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Changes in Routine Pediatric Practice in Light of Coronavirus 2019 (COVID-19)

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The outbreak of severe acute respiratory syndrome coronavirus 2 or coronavirus 2019 (COVID-19)¹ in the city of Wuhan, China, in December 2019 has rapidly emerged into a pandemic affecting national communities throughout the world.² As of May 17, 2020, more than 4.5 million people have been infected globally at a pace of 100 000/d, and 307 395 have died.³ We will briefly discuss the effects of COVID-19 on routine pediatric practice that have surfaced during the months after the onset of the pandemic and the implications for children's health. Our aim is to raise awareness about the likely need to remodel routine pediatric practice, both in hospital and ambulatory services, in light of COVID-19, and in the event of future similar infectious emergencies.

The Magnitude of COVID-19 Infection in the Young Population

Although peer-reviewed reports and commentaries may not provide an exhaustive epidemiologic and clinical overview on how children respond to COVID-19, they provide a useful early look. Differences were observed between adults and children, which may have implications for the management of this disease in the younger population.

Information on morbidity and mortality by COVID-19 was first documented in adults.⁴⁻⁶ Later studies have shown that infection rates in children are lower than in adults.⁷⁻¹⁰ Three weeks after the start of the pandemic, the Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report reported that in the US <2% of COVID-19 cases occurred in patients <18 years¹¹ and <1% in children <10 years of age.¹² The European Centre for Disease Prevention and Control reported that 1% of all cases were <10 years of age, and 4% were aged 10-19 years.¹³ Early studies performed in China on relatively large pediatric cohorts showed that approximately two-thirds of the children had suspected cases of COVID-19, and the rest of the cases were laboratory-confirmed. According to these reports, approximately 4% of children were asymptomatic, 51% had mild illness, and 39% had moderate illness. About 6% had severe or critical illness, compared with 18.5%

reported in adults.^{9,11,14,15} In multiple settings of several countries, the majority of COVID-19 infections in subjects <18 years of age were mild to moderate and in general were associated with significantly lower rates of hospitalization and significantly lower rates of critical and severe illness.^{12,13} However, recent reports do indicate the potential for severe disease in children and emphasize that children with severe symptoms usually belong to the most vulnerable age group, including infants who had greater hospitalization rates and intensive care admissions.^{11,16,17}

The reasons for the relatively milder viral phenotype in children remain elusive. Several factors were proposed as causative, including differences in angiotensin-converting enzyme 2 expression in children, simultaneous infection (coinfection) of competing viruses in children, and the age-related immature immune systems.^{9,15,18} In the general population, although men and women have the same prevalence, men with COVID-19 are more at risk for worse outcomes and death, independent of age.^{2,9} In children, the majority of COVID-19 cases were observed in male patients.^{7,19} COVID-19 is reported to be highly transmissible, with high rates of asymptomatic-yet-contagious subjects.²⁰ Taken together, these observations suggest that changes may be necessary in the provision of healthcare for children.²¹

COVID-19 Prompting Changes in Routine Pediatric Practice

COVID-19 infection in children has important public health, social, and economic implications, and even though children may have considerably milder symptoms than individuals >18 years of age, those infected seem to have the same levels of circulating virus in their body and may be as infectious as adults.²² However, other studies suggest that children have a

COVID-19 Coronavirus 2019
EPA-UNEPSA European Paediatric Association,
 Union of National European Paediatric
 Societies and Associations

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small role in the spread of COVID-19.^{23,24} Preventive regulations have been enacted by local and national authorities on the assumption that children are important in viral transmission and amplification. The majority of countries worldwide have established social and public health policies with the aim of slowing transmission and protecting vulnerable populations, including limiting interactions with adults and elderly people and issuing orders extending school closures. This unprecedented experience has brought enormous changes in routine pediatric practice, both in hospital and ambulatory services in Europe, as throughout the Western world. National public health authorities and professional organizations in Europe and in US have issued new rules and guidelines, which have led to redesigned pediatric practices in the different settings.²⁵⁻²⁷

