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Effects of the Global Coronavirus Disease-2019 Pandemic on Early Childhood Development: Short- and Long-Term Risks and Mitigating Program and Policy Actions

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In just a matter of weeks, the coronavirus disease-2019 (COVID-19) pandemic has led to huge societal public health and economic challenges worldwide. The clinical effects of COVID-19 on young children are uncertain when compared with older age groups, with lower morbidity and mortality rates and no conclusive evidence supporting transmission during pregnancy; however, there is emerging evidence of increasing rates of child hyperinflammatory shock.¹⁻³ Research on the effects of prior pandemics and disasters clearly indicates that there will be both immediate and long-term adverse consequences for many children, with particular risks faced during early childhood, when brain architecture is still rapidly developing and highly sensitive to environmental adversity.⁴ Estimates predict an increase in maternal and child mortality in low- and middle-income countries as health services for non-COVID-related issues become scarce. For example, a conservative scenario of 15% decrease in coverage of life-saving essential health interventions for 6 months in low- and middle-income countries is associated with a 9.8% increase in mortality among children less than 5 years of age and an 8.3% increase in maternal mortality.⁵ Before the pandemic, 43% of all children less than 5 years of age in the world were estimated to be at risk of not achieving their developmental potential.⁶ Unless there is a commitment to support coordinated, multisectoral approaches in which low- and middle-income countries governments receive international support to scale up essential interventions, a much higher percentage of children are at risk of devastating physical, socioemotional, and cognitive consequences over the entire course of their lives. We review the evidence base on short- and long-term risks for children during early childhood development (ECD; defining this from prenatal to 8 years of age). We also present evidence-based mitigating program and policy actions that may decrease these risks.

Immediate Consequences for Young Children

Maternal and child mortality and morbidity are predicted to increase in the short run, not only directly from COVID-19-related illness, but also as critical resources are directed away

from primary care to respond to the pandemic. Early results from a nationally representative phone survey in the US show that more than one-third of parents of children less than 6 years of age reported delaying health care visits.⁷ Risks include HIV-positive pregnant women and those in the post-natal period interrupting their supply of antiretroviral medication, placing their infants at risk of vertical transmission of HIV. This circumstance has the potential to begin to reverse the enormous progress made by prevention of mother-to-child transmission programs, especially in parts of sub-Saharan Africa, where rates of maternal infection remain high. Interruptions to the vaccination schedule in early childhood could have short- and long-term ramifications for children's health. Furthermore, as has been experienced during the HIV epidemic, illness, hospitalization, separation, and loss of caregivers have immediate harmful effects on young children's health, nutrition, well-being, and learning. These effects can occur even in the absence of infection or symptoms among children.

Deteriorating economic circumstances will further exacerbate immediate health, nutrition, care, and education risks. It is estimated that the pandemic can lead this year to an additional 42 to 66 million children who live in extreme poverty, and that the economic shocks experienced by families because of the global economic downturn could reverse the last 2 to 3 years of progress in decreasing infant mortality.⁸ Families may lose wages and housing, and have to bear the costs of increased health care and associated food insecurity. Low-income households quickly deplete savings and sell assets to provide better food and treatment for ill household members. As in prior economic crises, widespread loss of

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COVID-19	Coronavirus disease-2019
ECD	Early childhood development

employment and increases in poverty drive further migration, displacement, and family separations, which severely affects early childhood nutrition, care, and development.⁹

These factors are compounded by the stress experienced by caregivers, undermining their ability to provide consistent nurturing care.^{10,11} Parents can be the buffer between, and/or the mechanism through which, crises in the environment affect young children's experiences thereof. Parenting and family factors are the critical drivers of children's early healthy growth and development and are thus primary in determining the immediate severity of pandemic impacts on young children now and in the future. In crisis situations, primary caregivers and parents struggle to keep up with providing health, nutrition, safety, and care of children. For those households already living in conditions of adversity and stress, this crisis may have particularly harmful effects. And with many childcare and early education facilities closed worldwide, and interactions with extended families disrupted, children are deprived of both social and cognitive stimulation beyond their homes, in addition to the meals and other resources provided by many ECD programs. Early evidence shows increases in parents reporting mental health difficulties as well as increases in child behavior problems since the onset of the pandemic.⁷ The challenges may be amplified for parents and family members caring for children with disabilities or who are living with disabilities themselves.

Maternal mental health plays an important role during pregnancy also. Research has demonstrated exposure to prenatal depression affecting DNA methylation in a gene related to the stress response in the child.¹² Prenatal maternal stress more generally can lead to adverse pregnancy outcomes, such as preterm birth and increased perinatal complications.¹³ The importance of supporting parents during pregnancy and after birth cannot be emphasized enough.

Crowded housing and lack of access to water, sanitation, and hygiene facilities in concentrated urban poverty areas, refugee camps, and informal settlements makes preventive behaviors like physical distancing, handwashing, or within-household isolation of particular members difficult. In addition, early reports show that confinement and/or crowded conditions are associated with large increases in domestic violence related to COVID-19-related movement restrictions.^{14,15} Intimate partner violence during pregnancy, in turn, seems to affect DNA methylation in a gene centrally involved in the stress response system of the child.¹⁶ Restrictions on movement also can increase sexual exploitation. The Ebola crisis had a significant impact on girls, with increases in teen pregnancy, sexual violence, and disproportionate school dropout and marginalization.¹⁷ In Sierra Leone, there was an 11% increase in the chance of pregnancy for girls 12-17 years of age as a result of the Ebola crisis.¹⁸ Adolescent pregnancies, especially in context of poverty, uncertainty, and disruptions of the social fabric, carry their own risks to the development of both the mother and the child.¹⁹

Even before conception, the physical and mental health of mothers and fathers can affect children's postnatal develop-

ment. For example, stress symptoms in future fathers before conception can affect postnatal stress reactivity.²⁰ Supporting the well-being and health of adolescents and young adults in the pandemic may, therefore, bring about benefits for both current and future generations.²¹

Long-Term Risks

Long-term follow-up studies of individuals conceived and in utero during pandemics, natural disasters and famines (eg, the Dutch hunger winter, the 1918/1919 flu pandemic, the North American ice storm of 1998, and the Chilean earthquake of 2010) show the potential for life-long negative consequences of such shocks.²²⁻²⁴ Studies have demonstrated lower educational attainment and lifelong earnings and increased likelihood of obesity, noncommunicable diseases, and mental health problems (eg, depression, schizophrenia), depending on the timing of in utero exposure.²⁵ These long-term effects may have short-term precursors. For example, changes in DNA methylation owing to in utero exposure to the Canadian ice storm mediated the association between maternal prenatal stress and child immune and metabolic function at the age of 13 years.²⁶

The long-term effects of this pandemic for children are likely to be compounded by an enduring economic downturn well beyond the months of quarantine or restricted movement. International Monetary Fund projections predict a global economic recession to extend beyond 2021, even if the pandemic is contained.²⁷ Employment may take years to be recuperated in some sectors, and loss of productive assets and business loss may be unrecoverable. The duration of childhood poverty may therefore span all of the early childhood years or beyond. Studies of economic crises as well as birth cohort studies in high as well as low- and middle-income countries demonstrate the potential for life-long negative effects of exposure to poverty early in life, with more severe effects associated with longer exposure to poverty.^{10,28-32} In some countries such as the US, there is a racial component to the family's ability to deal with the stress of severe economic losses. In addition to a higher rate of poverty (child poverty rates in African American families are 32% vs 11% in white families), African American families have one-tenth the family net worth of white families, even at similar educational levels.^{33,34} Thus, there is much less financial flexibility or cushion to protect these families and their children during economic crises such as the current one.

Socioeconomic inequalities at a global level are thus exacerbating the situation for millions of families. Furthermore, seasonal climate-related patterns (eg, monsoons) and other infectious diseases (eg, dengue, malaria, diarrhea) may deal further blows to those living in vulnerable geographic areas. These enduring and accentuated economic inequalities yield the potential for heightened societal discrimination, violence, and involuntary displacement.

