



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

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



Child Care in the Time of Coronavirus Disease-19: A Period of Challenge and Opportunity

Andrew N. Hashikawa, MD, MS¹, Jill M. Sells, MD², Peter M. DeJonge, MPH³, Abbey Alkon, RN, PhD⁴, Emily T. Martin, PhD, MPH⁵, and Timothy R. Shope, MD, MPH⁶

The early care and education of young children, more commonly known as child care, is a ubiquitous experience in the US across geographies and socioeconomic levels. Nationally, more than 12 million children—or nearly two-thirds of children under 5 years of age—regularly participate in out-of-home care, making early care and education a \$47.2 billion industry with a workforce of more than 1.5 million child care providers.¹⁻³ Early care and education involves children from birth through kindergarten entry, a time when organized, group care, including child care centers, family child care homes, preschool, and Head Start programs represent the majority of child care arrangements.¹

Unlike other major Western countries, the US lacks a national child care system with a comprehensive centralized mechanism for policymaking or coordinated funding.⁴ Therefore, early care and education in the US is fragmented, leading to substantial variability in the availability, cost, and quality of child care.⁴ This piecemeal system has been severely challenged by the global pandemic associated with the severe acute respiratory syndrome coronavirus 2019 (SARS-CoV-2), owing to both preexisting structural and financial problems of the early care and education system, as well as the unique epidemiology of coronavirus disease 2019 (COVID-19) disease in children.

Preexisting shortcomings of the US early care and education system worsened during the pandemic, presenting novel challenges for early care and education programs related to the COVID-19 pandemic. We offer recommendations for improving health in early care and education programs at this time.

Existing Problems in Child Care Exacerbated by the COVID-19 Pandemic

Access to Quality Early Care and Education Programs Is Limited Financially and Geographically

Before the COVID-19 pandemic, early care and education access was a significant challenge for many families because of its expense and limited supply.^{5,6} US early care and education programs have high operating costs and, unlike public schools, receive minimal federal or state subsidies.^{2,4,6}

Some programs, such as Head Start and military-sponsored programs, receive federal funding, but these represent only a small fraction of early care and education arrangements.¹ The high operating costs of early care and education are passed onto families in the form of tuition and can represent a substantial proportion of a family's income; in some states, the price approaches or exceeds in-state college tuition.⁶ High-quality early care and education has become cost prohibitive to most poor and minority families.^{4,6} The federal government has provided some funding to states that is intended to subsidize early care and education costs for low-income families (eg, Child Care and Development Fund, Temporary Assistance for Needy Families, and the Social Services Block Grant), but these funds cover only 30% of total child care expenditures nationally.¹ Similarly, federal tax credits, which only apply to middle-class families, average 10% or less of the cost of full-time child care.¹

Furthermore, more than 50% of the US population lives in child care “deserts,” or census tract areas that either completely lack early care and education services or only have one-third of the licensed child care capacity needed by families.⁵ Early care and education deserts are more frequently found in rural, low-income areas, and also are associated with a high proportion of minority residents.⁵ Even in locations with sufficient early care and education capacity, many parents report having significant difficulty finding backup child care when their child is sick and cannot attend their regular early care and education program.⁷ Parents often rely on nonparental relatives such as the child's grandparents for emergency child care; now, the pandemic has limited this backup option because of the concern for the spread of COVID-19 to more vulnerable, high-risk family members.⁸

The pandemic has impacted the availability of early care and education, both in the early months of the pandemic and likely into the future as well. In most states, social distancing policies shuttered nonessential businesses temporarily, but there was a variety of responses related to early care

CCHC	Child care health consultants
CCR&R	Child care resource and referral
CDC	Centers for Disease Control and Prevention
COVID-19	Coronavirus disease 2019
SARS-COV-2	Severe acute respiratory syndrome coronavirus 2019

From the ¹Department of Emergency Medicine, Children's Emergency Services, Michigan Medicine, Ann Arbor, MI; ²Department of Pediatrics, University of Washington School of Medicine, Seattle, WA; ³Department of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, MI; ⁴School of Nursing, University of California, San Francisco, San Francisco, CA; ⁵Department of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, MI; and ⁶Department of Pediatrics, UPMC Children's Hospital of Pittsburgh, Pittsburgh, PA

The authors declare no conflicts of interest.

0022-3476/\$ - see front matter. © 2020 Elsevier Inc. All rights reserved.
<https://doi.org/10.1016/j.jpeds.2020.07.042>

and education programs. Some states closed all organized early care and education programs, others allowed exemptions for programs that cared for children of essential workers, and some did not close any programs. Early care and education program closings varied so markedly from state to state that dashboards were created to track different state closings.⁹ During COVID-19, as businesses closed and parents were furloughed or worked from home, demand for early care and education from these parents decreased, decreasing attendance and decreasing revenue to early care and education programs, resulting in further closures of programs for financial reasons. An estimated 60% of early care and education programs and 96% of Head Start programs were closed (S. Shuman, Senior Training and Technical Assistance Associate, National Center on Early Childhood Health and Wellness Development Center, written communication, June 30, 2020), during the first 2 months of the pandemic.⁸ A May 2020 national survey of 163 child care resource and referral (CCR&R) agencies from 41 states found that 77% of CCR&R agencies were planning to assist child care programs in reopening and 37% of CCR&R were administering federal funding directly to early care and education programs.¹⁰

The closure of early care and education programs caused problems for essential workers (eg, health care workers, first responders, transit workers, grocers). A nationally representative survey of parents found that more than one-third of respondents found it “very difficult” to find child care, nearly double that from the same period 6 months prior, and particularly remarkable considering simultaneously decreased demand because of historically high unemployment.⁸ Only 22% of essential workers were able to continue their previous early care and education arrangements during the pandemic and parents were nearly twice as likely to report difficulties finding quality early care and education programs within their budget.⁸ Many low-income essential workers were without paid leave, did not have an available family caregiver, or also were less likely than high-income parents to be able to work remotely.⁸ However, even among parents who could work from home, a national survey reported that 43% still required child care.⁸

The Financial Unsustainability of Early Care and Education Programs

Typically, the majority of revenue for early care and education programs is derived from tuition fees, and 80% of child care program expenses are related to payroll; most experts view this as unsustainable.⁶ Indeed, previous regional disasters and societal upheaval consistently have demonstrated the fragility of the early care and education infrastructure.^{11,12} For example, most early care and education programs are a low-margin business and have limited access to recovery funds. Therefore, if they are closed for relatively brief periods in excess of several weeks, they cannot meet payroll or pay rent, often resulting in permanent closure.¹² Subsequently, the lack of available early care and education programs for families after disasters significantly affects

recovery efforts by keeping families from working and businesses from rebounding economically.^{11,13} Although early care and education is considered a critical service by the Federal Emergency Management Agency for regional recovery, early care and education programs are underprepared for emergencies and are usually overlooked during disaster recovery planning.^{11,13,14}

The COVID-19 pandemic has placed substantial financial strains on the industry, with smaller early care and education programs vulnerable to permanent financial collapse, and very little direct federal or state public financial support. One national survey conducted by the National Association for the Education of Young Children in March 2020 found that many early care and education owners questioned the future viability of the early care and education industry.¹⁵ The survey revealed that 50% of early care and education programs were losing income because families were unable to pay, with another 25% losing additional income because states reimbursed providers based on attendance rather than enrollment for low-income families receiving child care subsidies, and thus these payments decreased as well when children stayed home.¹⁵ This is dire news for a workforce that is overwhelmingly female, minority (40%), significantly underpaid (double the proportion of workers living below the poverty line compared with other industries), and lacking health insurance despite having many underlying chronic health conditions.^{6,16} CCR&R agencies have reported that the attrition of the child care workforce is among the top concerns for early care and education programs during the pandemic.¹⁰

The federal government has met some of the immediate early care and education needs during the pandemic, but has fallen short in other areas. Realizing the early care and education system’s importance to the economic infrastructure, Congress included specific provisions for the early care and education sector when passing the \$2 trillion dollar Coronavirus Aid, Relief, and Economic Security Act. The Coronavirus Aid, Relief, and Economic Security Act included \$3.5 billion in discretionary funding to states to help support early care and education through payment assistance to programs experiencing decreased enrollment, emergency child care for essential workers, financial assistance to parents working in critical sectors, and funding for purchasing supplies to stay open or reopen.¹⁷ Currently, most early care and education providers, with little cash reserves and high overhead costs, are unsure if they can remain in business without further financial support from the state or federal government.¹⁵ Other additional legislation to financially support the early care and education industry is currently pending in Congress.¹⁸ The early care and education system also was not included when the Department of Homeland Security identified 16 groups of critical infrastructure sectors during the COVID-19 pandemic.¹⁹ The designation as critical essential infrastructure workforce is a way to assist states and local governments in prioritizing accommodations for employees critical to operations so they can continue to work during the pandemic.¹⁹

