Children: The Hidden Pandemic 2021

A joint report of COVID-19 associated orphanhood and a strategy for action

CDC

USAID
FROM THE AMERICAN PEOPLE

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

World Health Organization

UNIVERSITY OF OXFORD

UCL

Imperial College London

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

CS-333514-A

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

"Children: The Hidden Pandemic 2021 – A joint report of COVID-19-associated orphanhood and a strategy for action" reflects the contributions of technical experts from all core agencies contributing as co-authors to the linked report in the Lancet, "Global minimum estimates of children affected by COVID-19-associated orphanhood and deaths of caregivers: a modeling study." (Published Online July 20, 2021. Available at https://doi.org/10.1016/S0140-6736(21)01253-8), prepared by the **Global Reference Group on Children Affected by COVID-19: Joint Estimates and Action.** This group includes:

Expert Reference Group for Estimates: Seth Flaxman (Imperial College London/Oxford University), Juliette Unwin (Imperial College London), Christl Donnelly (Oxford University/Imperial College London), Oliver Ratmann (Imperial College London), Samir Bhatt (University of Copenhagen, Imperial College London), Chris Desmond (University of Kwa-Zulu Natal)

Expert Reference Group for Evidence-Based Action: Susan Hillis (U.S. Centers for Disease Control and Prevention (CDC)), Lucie Cluver (University of Oxford/University of Cape Town), Alexander Butchart (World Health Organization), Gretchen Bachman (U.S. Agency for International Development (USAID)), Andrés Villaveces (U.S. Centers for Disease Control and Prevention (CDC)), Lorraine Sherr (University College London), Charles Nelson III (Harvard University Medical School), Laura Rawlings (World Bank), Philip Goldman (Maestral International), Phil Green (World Without Orphans).

Report Co-authors: Susan Hillis (U.S. Centers for Disease Control and Prevention (CDC)), Juliette Unwin (Imperial College London), Lucie Cluver (Oxford University/University of Cape Town), Lorraine Sherr (University College London), Philip Goldman (Maestral International), Laura Rawlings (World Bank), Gretchen Bachman (U.S. Agency for International Development (USAID)), Andrés Villaveces (U.S. Centers for Disease Control and Prevention (CDC)), Charles Nelson (Harvard University), Phil

Green (World Without Orphans), and Seth Flaxman (Imperial College London/Oxford University) wrote the document. In addition:

- Imperial College London modelers who provided further contributions to the analytics include Christl Donnelly, Oliver Ratmann, Yu Chen, Samir Bhatt
- CDC provided further inputs from Lauren Rossen
- UNICEF provided inputs from Cornelius Williams and Jérôme Pfaffmann
- John Williamson wrote the section "Every child Needs a Family"
- WHO inputs were provided by Alexander Butchart and Boris Pavlin

Funding sources contributing support for modeling and investigation include UK Research and Innovation (UKRI) Global Challenges Research Fund Accelerate Hub; UKRI Medical Research Council; UKRI Engineering and Physical Sciences Research Council; UK National Institute for Health Research Health Protection Research Unit in Emerging and Zoonotic Infections, with Public Health England; Imperial College London COVID-19 Research Fund; and U.S. National Institutes of Health.

DISCLAIMERS

World Bank Group and World Health Organization: This work is a product of authors working across various institutions. The findings, interpretations, and conclusions expressed in this work are entirely those of the authors. They do not necessarily reflect the views of the authors' employers, their boards, or the governments they represent.

U.S. Government: The views, findings, and conclusions in this article are those of the authors and do not necessarily represent the views or official position of the U. S. Centers for Disease Control and Prevention (CDC), USAID, PEPFAR, or the U. S. Government.