Reports collected by the European Paediatric Association, Union of National European Paediatric Societies and Associations (EPA-UNEPSA) from its member national European pediatric societies show that the COVID-19 pandemic has produced a sharp decline in hospitalizations and emergency department visits for urgent and non-urgent care. The rate of decline in several hospitals is >70%, and there is a significant reduction of admissions and days of stay recorded in pediatric wards. Furthermore, most of the outpatient services in hospitals have been closed to reduce person-to-person contact. Reasons for such a decrease also may include parents' fear and apprehension about children's exposure to patients with COVID-19 in hospitals. Some children were referred to the emergency department in critical condition caused by acute illnesses, including severe ketoacidosis, full-blown sepsis, and other life-threatening situations, without previous medical assessment. However, a sharp decline in other common seasonal infectious diseases due to the general lockdown and reduced school activities also should be considered when analyzing COVID-19 data and their related epidemiologic implications.

These circumstances have brought a reorganization of pediatric services in many hospitals, which have reduced the services and the space previously assigned to pediatric wards to use pediatric beds for patients of all ages with COVID-19. In parallel, pediatric staff often have been reassigned to other duties.

Several factors have influenced also the routine practice of general pediatricians working in ambulatory settings during COVID-19. Many pediatricians belonging to high-risk groups limited their clinical exposure and direct clinical care of patients. Primary care pediatricians felt inadequately protected from COVID-19, as they were provided with insufficient personal protective equipment and because the virus-containment measures established by authorities were considered unable to effectively isolate suspected patients with COVID-19. Inefficient containment measures included the absence of negative-pressure rooms and the lack of space to effectively separate patients with respiratory symptoms, including those with greater COVID-19 index of suspicion, from patients with nonrespiratory symptoms.

Taken together, these factors may have contributed to the dramatic decline in direct pediatrician-patient encounters

and the rise in telephonic and virtual consultations. As reported by the EPA-UNEPSA working group on social pediatrics, during the past 3 months, direct care has declined (**Figure**). Pediatric care has rapidly turned from direct to a predominantly virtual care practice, and pediatricians seem to have adapted to it, most likely including those who in the past may have objected to virtual-assisted care.

A significant limitation to telehealth is the availability of technical equipment. Although some hospitals and large physician practices are currently equipped to deliver care in virtual mode, many hospitals, public ambulatory settings, and private practices are not.²⁸ Additional factors included the level of training enabling clinicians to provide effective care in video visit modality and the costs for providing video-assisted care opportunities by the public health systems, which also needs to be regulated.²⁸ For instance, one of the health maintenance organizations in Israel announced that clinicians will be compensated for virtual calls only if they spend at least 50% of their time in the office to provide direct care for patients who are interested in this encounter. This statement caused deep dissatisfaction in many clinicians, who felt health maintenance organizations were forcing them to face patients without the provision of adequate personal protective equipment.

COVID-19 Influencing Standards of Practice in Pediatrics

Data collected by EPA-UNEPSA from its member societies show that in different European countries, many pediatricians during the pandemic have largely discontinued the practice of throat culture. Furthermore, referrals to laboratory tests, imaging, and consultations also have been reduced and primary care pediatricians have decided about treatment in absence of sufficient data. Ambulatory services dedicated to preventive care, including a variety of clinical services and programs, have been reduced. Periodic well child health examination and screening programs, including key newborn screening tests, were postponed, and physiotherapy, occupational therapy, and dietary consultations have declined.

The Future of Pediatric Practice after COVID-19

The pediatric practice changes and adjustments are most likely to remain after the pandemic is over.²⁹ Important discussions are ongoing in several European countries and the US on the effectiveness shown by telehealth and telephone care during the months of the pandemic.³⁰ Many consider them to be important tools, enabling pediatricians to connect with patients and families, especially in times of physical distancing. Public health services throughout Europe are also considering implementing this practice into national programs,³¹ due to its cost effectiveness and efficiency to provide timely childcare in a less time-consuming manner than traditional in-person practice.³² However, concerns exist regarding whether this form of healthcare