The Lack of Standardized Regulation, Preparation, and Health Support for Early Care and Education

There are no comprehensive federal regulations for the safe and healthy operation of early care and education programs, other than federally funded Head Start and military programs. Instead, regulations are developed at the state level, resulting in a high degree of national variability in the health and safety requirements for licensed programs. Even within states, early care and education practices and policies vary between programs, and a significant proportion of early care and education in the US is unlicensed and unregulated.⁴

Across states and local jurisdictions, early care and education agencies and programs have variable access to support from health professionals such as child care health consultants (CCHC) to discern needs, inform the development of standards for daily operation, disseminate these standards, and support implementation. These standards include adequately detailed and updated emergency, disaster, and pandemic plans, which most licensed early care and education businesses lack despite being required for licensing in many states.^{10,20,21}

There has not been a nationally coordinated effort to develop, disseminate, and implement effective, adequately detailed guidance for the early care and education system during the COVID-19 pandemic. Initial Centers for Disease Control and Prevention (CDC) recommendations offered guidance for programs that remained open to care for children of essential workers.²² This guidance was replaced by advice for programs “that remain open” and was complemented by a protocol offered to commercial businesses regarding social distancing, cleaning, and screening as they reopen.^{23,24} These guidelines remain largely insufficient for the day-to-day operational needs of most early care and education programs.

National standards for early care and education—including those related to emergencies and infection control—exist for health and safety in child care, which are published in *Caring for Our Children* by the American Academy of Pediatrics, the American Public Health Association, and the National Resource Center for Health and Safety in Child Care and Early Education.²⁵ However, there is no mechanism to rapidly modify, update, and disseminate these standards to meet the needs of the COVID-19 pandemic. Existing *Caring for Our Children* standards do not address the new concerns expressed by early care and education workers during the pandemic, which include determining the risks for early care and education workers, establishing whether physical distancing in young children is feasible and effective, providing more details about cleaning and disinfecting, defining new group size requirements, defining the proper use of SARS-CoV-2 screening tests, handling readmission of children with symptoms or positive COVID-19 tests, and establishing guidelines for temperature checks (type of thermometer, fever threshold for exclusion, when to take temperatures after the initial screening).²⁶ Without federal or other national guidance, each state government and local

health department is left to develop their own early care and education health policies.

The COVID-19 Pandemic Poses New, Unique Challenges for Early Care and Education

Clinical Presentation and Epidemiology of SARS-CoV-2 Infection in Children

SARS-CoV-2 is not yet well-understood, with a distinct lack of pediatric SARS-CoV-2 epidemiologic studies in group settings to guide policy and practice.²⁷ In part, this is because a large proportion of infected children have asymptomatic or mild COVID-19 clinical courses. Although uncommon, childhood cases of COVID-19 can also be severe. The multisystem inflammatory syndrome in children associated with SARS-CoV-2 infection, which shares some characteristics with Kawasaki disease, has prompted a recent CDC alert.²⁸⁻³¹ However, because most children with SARS-CoV-2 infection have mild to no symptoms, childhood cases often are detected only through contact tracing related to an adult clinical case.³⁰⁻³²

As a result of underdetection in children, the extent to which children may fuel community spread of SARS-CoV-2, as with other respiratory illnesses, is currently unknown.³²⁻³⁴ The recommendations to close early care and education programs and schools, however, were derived from epidemiologic transmission studies of influenza, which has disproportionately higher transmission rates and clinical disease in young children.^{33,35} At present, SARS-CoV-2, compared with influenza, seems to infect fewer and cause milder clinical disease in young children, and have higher transmissibility among adults.^{30-32,36} SARS-CoV-2 surveillance data in group settings are not yet available, but neither are published reports of widespread child-to-child transmission of COVID-19 in early care and education or school settings, suggesting transmission in these settings is either uncommon or unrecognized owing to mild or asymptomatic infection.³²⁻³⁴ However, media reports of COVID-19 outbreaks in schools in Israel and child care centers in Texas require further research to determine the extent of child-to-child transmission from infected adults to children.^{37,38} Modeling for SARS-CoV-2, and other coronavirus epidemics of SARS and MERS demonstrates that the effect of child care and school closures on reducing transmission and mortality in society, in general, is minimal.³⁵

Child Care Programs Need Tailored Day-to-Day Operating Guidelines

Although CDC-informed policies and regulations have been put forth regarding business, industry, and school reopenings, these protocols largely provide insufficient detail for early care and education programs.³⁶ The main challenge is that the proposed reopening procedures hinge on key nonpharmaceutical interventions to combat SARS-CoV-2 transmission—physical distancing, respiratory etiquette, handwashing, and masking. Although effective in the general

population, these practices are difficult to implement and maintain in groups of very young children.

Daily Health Checks

CDC guidance recommends daily screening of children for fever and illness symptoms on arrival,²⁴ yet this may be challenging for large early care and education programs to implement because measuring temperatures in young children is more challenging and time-consuming when compared with older children. Staggering of morning arrivals is cumbersome for parents headed to work, and the less risky outdoor screenings would be problematic during inclement weather.

Personal Protective Equipment

The CDC recommends that child care workers wear cloth masks and have suggested gowns for extensive contact. Child care workers have questions about the frequency of gown changes because infants and toddlers frequently drool, cry, or spit up when being held. Similarly, young children do not effectively wear masks for prolonged periods and children under the age of 2 years should not wear masks because of concerns for suffocation.²⁴

Respiratory Etiquette and Hand Hygiene

Although it is clear that respiratory etiquette and hand hygiene must be practiced by staff,²⁴ studies combining respiratory etiquette and hand hygiene for caregivers and children, and environmental cleaning, sanitizing, and disinfecting surfaces in early care and education programs show only a modest benefit in the reduction of respiratory virus transmission.³⁹⁻⁴² The modest effect is likely because these interventions do not reduce droplet spread, the primary transmission mode of most respiratory viruses, including SARS-CoV-2.

Cleaning, Sanitizing, and Disinfecting

The CDC recommends cleaning and disinfecting frequently touched surfaces.¹⁸ However, the high frequency with which young children touch objects and each other makes this challenging. Time and resources are limited in early care and education programs and the ability to do this effectively and repeatedly for all potentially touched surfaces often is not practical.

Group Size and Ratios

The CDC recommends to “maintain an adequate ratio of staff to children to ensure safety,” group cohorting, and avoiding mixing of different ages, but does not give any guidance on group size.^{23,24} A review of all 50 states’ individual reopening guidelines posted online (June 30, 2020) showed that 36% of states (n = 18) recommended a group limit of 8-10 children; 20% of states (n = 10) a limit between 11 and 20 children; 8% of states (n = 4) a limit of 21-25 children; and 36% of states (n = 18) have no suggested group size limits.⁹ Challenges to downsizing classroom groups include decreasing available child care access for working parents, not enrolling enough

children to keep the early care and education program financially viable, having enough staff to maintain adequate child-to-staff ratios, and having enough available rooms or physical space to keep smaller groups apart.

Exclusion and Return-to-Care

The CDC recommends that programs “require sick children and staff to stay home,” yet research indicates that children often experience minor or no symptoms when infected with SARS-CoV-2.²⁴ On average, children in early care and education programs experience approximately 6 upper respiratory infections per year, with younger children and children in their first year of group child care experiencing substantially more.⁴³ Excluding all children with runny nose or congestion, symptoms listed by the CDC as potential COVID-19-related symptoms, would result in large numbers of children being excluded, and may not be practical for either the family’s child care needs, or the early care and education program’s operations.⁴⁴ Additionally, COVID-19 symptoms for young children are different than for adults, yet the CDC list of symptoms does not distinguish between adults and children. The CDC suggests early care and education programs and schools close for 2-5 days after a positive case of COVID-19 occurs because it “allows time for the local health officials to gain a better understanding of the COVID-19 situation impacting the school.”⁴⁵ Repeated, prolonged closures may prove financially impractical for early care and education programs and working families who cannot work without child care services.

RECOMMENDATIONS

Develop National Tailored Guidance to Support Health in the Early Care and Education Programs During COVID-19

The most pressing issue currently is a need for more tailored guidance and specific considerations for early care and education programs during the COVID-19 pandemic. In June 2020, the American Academy of Pediatrics published “COVID-19 Planning Considerations: Guidance for School Re-entry,” which is focused predominately on the kindergarten through 12th-grade population and makes recommendations tailored to school settings.³⁶ Early care and education programs would benefit from a similar document, with guidelines and operating considerations tailored to their needs. An expedited process to develop such guidance from experts in COVID-19, pediatrics, public health, and child care health is needed and should build from existing Caring for Our Children and CDC guidance. Even though there remain gaps in COVID-19-specific information that need further research, there is an important role for pediatric health experts to provide some structured guidance based on both expert group consensus and best available evidence to assist early care and education directors in operating their programs and in providing consistent messaging to parents. This guidance should address, as a starting point, the following significant challenges identified to date.

Daily Health Checks

Guidelines should consider strategies that would facilitate the daily health check in early care and education programs (eg, use of noncontact infrared skin thermometers⁴⁶ or screening for symptoms prior to arrival by using numerous available COVID-19 apps).

Face Masks

Guidelines should consider how early care and education staff can effectively wear face protection while still allowing facial expression critical for child development (eg, consider use of face shields for staff working with young children or face masks that have a transparent window).⁴⁷ Studies are needed to assess the transmission prevention effect of face mask wearing in young children and any mask-related recommendations must consider the physical, social-emotional, and developmental implications of their use.

Respiratory Etiquette and Hand Hygiene

Young children cannot be relied on to practice respiratory etiquette and good hygiene practices consistently. Instead, efforts should focus on effective strategies that improve hand hygiene among early care and education providers and children.^{48,49}

Cleaning, Sanitizing, and Disinfecting

Although SARS-CoV-2 transmission is primarily via the respiratory route, some transmission may occur from touching surfaces and fomites contaminated with viable virus. Early care and education programs would greatly benefit from having more detailed guidance for efficient cleaning, sanitizing, and disinfection and alternative strategies (eg, rotating availability of toys) that address their unique population and environment.

Group Size and Age Group Ratios

Smaller group size is an important strategy to decrease viral transmission compared with larger group sizes, especially because physical distancing is not a viable strategy among young children. Although research studies on optimal group size for a decrease in SARS-CoV-2 transmission are still necessary, a national recommendation for group size, balanced by the constraints of the early care and education environment, is necessary.

Exclusion and Return to Care

Although medical evidence regarding the epidemiology of SARS-CoV2 transmission among children is lacking, there is a role for pediatric health experts to provide structured, consensus guidance based on the best available evidence. Having national exclusion and return-to-care recommendations can guide early care and education administrators and directors in operating their programs, provide a better framework for local public health departments to manage outbreaks, and to provide consistent messaging to parents.

Conduct Research to Answer Critical Questions about SARS-CoV-2 in Young Children

The development of best practice guidelines for early care and education programs is linked to a better understanding of SARS-CoV-2 epidemiology in young children. We need more high-quality surveillance and transmission studies of children in early care and education and school settings. In addition, we need further studies delineating pediatric attack rates and the likelihood of symptoms after infection. These studies are critical to determine when children, who are infected or exposed, can return to care, and these recommendations may differ from those for adults.⁵⁰ The role of antibody testing needs to be explored further to determine which antibodies confer immunity and decreased transmissibility, and for how long. These data will have implications on procedures and practices such as the daily health check, use of PPE, infection control and prevention practices, group size and exclusion, and return-to-care guidelines, all of which may need to be updated as COVID-19 research evolves.

Increase Health Support for Child Care Programs

Many states have Child Care Health Consultants (CCHC) working in their public health departments who provide regular assessments and consultation to help early care and education administrators, directors, and providers improve the quality of health and safety in their programs.^{51,52} CCHC have ongoing relationships with local early care and education programs, public health departments, resource and referral agencies, and primary care pediatric practices. They should be engaged as key partners with pediatric and public health professionals to inform, disseminate, and support the implementation of new guidance for operation during COVID-19. Funding for CCHC is inconsistent across states and should be supported by local and state health departments or federal programs for improving the health of early care and education programs. Pediatric health providers and the national early childhood training and technical assistance systems, including the National Center on Early Childhood Health and Wellness (and its successor National Center on Health, Behavioral Health, and Safety), should support families and early care and education providers by translating evidence into common messages and best practices.