PREFACE

No country is unaffected by the ravages of the COVID-19 pandemic. The data on death and illness have clearly focused attention on the tragic and disproportionate burden among older adults – yet this has served to divert attention and understanding away from the needs of the world's children. History conveys clear lessons of how short-sighted it is to ignore children and their needs in a pandemic[1]. The ramifications are lifelong and inter-generational. As early as 2002 the HIV/AIDS epidemic provided a stark example: when parental death was examined, much of it was found to be clustered in the world's poorest social environments[2]. For children, the death of a parent, the loss of their caregiver and abrupt changes to their lives have a devastating and long-term impact on their economic, physical, and emotional welfare. The "Children on the Brink 2002"[3] report, addressing the consequences of the HIV/AIDS pandemic, foresaw that an unprecedented crisis was underway and projected that international assistance would be needed for "at least two decades". That report informed a global strategy that addressed the needs of HIV/AIDS-affected "orphaned and vulnerable children" and provided many lessons in response, prevention, and care[2]. This year – 2021 – marks two decades of progressive reductions in HIV/AIDS prevalence, yet as a lasting legacy, there remain close to 14 million children who have lost one or both parents to AIDS.

Today, the world is faced with another new and devastating pandemic that has left vast numbers of bereaved children in its wake, at an unprecedented speed. The COVID-19 pandemic had, by the end of April 2021, left over 1.5 million children experiencing the death of a parent or a grandparent caregiver who lived in their homes and helped care for them. Without immediate action, the COVID-19 pandemic is destined to leave millions more children orphaned. This is a critical moment to understand how COVID-19 will affect the lives of children, how lessons learned from prior emergencies can be adapted, and how an understanding of complex adversities can maximize the effectiveness of our response.

"THE ONE WHO LEADS WITH HOPE WILL LEAD."

Dr. Peter Okaalet, Kenyan statesman, physician, and theologian

With the benefit of a hindsight lens and a pressing need, it is time to take stock and to act decisively for children. The emerging lessons are clear: Think broadly and respond promptly. COVID-19 progresses quickly and there can be little time to provide support and preparation to a child facing the loss of a parent or other caregiver. Bereavement can often be followed by increased impoverishment. Many children are made vulnerable by caregiving disruptions. Infectious diseases cluster in families – true of HIV/AIDS, Ebola, and now COVID-19. Although many children have strong resilience, multiple shocks can wear away their ability to bounce back. Multiple loss is a reality. The importance of family is key[4].

Despite the comprehensive literature on the harms[5] and negative outcomes associated with residential care such as orphanages and children's institutions[6], such provision mushroomed rather than diminished in some countries affected by HIV/AIDS. The challenges of dismantling such provision, reintegrating children into their origin communities, and resourcing alternative care are enormous. Most children losing a parent or other caregiver to COVID-19 have a living relative who can care for them[3]. The clear benefits of safe and loving family care are well established. Balancing resources to families who shoulder the burden of childcare has been slow in coming, exacerbating the hardships and skewing the understanding of what is best for children. Orphanhood creates a whirlpool of effects – all with long term ramifications. Child displacement, sibling separation, reconstituted families, social relationships, child marriage, street status, domestic violence risks, school enrollment, nutritional status, and alternative care strategies are all affected.

Ramjan (12), is playing with his friends on the premises of Gogtoli Protection Service Hub. Ramjan came to Dhaka city alone during the COVID-19 lockdown form his village home. He was begging and sleeping on the streets and not receiving an education.

It is important to highlight the indispensable part that grandparents, guardians, and at times other extended family caregivers (such as aunts and uncles) play in the lives of many children. During the HIV/AIDS epidemic, they have stepped in as caregivers, after parental death. These very grandparents and guardians are now at the highest vulnerability for COVID-19. In countries where epidemics like HIV/AIDS or Ebola have caused the death of parents, the impact of COVID-19 may leave children orphaned of the grandparents or relatives who stepped in to care in their parents' place. In countries with high rates of HIV/AIDS or Ebola, COVID-19 will only compound the vulnerabilities of children and families. The HIV/AIDS pandemic taught us the importance of gender – both the gender of the parent lost and of the child thereby bereaved. HIV/AIDS also brought to light the many setbacks generated by stigma, societal reaction, and community competence. