduled standard developmental assessments and for unscheduled visits for one sample week per month (without a public holiday) and a respective, public holiday-free week from 2019. The method for obtaining these precise numbers was not specified. The survey ended with two closed-ended questions on if there were patient groups perceived to receive better or worse care during the pandemic. All closed-ended items used mutually exclusive and comprehensive replies. The survey form is provided in the online supplementary material for this article (document in German). Attached to the survey was a non-anonymised section containing a written participant information, informed consent and questions on willingness to participate in the follow-up interviews or other studies on primary care in the COVID-19 pandemic.

After entry of results into Microsoft Excel, data were imported into Stata V.15, which was used for all further data management and statistical operations. Descriptive statistics were used and comparisons of consultation numbers between 2019 and 2020 were made by paired *t*-tests.

## Interviews

The survey forms included one item asking if the participant were willing to participate in an interview. A reason for refusal or willingness to participate was not asked. Care

providers who responded to the survey and indicated their agreement to be contacted for an interview participated in semistructured telephone interviews between 28 July and 7 August. All interviews were held by the same investigator (a paediatric medical specialist) and recorded via an online meeting tool (GoToMeeting by LogMeIn, Boston, MA). They consisted of three lead questions, structured short follow-up questions and open dialogue for clarification or further detail and were concluded with an open question for additional comments.

The semistructured interview lead questions were as follows:

1. Which patients, in your opinion, receive better or worse paediatric outpatient care in the context of the current COVID-19 pandemic?

Why?

Are there solutions or ways to improve this situation?

2. What is your biggest worry for your practice or your caring for patients with regard to the upcoming winter?

What could be done to address this worry?

3. Do you feel you are supplied with enough information on new findings on COVID-19 and the course of the pandemic to be able to care for your patients in the best possible way?

What could be improved?

Audio recordings were transcribed and not returned to the interview participants for comment or correction. Transcripts were independently reviewed by two investigators. Responses were thematically grouped into clusters. Cluster disagreements between the investigators were resolved by discussion and, where no consensus was achieved, clustering was decided by majority vote among the coauthors. Per lead question, all clusters mentioned by at least two interviewees were listed.

## RESULTS

22 practices completed the survey (response rate of 50%), 8 participants agreed to being interviewed. 10 of the practices were located in the urban centre of Düsseldorf and the remainder in the outskirts or surrounding communities.

19 practices (86%) had adopted a standardised case definition for COVID-19 suspect cases. Practices either adopted the case definition issued by the federal German public health authority (Robert Koch Institute, RKI) directly or followed related case definitions issued by local (district level) public health authorities that have discretion to alter and adapt federal (ie, country level) guidelines. Criteria for testing children for SARS-CoV-2 differed, with 59% reporting that they followed the definition of a suspect case for this decision (36% reported to follow this definition strictly and 23% reported making exceptions). 36% decided on a case-by-case basis without prespecified criteria.

12 practices were able to supply numbers of SARS-CoV-2 tests performed in the specified weeks in February to May.

As expected, numbers of patients tested for SARS-CoV-2 increased slightly over the study period with a maximum of 30 tests per week performed in one single practice. Still, the median of tests per practice was low (0 in February, 1.5 in March and April and 2 in May). Only 3 practices could expect test results back on the same day, 13 (59%) received test results on the following day and 6 (27%) regularly had to wait for more than 1 day for test results to be back. Almost two-thirds (64%) had already used serological testing and the majority (78%) of these reported deciding to do serology on a case-by-case basis.