Mitigating Actions to Support Early Childhood and Later Development

Evidence of the effectiveness of programs for families with young children—particularly those that assist caregivers, parents, and other household members—supports policies that can mitigate the severe short- and long-term impacts on young children of the COVID-19 pandemic.

First, healthcare and economic relief are critical and must occur together. Emergency food provision should be accompanied by sustainable economic support (eg, through child benefits, increased cash transfers), because transfer-based social protection can benefit multiple domains of children's health and development.³⁵ These efforts must be accompanied by support for caregivers' well-being, mental health, and capacity to provide nurturing care for young children as a family support package, so that young children can thrive, not just survive.³⁶ Screening for needs assessment (eg, basic needs and symptom checklists being implemented concurrently at mass scale) could integrate items measuring caregivers' anxiety, stress, and depression as well as both basic and psychosocial needs of their young children.³⁷ Under the current conditions of less accessible childcare and healthcare, cash transfer programs, such as child benefits, should take into account the heightened costs of raising young children, as the Canadian child benefit program does.³⁸ Evidence suggests that stimulation and nutritional support are particularly important in early childhood, and within early childhood, more important during the perinatal period and infancy when the brain is particularly plastic.³⁹ Successful national efforts to integrate cash transfers/child benefits, nutrition (including support for breastfeeding), and health interventions with support for parenting and early learning are models to be considered closely.^{36,40,41} These support policies are in alignment with the new United Nations framework on the delivery of interventions across health and social protection as a package, for countries and the international development sector to respond to COVID-19 with a focus on protecting children.⁴²

Second, delivery platforms that are at a scale to reach families with young children—depending on country context, health, nutrition, or social protection, for example—must adapt to the current pandemic. The kinds of task shifting, retraining, and targeting of additional resources that have been effective in the response to HIV, malaria, and tuberculosis may have lessons for the unique combination of health, nutrition, economic, and care consequences of COVID-19. Many low- and middle-income countries face an ongoing HIV epidemic, as well as tuberculosis, multidrug-resistant tuberculosis, malaria, and child undernutrition. Trained paraprofessional community health and support workers, supervised within the health system in collaboration with faith organizations and civil society, are effective at reaching large numbers of people in their homes and in groups to deliver information, essential health products, support services, and referrals.⁴³⁻⁴⁵

A delivery platform that is uniquely important in a crisis that forces restricted movement is mass media. Even in a rich country like the US, there are estimated to be more than 3 million children who do not have Internet connections at home or where the service is not adequate to participate in online learning fora.⁴⁶ Radio, television, digital, and app-based learning programs for young children, radio, and other mass media interventions for parents and caregivers, and psychosocial support through community organizations are being made available in the crisis.⁴⁷ Some countries have initiated daily national programming to support parents and caregivers for the early childhood age group through broadcast on national television and radio as well as online (eg, Peru's *Aprendo en Casa* program of the Ministry of Education, launched in April 2020, which aims to cover all areas of the country, including those without Internet or television access).⁴⁸ *Triple P Online*, the on-line version of a parenting program for parents of children with increased behavior problems, uses social media and gamification of parenting content to improve parents' behavior management.⁴⁹ A text-based parenting intervention that tailored activity messages to a 5-year-olds' level of development, as assessed through classroom formative assessment, increased both stimulating activities and child learning.⁵⁰ China's national online learning platform in response to COVID-19 similarly includes classes for primary school children broadcast on national television.⁵¹ And to address the need for psychosocial support, telecounseling in China seemed to be successful in responding to the COVID-19-related depression, anxiety, and stress reported by healthcare workers and the public.⁵² Many media-based programs have been evaluated in the context of improving health, including HIV health, and addressing poverty and gender-based violence.⁵³⁻⁵⁵ A systematic review showed promising effects on parenting of technology-based programs in low- and middle-income countries that focused on children's social-emotional behavior.⁵⁶

In contrast with these promising models in media-based intervention, there are serious public health challenges associated with the ongoing COVID-19 "infodemic" of misinformation.⁵⁷ An increase in the use of online platforms has increased children's risk to online threats, such as exposure to inappropriate content and exploitation.⁸ There are, therefore, legitimate concerns about moving services, in particular educational services for children, to online platforms without proper monitoring. In the longer run, children at risk academically could be further disadvantaged if they do not have parents who can support their learning process at home. Therefore, media-based learning platforms should be accompanied by outreach to caregivers and parents.

Third, the unique challenges of COVID-19 require further integration of family support with the realities of distancing, quarantine, isolation, and, in too many cases, loss. COVID-19-related awareness can accompany ECD awareness and supports for parental well-being and responsive caregiving. When distancing within households is indicated, separation

of children from caregivers should only occur when absolutely necessary; when it does occur, communication between children and caregivers should be maintained as much as possible.

For those households that experience loss of or serious illness in a caregiver, the approach to communicating this to children should build on evidence-based principles.⁵⁸ Caregivers might avoid talking about difficult issues such as illness and death, especially when they are distressed themselves. However, research shows that even children as young as 2 years are aware of changes around them, get upset when a caregiver leaves, and seek their return; toddlers also notice and react to distress expressed around them. Children's understanding of illness and death evolves throughout childhood.⁵⁹ Thus, children need coherent explanations that are clear, simple, and concrete, taking into account their age and level of understanding, and accompanied by support and reassurance that they will not have to manage alone (for support on how to communicate about COVID-19 see www.psych.ox.ac.uk/research/covid_comms_support). Sensitive and effective communication has considerable benefits for children and their family's long-term psychological well-being.

Attention to the most vulnerable populations requires unprecedented coordination of these services, owing to these groups' even more challenging contexts. These include refugees, migrants, and undocumented or stateless immigrants in camps, informal settlements, and host communities. These households are at particular risk of exclusion from health-care, early childhood programming, and employment opportunities.⁶⁰ Even in high-income countries like the US, marginalized groups such as families with undocumented immigrants may face significant nutritional, health, and educational risks exacerbated by the COVID-19 pandemic.⁶¹ Community-based programs with demonstrated success in isolated communities, such as community leadership mobilization for diffusion of health and ECD messages, network-based communication strategies, and integration of culturally specific modalities of communication, may be helpful for remote and/or isolated community contexts of the most vulnerable.^{62,63}

Finally, this is an opportune time to foster social cohesion within communities and nations affected by violence and conflict. The United Nations Secretary-General António Guterres has appealed for a global ceasefire of conflicts in the wake of the COVID-19 pandemic. At least 70 member states, civil society networks, and organizations as well as religious leaders have endorsed his appeal. Here, we highlight the efforts of the Early Childhood Development Action Network (ecdan.org); announced by World Bank and UNICEF, endorsed by the G20, and with thousands of members and the Early Childhood Peace Consortium (ecdpeace.org), which aims to build a more peaceful and sustainable world by investing in ECD programs and empowering youth to become agents of change across generations.^{64,65} We especially recommend that funding agencies such as the World Bank further strengthen support to nations to invest in

ECD programs as a pathway to peace and sustainability. We are confident that this will strengthen nations' ability to facilitate economic and social recovery.

In sum, the COVID-19 pandemic has the potential to profoundly affect young children's development worldwide, through increases in poverty and food insecurity, loss of caregivers, heightened stress, and decreased health care. These realities can affect not only the entire life course of the child, but also future generations through physiologic, psychological, and epigenetic changes occurring in utero and during early development that can decelerate the gains made since the turn of the century.²¹ The outlined mitigating actions are urgently warranted by governments, nongovernmental organizations, civil society and communities to reduce the potential devastating impact on current and future generations. Our hope is that these coordinated actions and shared responsibility to address them may not only build recovery, but better, more resilient and equitable societies to address current and future global crises. ■

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