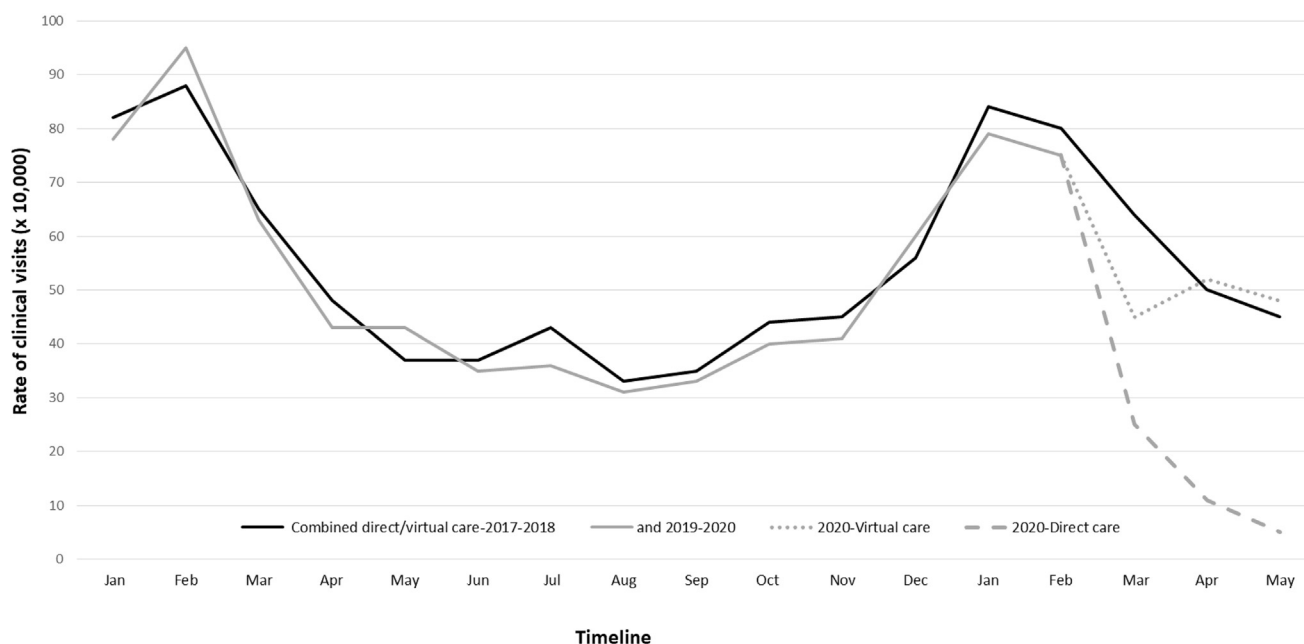


Figure. Pediatric primary care, hospital, and ambulatory settings. Comparison between direct and virtual pediatric clinical visits in European countries during the periods 2017-2018 and 2019-2020. Data were elaborated by the EPA-UNEPSA working group on social pediatrics based on preliminary reports from member societies. *Continued lines* indicate combined direct and virtual care. *Noncontinued lines* show separately the rates of virtual and direct care.

provision could be considered a main practice management resource in future child healthcare. In fact, many object, stating that medicine in general and pediatrics in particular is a human science, and the major part of healing is the direct encounter of the physician with the child and the patient's parents or caretakers.³³ Failure to create such conditions could result in less-effective clinical evaluations, which could lead to critical mistakes and to a decline in compliance with the physician's advice and recommendations. In accordance with this vision, telehealth and telephone care should be adopted only as an adjunctive to conventional health but not as the major resource in childcare provision. Reports to EPA-UNEPSA from its member societies indicate that previously and in the current crisis, to avoid direct encounters, physicians tend to overmedicate their patients to compensate for the inability to thoroughly evaluate their patients.³⁴

However, protocols and algorithms for provision of telehealth and virtual care are developing, including relevant medical ethical issues and legal medicine implications. Pediatricians should be prepared by learning the advantages and disadvantages of distance medical practice and acquiring appropriate training.

Conclusions

Changes in pediatric practice driven by the COVID-19 pandemic are likely among the causes of delayed identification of serious illnesses, the failure to provide routine care for chronic conditions including mental and behavioral

problems triggered during this period,² and the re-emergence of disorders due to uncompleted neonatal screening tests.³⁵ The pandemic has caused delays and significant disruption of standard vaccination programs.³⁶ Only time and future studies will show the real extent of collateral damages that have occurred due to the pandemic. ■

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