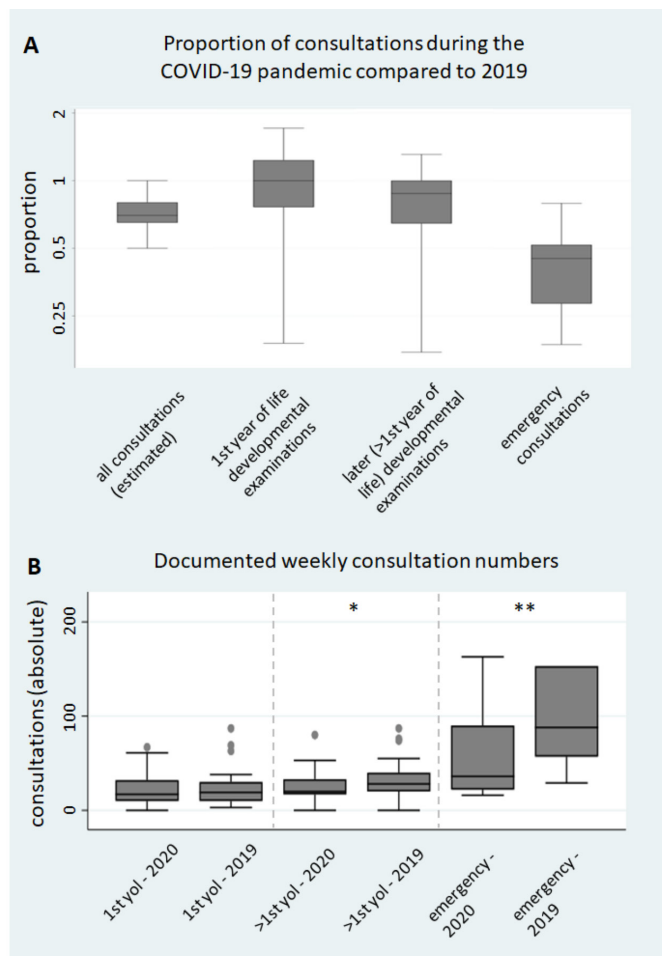
All practices reported having changed clinic procedures in response to the pandemic. Most (91%) either used separate clinic hours for non-infection-related and infection-related consultations, used separate rooms for these groups or made both spatial and clinic hour changes (27% separated patients spatially, 27% temporally and 36% used both options). 11 practices (50%) had a policy to divert potentially SARS-CoV-2-infected patients to other facilities (eg, hospital emergency departments or testing centres), either exclusively or in combination with patient separation.

All but one of the practices estimated that their consultation numbers were lower than usual during the sampled period (mean 28% lower, ie, 72%, 95% CI: 67% to 77%). [Figure 1A](#) shows relative consultation numbers in March, April and May 2020 compared with corresponding weeks in 2019. Documented consultation numbers for developmental assessments were similar between 2019 and 2020, while emergency consultation numbers were markedly lower. [Figure 1B](#) shows the respective absolute numbers of consultations per practice per week.

All practices reported that parents had cancelled scheduled appointments due to the pandemic. 50% of practices said that they had cancelled and rescheduled patient appointments, either of their own initiative (82%) or following external regulations (18%). 64% of the practices that had cancelled appointments and 50% of the ones that had not cancelled appointments used telephone appointments as an alternative.

The majority of surveyed primary care providers reported that in their practice, patients were neither treated worse nor better during the pandemic (64% reported no patients were treated worse, 82% reported none were treated better). During the semistructured interviews, five out of eight interviewees reported that they observed that some patient groups generally received worse care during the pandemic. [Table 1](#) lists patient groups that were named during the interviews.

The patient group most often named for receiving worse care was children in need of developmental and psychosocial support. In Germany, this group is cared for by social-paediatric centres that are commonly located at paediatric hospitals. Some interviewees highlighted that families with children with behavioural problems may be less likely to attend appointments anyway and may have been persuaded to miss appointments following public messages not to visit healthcare facilities if avoidable.



**Figure 1** Patient consultation numbers in 2019 and 2020. Panel A: estimated proportion of patient consultations during the first pandemic wave as compared with regular numbers of consultation (left box), other boxes proportion of documented visits in sample weeks in March, April and May 2020 compared with corresponding weeks in 2019; first year of life (yol) developmental examinations comprise U1–U6 examinations, later developmental examinations comprise U7–J2 examinations that are compulsory for all German children; Panel B: absolute weekly consultation numbers for sample weeks between March and May, 3 upper range outliers for right box (emergency–2019) not shown; first yol and >first yol indicating developmental examinations as specified for panel A; no difference for first yol ( $p=0.611$ ), mean difference >first yol 5.8 consultations per week ( $*p=0.002$ ), mean difference emergency 87.3 consultations per week ( $**p=0.001$ ).

However, there was broad agreement that appointments that were suspended from the side of care providers were a major problem (see [box 1A](#) for illustrative statements).

Interviewees were uncertain about possible solutions to this problem and expressed a high degree of acknowledgement for the difficulties in keeping up therapies and specialist clinics. However, regarding therapies, there was agreement that for lack of available therapists it will not be possible to compensate for the lost time. For clinic appointments, interviewees suggested that hospitals should increase their efforts to contact families whose

**Table 1** Patient groups identified to be perceived as receiving better or worse care during the COVID-19 pandemic and respective reasons

#### Better care during pandemic

Patient group	Advantages
Presenting for minor problems	Fewer time constraints, easier access to the doctor
Presenting for regular check-up visits	Fewer time constraints

#### Worse care during pandemic

Patient group	Issues
Chronic health conditions, incl. asthma and allergies	Afraid to seek medical care or attend check-up visits, delayed adaptation of long-term medication
Children with neurological and developmental problems	Physiotherapy, occupational therapy and speech and language therapy suspended for extended periods of time
Children from disadvantaged backgrounds, social paediatrics	Suspended therapies, suspended social care visits; less reliably attending appointments
Children requiring further investigations offered in hospitals	Appointments unavailable
Families with high fear of SARS-CoV-2 infection	Afraid to seek medical care even if urgent

appointments were cancelled in order to offer alternatives with as little delay as possible.

The other concern mentioned in multiple interviews were families who were reluctant to seek medical care for fear of contracting COVID-19. This problem was felt to affect both patients with chronic conditions who missed regular follow-up appointments and patients with acute illness who were sometimes seen to present later than they usually would have. Here interviewees suggested that there should be clear and unambiguous public communications from officials that seeking medical care is safe despite the ongoing pandemic ([box 1B](#)).

Concerns for the upcoming winter season universally centred on shortages of resources, mainly of staff and time which were seen as interconnected. The Venn diagram ([figure 2](#)) shows the topics named as worrying interviewees the most regarding the upcoming winter.<sup>10</sup>

Most frequently mentioned was a high number of patients expected to present with mild symptoms who require a certificate that their symptoms are not caused by SARS-CoV-2 or a sick note for their child so that they, their parents, would be able to stay home with them. This was frequently illustrated by examples from current practice in combination with the statement that this was felt to be frustrating even now where patient numbers are low, but the real concern is that it would lead to a collapse once

### Box 1 Illustrative statements in reply to the interview question concerning patient groups treated worse during the pandemic and possible solutions

#### (A) On interrupted therapies and cancelled clinic appointments

*Int. 5: Certain key people(...)don't necessarily see the parents' suffering. I believe at the point where we from primary care (refer these patients) they have already gone a long way(...)And this is really tough, they will suffer from that for their whole lives.*

*Int. 3: Everything closed down, the social workers did no longer come out: this means, those who are not able to care for their children, they were undisturbed in not caring. The speech therapists did not work, nobody did anything. Passing time is really valuable in a child, half a year is a lot for a 3-year-old.*

*Int. 2: The problem is that their care is not just under me, but also under paediatric psychiatrists and in social-paediatric centres(...)where no visits took place for a long time. And therapies, occupational therapy, speech and language therapy – there were many breaks there, where they now have to start from the beginning.*

*Int. 5: In parts, I'm disappointed. From the outside it looks like hospitals had just laid down their arms – thrown themselves on their backs like a dog and put their feet up.(...)it's exactly these children who had been waiting for an appointment for nine months(...)It's a huge fight to get somewhere anyway, and then these appointments are all cancelled.*

#### (B) On how to increase patient trust in healthcare facilities

*Int. 4: And the people are aware now, the hygiene precautions are understood, the practices are equipped.(...)The patients don't need to be afraid to contract something in the practices someday. Exactly this should be shown with pictures and videos, what the practices look like from the inside, how trained and equipped staff approach patients with protective equipment, that this is just illustrated - so the people see that they can feel safe in a practice, that you're not going to catch anything there.*

### Box 2 Illustrative statements in reply to the interview question concerning worries regarding patient care during the upcoming winter

#### (A) On mildly symptomatic children presenting for organisational reasons

*Int. 1: A snuffly child is presented and the mother says: 'Normally I would've gone buy a pack of tissues', now the child is not allowed to go to kindergarten and the mother is under pressure, she has to go to work and I have to confirm that the child is allowed to attend kindergarten—which I can't.*

*Int. 5: The main problem will be frustrated parents, and that's what I'm most afraid of personally, because I will again be their last resort and they will want a solution from me, but I don't have one.*

*Int. 3: They're coming in with the mission to be issued a sick note for their employer.(...)They are aware that the child doesn't need a doctor. And that's a difference, if they present because I should issue a rag (German colloquial derogatory term for a document) or because they need a doctor.*

*Int. 1: And my worry is, how are we going to cope with this workload?—which is pointless anyway. The patient doesn't benefit. If we had sick children, then we would need to offer 24-hour service at a pinch. But these children are not unwell, they have a cold.*

#### (B) On the difficulties of distinguishing COVID-19 from other respiratory infections

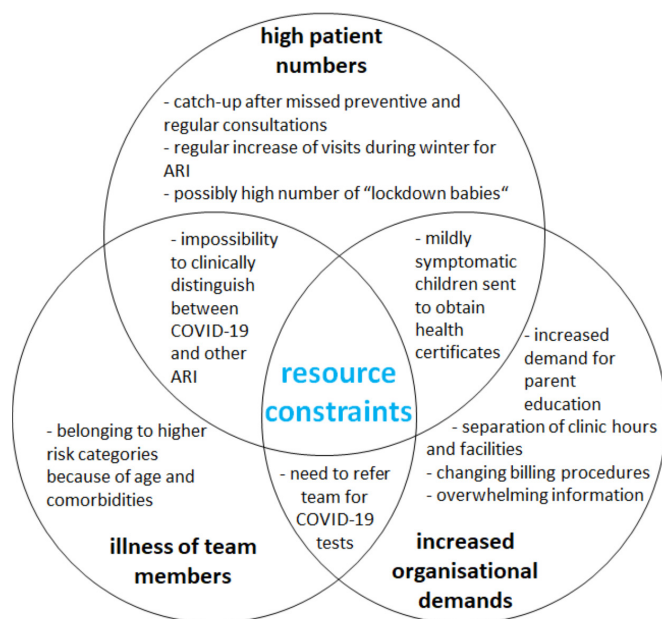
*Int. 7: Until now it's still possible not to have too many contacts in the practice, because there are not that many patients, so there are no long waits. But when you think of last winter, where people needed to wait for two hours because there are too many and I'm on my own, then that's impossible organisationally.*

*Int. 6: And we will have to pay a lot of attention that people stick to their appointments.(...)As I know our parents, it will still happen time and again that the acutely sick child coughing and with a fever, will just come in and stand here. That will push us over the edge in terms of organisation.*

#### (C) On the illness of team members and need to refer for testing

*Int. 7: And I as a paediatrician just cannot distinguish between all these viruses(...)—that means I have endless viral infections and some of it will happen to be corona. I don't believe it will harm the children. I have gone to great lengths and made it my mission that no one from my team catches it and it worked, but I'm afraid I won't keep that up(...)if I can't work, that's obviously dramatic when you're self-employed, but also if multiple of my assistants drop out, I haven't even considered that, but I won't be able to work.*

*Int. 1: A huge problem is when one of my staff has respiratory symptoms, we already had that three times—all colleagues from other specialties are allowed to swab their employees, but we're only allowed to treat patients until the age of eighteen, that means I'm not allowed to swab my assistant, although we would have a (separate workspace) for example for telephone receptionist duties, and with a bit of a cold she isn't unfit for work. But I want to separate and not let her (work with patients) unless I know she's definitely negative. I can't do that, I'll have to give her leave so she can go to her GP and they will give her a sick note for three days to be safe, because only then the test result will be back—if this continues, all paediatricians will be left without staff this winter.*



**Figure 2** Venn diagram<sup>10</sup> of topics worrying primary care paediatricians most when thinking about patient care in the upcoming winter. ARI, acute respiratory infection. Resource constraints in the intersectional areas are further illustrated by selected interviewee responses (see [box 2](#)).

these consultations compete with those of more severely ill patients (see [box 2A](#) for illustrative statements).

Asked for possible solutions, interviewees highlighted the need for improved and unambiguous guidelines for

day-care centres and schools. They repeatedly explained that the guidance currently issued to day-care centres by the state was both hard to understand and left too many details up to interpretation, thinking that any ambiguity will lead to day-care centres understandably shifting responsibility back to providers of medical care.

Furthermore, interviewees were consistently worried that with rising patient numbers, they will need to invest increasing amounts of resources into separating possibly contagious children from others and from their staff, with the added problem that clinical criteria for potential COVID-19 patients will be unable to distinguish them from children with common respiratory infections (box 2B and C).

Multiple interviewees expressed positive views about their general preparedness for the winter season. Specifically, they highlighted that they felt sufficiently equipped with materials for infection prevention, including personal protective equipment. Also, interviewees expressed that they felt they were working in a health system showing high capacity to adapt to the current situation, including flexibility from public health authorities and health payers.

Some interviewees explained that they felt population surveillance might be helpful to have the best possible knowledge of disease activity at any time, and to better be able to adjust their level of caution. They also expressed that definite guidelines and screening questions on what patients may be at risk of being infected with SARS-CoV-2 would be helpful. However, a view expressed multiple times was that this may not be possible because of a requirement of continuous changes during the evolving pandemic.

Availability of information on COVID-19 and the evolution of the pandemic was not seen as a problem by the interviewees. Some mentioned that they felt the information offered was almost too much to handle, but generally interviewees felt they were able to extract everything necessary for their daily practice. The most commonly named sources of information were official communications and websites by the RKI, medical journals and the online members' area offered by the paediatricians' trade association (Berufsverband, bvjk) that allows sharing of documents and discussion among users. Multiple interviewees felt they would benefit from filtered and structured updates from a trusted source. Two interviewees mentioned the importance of informal exchange among community paediatricians for forming consensus on how to overcome problems and meet challenges, for example during continuing education meetings or informal evening meetings (that were difficult to maintain especially early in the pandemic).

## DISCUSSION

In line with previous studies from hospital emergency departments, this survey showed that the reduction of patient consultations during the first wave of the

COVID-19 pandemic was largely due to reduced unscheduled visits. Hospital emergency departments reported a similar reduction in emergency consultations.<sup>6</sup> Therefore, while part of this reduction may be explained by changes in care-seeking behaviour, it seems probable that visit numbers were at least partly reduced due to the generally lower incidence of acute respiratory infections in the general population.<sup>11</sup> A recent study showed that in Germany, the proportion of children newly diagnosed with type 1 diabetes who presented with ketoacidosis was increased during the early pandemic.<sup>12</sup> It is therefore likely that another factor contributing to lower emergency consultation numbers may indeed be reluctance to seek care even in medically severe situations. As infection prevention measures in Germany did not restrict movement and primary care providers' service hours were unrestricted, it is less likely that obstacles introduced by lockdown measures directly impeded access to primary care.

While consultation numbers for regular developmental examinations only changed by a small degree, all surveyed paediatric practices reported that parents cancelled scheduled appointments. The observation that developmental examinations during the first year of life continued unchanged, while they were slightly reduced for older children, may reflect that narrower suggested windows for these examinations increased the willingness to keep scheduled appointments. Although completing routine vaccination schedules decreased in the UK in the current pandemic,<sup>13</sup> seeking of routine vaccinations may still have contributed to the consistency of visits as well. Following the interviews, it seems most likely that reported cancellations are often children with chronic conditions who missed scheduled follow-up appointments. This finding is concordant with observations from previous epidemics and other settings, and a need to prepare for a higher number of follow-up visits as compensation has been stated.<sup>14 15</sup> Video consultations for patients with chronic conditions have been shown to be feasible across a range of settings.<sup>5 16</sup> These may be a good option for a group of patients reluctant to have face-to-face visits. Interruptions in regular therapies, like speech and language therapy or physiotherapy, have been highlighted as a problem across a range of countries.<sup>15 17 18</sup>

Paediatricians in this study highlighted that the inability to clinically discern COVID-19 patients from children suffering from other viral infections increased organisational demands aiming at preventing transmission to staff and other patients in the practice. Clinical signs for COVID-19 have been shown to be unspecific early on in the pandemic.<sup>19</sup> Although the majority of care providers adopted case definitions issued by German public health authorities and used these to guide testing, this proportion was slightly lower than the proportion documented in a survey in paediatric hospital emergency departments.<sup>20</sup> A perception of lower applicability of case definitions for the primary care setting may have influenced this behaviour. Performance of predictive scores depends

on the population they are applied to and scores developed in inpatient care may be less suitable for primary care.<sup>21</sup> Establishing aetiology is further complicated by the long turnaround times for SARS-CoV-2 tests.<sup>20</sup> There is limited data available on presenting features and the course of disease in children managed as outpatients. Multiple registries in Germany compete for hospitalised COVID-19 patients,<sup>22</sup> but follow-up on outpatients has just recently been initiated.

The main limitation of this study is the small scope with a limited number of surveyed and interviewed care providers in a small geographical area. Yet, the survey had a fair response rate among paediatric practices representing a broad spectrum in the Düsseldorf area and the findings are likely to be transferable to other similar settings in Germany and internationally. Interviews were only held with a subsample of survey respondents who volunteered for this. This subsample has an increased risk of selection bias towards care providers who have more pressing complaints or hold stronger opinions compared with those survey respondents who opted not to participate in the interviews. Although only answers shared by at least two interviewees are reported here, it is still possible that among all primary care paediatricians, more may have shared calmer or more optimistic predictions for the winter season than the interviewed sample suggest.

Population management strategies for COVID-19 have been proposed, but these are not specific for Paediatrics.<sup>23</sup> Paediatric primary care, both in hospital emergency departments and in the community, would benefit from clear testing criteria specific for children and adolescents that incorporate the considerations most relevant for these age groups. On developing these criteria, there are several important differences to adult populations that need to be taken into account. Most importantly, children and adolescent have a lower individual risk of severe disease.<sup>24 25</sup> At the same time, they have higher average interpersonal contact rates compared with the adult population.<sup>26 27</sup> Identifying children with COVID-19 based on clinical symptoms is especially challenging due to the very high prevalence of non-specific respiratory symptoms during winter in young children.<sup>19 28</sup>

The usual seasonal peak of acute respiratory infections was not observed in the first European winter season since the beginning of the pandemic, probably largely due to ongoing distancing measures aiming at reducing case numbers of COVID-19.<sup>29</sup> In retrospect, as far as the authors are aware, the concerns from the summer regarding patient pressure and organisational demands in the winter turned out to be overly pessimistic. However, these concerns reflect the situation paediatric primary care providers expected to encounter during the winter season and understanding these concerns is valuable to prepare for epidemics emerging in the future. On the other hand, concerns about delayed and deteriorated care for vulnerable patient groups have since been expressed repeatedly. These likely have less to do with the actual COVID-19 and respiratory infection case numbers

but with the patients' and families' at risk perceptions and the observations reported here have therefore likely changed less over time. As European countries have currently not licenced any vaccine for the age group below 16 years and SARS-CoV-2 transmission numbers remain high in Europe,<sup>8</sup> the probability of contracting COVID-19 remains high for paediatric risk groups. It is therefore likely that patient and family perceptions and behaviours have not changed substantially since the study was done.

## CONCLUSION

At the end of the first wave of the COVID-19 pandemic in Germany, paediatric primary care providers expected strained resources for the upcoming winter. They expected that unambiguous guidance on which children should present to primary care and who should be tested would help to allocate resources appropriately. At the same time, they voiced concerns about quality of care for patients with chronic health conditions and developmental disorders. Public health authorities and decision-makers may support provision of primary care by placing a focus on these expectations and concerns.

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**Contributors** MKV and HMB conceptualised the study with input from HR. KR and HMB provided access to the primary care network. MKV managed and analysed the survey data and performed the interviews. KW transcribed the interviews and MKV and HMB analysed the transcripts. DV-H, MK and TeS aided with interpretation and analysis. MKV drafted the manuscript and all authors commented on the manuscript and approved the final version.

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**Competing interests** DV-H and MK are members of the German paediatricians' trade association bvkj (Berufsverband der Kinder- und Jugendärzte). The authors declare no other potential conflicts of interest.

**Patient consent for publication** Not required.

**Ethics approval** The study was approved by the ethics committee of the Medical Faculty of Heinrich Heine University Düsseldorf (study number: 2020-1056). All participants gave informed consent separately for participation in the survey and the interviews.

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