Define Early Care and Education as Essential Critical Infrastructure

The COVID-19 pandemic demonstrates how vital early care and education services are to other essential workers. Ensuring that local and state governments continue to support the operation of quality early care and education programs ensures the care of worker's children in other sectors of essential critical infrastructure. With the continued surge of COVID-19 cases in many states and the distinct possibility of a additional waves of infections, the early care and education workforce should also be considered essential critical infrastructure workforce, perhaps in a separate "Education"

sector within the Department of Homeland Security's designation of critical infrastructure workforce.¹⁹ The designation, although it does not guarantee additional federal funding, would at least bring the necessary awareness to local and state governments of the need to prioritize accommodations for the early care and education workforce in addition to other critical infrastructure workers. Designating the early care and education system as critical infrastructure may also promote greater collaboration between early care and education stakeholders and local government policymakers to facilitate increased disaster preparedness planning to ensure early care and education programs are ready to meet the challenges of future emergencies beyond this pandemic.

Summary of Needs

There is an urgent need to address the lack of cohesive national guidance for early care and education programs through a collaboration of pediatric, public health, and child care experts. Informed by the best science about SARS-CoV-2 in children, stakeholders must work together to develop, disseminate, and implement guidance that thoughtfully considers young children's physical, developmental, and social-emotional needs along with the realities of operating early care and education programs. Guidance must build from existing health guidance and leverage systems of consultation and technical assistance to support dissemination and implementation. Further federal funding is needed for COVID-19 that meets the significant knowledge gaps in the pediatric population so that policymakers, public health experts, and health providers can provide science-informed recommendations to ensure the health and safety of children in early care and education programs. ■

Submitted for publication Jul 3, 2020; last revision received Jul 10, 2020; accepted Jul 13, 2020.

Reprint requests: Andrew N. Hashikawa, MD, MS, North Campus Research Complex - University of Michigan Injury Prevention Center, 2800 Plymouth Road, Suite G080, NCRF Building 10, Ann Arbor, MI 48105. E-mail: drewhash@med.umich.edu

References

- Committee for Economic Development. Child care in state economies 2019 update. www.ced.org/assets/reports/childcareimpact/181104%20CCSE%20Report%20Jan30.pdf. Accessed June 5, 2020.
- Kennedy LB, Mayshak K. Say hello to that new spin studio and goodbye to your child care. *The New York Times*; 2020.
- US Census Bureau. Who's minding the kids? Child care arrangements. <http://www.census.gov/prod/2013pubs/p70-135.pdf>. Accessed June 5, 2020.
- Zigler E. *Tragedy of child care in America*. Yale University Press; 2009.
- Center for American Progress. Child care deserts. <https://childcare.deserts.org/>. Accessed June 5, 2020.
- Child Care Aware. The US and the high price of child care: an examination of a broken system. 2019. www.childcareaware.org/our-issues/research/the-us-and-the-high-price-of-child-care-2019/. Accessed June 5, 2020.
- Hashikawa AN, Brousseau DC, Singer DC, Gebremariam A, Davis MM. Emergency department and urgent care for children excluded from child care. *Pediatrics* 2014;134:e120-7.
- Bipartisan Policy Center Nationwide Survey. Child care in the time of coronavirus. <https://bipartisanpolicy.org/blog/nationwide-survey-child-care-in-the-time-of-coronavirus/>. Accessed June 8, 2020.
- Child Care Aware. State by state resources - statewide child care status. www.childcareaware.org/resources/map/. Accessed June 9, 2020.
- Child Care Aware. CCR&R response to the coronavirus. <https://info.childcareaware.org/hubfs/ccrr-survey-pdf.pdf>. Accessed June 9, 2020.
- Save the Children. Child care - an essential service for disaster recovery. www.savethechildren.org/content/dam/usa/reports/emergency-prep/GRS-BRIEF-2007.PDF. Accessed June 9, 2020.
- Swaby A. Without recovery funds, more than 50 Texas day cares close after Harvey27. *The Texas Tribune*; 2017.
- Save the Children. Disaster report card. www.savethechildren.org/us/what-we-do/us-programs/disaster-relief-in-america/family-emergency-preparedness-plan/disaster-report-card. Accessed June 20, 2020.
- FEMA. Critical components of a child's world. https://emilms.fema.gov/IS0366a/lesson3/L3_print.htm. Accessed June 9, 2020.
- National Association for the Education of Young Children. Child care in crisis understanding the effects of the coronavirus pandemic. www.naeyc.org/sites/default/files/globally-shared/downloads/PDFs/our-work/public-policy-advocacy/effects_of_coronavirus_on_child_care.final.pdf. Accessed June 5, 2020.
- Linnan L, Arandia G, Bateman LA, Vaughn A, Smith N, Ward D. The Health and working conditions of women employed in child care. *Int J Environ Res Public Health* 2017;14.
- Administration for Children and Families. Summary of child care provisions of Coronavirus Aid, Relief, and Economic Security Act or "CARES Act". www.acf.hhs.gov/occ/resource/summary-of-child-care-provisions-of-cares-act. Accessed June 9, 2020.
- 116th Congress H.R. 7027, Child Care Is Essential Act, Bill Profile. Washington D.C: U.S. Government Publishing Office. https://congressional-proquest-com.proxy.lib.umich.edu/congressional/docview/t03.d04.116_hr_7027?accountid=14667. Accessed May 27, 2020.
- Cybersecurity and Infrastructure Security Agency. Identifying critical infrastructure during COVID-19. www.cisa.gov/identifying-critical-infrastructure-during-covid-19. Accessed July 10, 2020.
- Chang MT, Bradin S, Hashikawa AN. Disaster Preparedness Among Michigan's Licensed Child Care Programs. *Pediatr Emerg Care* 2018;34:349-56.
- Shope TR, Walker BH, Aird LD, Southward L, McCown JS, Martin JM. Pandemic influenza preparedness among child care center directors in 2008 and 2016. *Pediatrics* 2017;139:e20163690.
- Centers for Disease Control and Prevention. Interim guidance for administrators of US K-12 schools and child care programs - plan, prepare, and respond to coronavirus disease 2019 (COVID-19). http://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-schools.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fspecific-groups%2Fguidance-for-schools.html. Accessed June 14, 2020.
- Centers for Disease Control and Prevention (CDC). Activities and initiatives supporting the COVID-19 response and the President's plan for opening America up again. Atlanta: CDC; 2020.
- Centers for Disease Control and Prevention (CDC). Guidance for child care programs that remain open. www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-childcare.html. Accessed June 8, 2020.
- American Academy of Pediatrics. American Public Health Association, National Resource Center for Health and Safety in Child Care and Early Education. CFOC standards online database. <https://nrckids.org/CFOC/>. Accessed July 10, 2020.
- National Resource Center for Health and Safety in Child Care and Early Education. COVID-19 questions - CFOC crosswalk. Aurora, CO: National Resource Center for Health and Safety in Child Care and Early Education; 2020.
- Kelvin AA, Halperin S. COVID-19 in children: the link in the transmission chain. *Lancet Infect Dis* 2020;20:633-4.
- Levin M. Childhood multisystem inflammatory syndrome - a new challenge in the pandemic. *N Engl J Med* 2020 [Epub ahead of print].

29. Feldstein LR, Rose EB, Horwitz SM, Collins JP, Newhams MM, Son MBE, et al. Multisystem inflammatory syndrome in U.S. children and adolescents. *N Engl J Med* 2020 [Epub ahead of print].
30. Belhadjer Z, Meot M, Bajolle F, Khraïche D, Legendre A, Abakka S, et al. Acute heart failure in multisystem inflammatory syndrome in children (MIS-C) in the context of global SARS-CoV-2 pandemic. *Circulation* 2020 [Epub ahead of print].
31. Centers for Disease Control and Prevention Health Alert Network. Multisystem inflammatory syndrome in children (MIS-C) associated with coronavirus disease 2019 (COVID-19) (HAN00432). <https://emergency.cdc.gov/han/2020/han00432.asp>. Accessed June 29, 2020.
32. Isaacs D, Britton P, Howard-Jones A, Kesson A, Khatami A, Marais B, et al. To what extent do children transmit SARS-CoV-2 virus? *J Paediatr Child Health* 2020;56:978-9.
33. Heavey L, Casey G, Kelly C, Kelly D, McDarby G. No evidence of secondary transmission of COVID-19 from children attending school in Ireland. *Euro Surveill* 2020;25:2-5.
34. Gudbjartsson DF, Helgason A, Jonsson H, Magnusson OT, Melsted P, Norddahl GL, et al. Spread of SARS-CoV-2 in the Icelandic population. *N Engl J Med* 2020;382:2302-15.
35. NPR. After reopening schools, Israel orders them to shut if COVID-19 cases are discovered. www.npr.org/sections/coronavirus-live-updates/2020/06/03/868507524/israel-orders-schools-to-close-when-covid-19-cases-are-discovered. Accessed July 1, 2020.
36. OXNER R. More than 300 children in Texas day cares have caught COVID-19, and the numbers are rising. *The Texas Tribune*; 2020.
37. Esposito S, Principi N. School closure during the coronavirus disease 2019 (COVID-19) pandemic: an effective intervention at the global level? *JAMA Pediatr* 2020 [Epub ahead of print].
38. American Academy of Pediatrics. COVID-19 planning considerations: guidance for school re-entry. <https://services.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/clinical-guidance/covid-19-planning-considerations-return-to-in-person-education-in-schools/>. Accessed July 1, 2020.
39. Roberts L, Smith W, Jorm L, Patel M, Douglas RM, McGilchrist C. Effect of infection control measures on the frequency of upper respiratory infection in child care: a randomized, controlled trial. *Pediatrics* 2000;105:738-42.
40. Pandejpong D, Danchaivijitr S, Vanprapa N, Pandejpong T, Cook EF. Appropriate time-interval application of alcohol hand gel on reducing influenza-like illness among preschool children: a randomized, controlled trial. *Am J Infect Control* 2012;40:507-11.
41. Uhari M, Möttönen M. An open randomized controlled trial of infection prevention in child day-care centers. *Pediatr Infect Dis J* 1999;18:672-7.
42. Huskins WC. Transmission and control of infections in out-of-home child care. *Pediatr Infect Dis J* 2000;19(10 Suppl):S106-10.
43. Shope TR. Infectious diseases in early education and child care programs. *Pediatr Rev* 2014;35:182-93.
44. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19) information for pediatric healthcare providers. www.cdc.gov/coronavirus/2019-ncov/hcp/pediatric-hcp.html. Accessed July 1, 2020.
45. Zimmermann P, Curtis N. COVID-19 in children, pregnancy and neonates: a review of epidemiologic and clinical features. *Pediatr Infect Dis J* 2020;39:469-77.
46. Teran CG, Torrez-Llanos J, Teran-Miranda TE, Balderrama C, Shah NS, Villarreal P. Clinical accuracy of a non-contact infrared skin thermometer in paediatric practice. *Child Care Health Dev* 2012;38:471-6.
47. Perencevich EN, Diekema DJ, Edmond MB. Moving personal protective equipment into the community: face shields and containment of COVID-19. *JAMA* 2020 [Epub ahead of print].
48. Zomer TP, Erasmus V, van Beeck EF, Tjon ATA, Richardus JH, Voeten HA. Hand hygiene compliance and environmental determinants in child day care centers: an observational study. *Am J Infect Control* 2013;41:497-502.
49. Clark J, Henk JK, Crandall PG, Crandall MA, O'Bryan CA. An observational study of handwashing compliance in a child care facility. *Am J Infect Control* 2016;44:1469-74.
50. Centers for Disease Control and Prevention (CDC). Criteria for return to work for healthcare personnel with suspected or confirmed COVID-19 (interim guidance). www.cdc.gov/coronavirus/2019-ncov/hcp/return-to-work.html. Accessed June 27, 2020.
51. Isbell P, Kotch J, Savage E, Gunn E, Lu L, Weber D. Improvement of child care programs' policies, practices, and children's access to health care linked to child care health consultation. *NHSA Dialog* 2013;16:34-52.
52. Alkon A, Bernzweig J, To K, Wolff M, Mackie JF. Child care health consultation improves health and safety policies and practices. *Acad Pediatr* 2009;9:366-70.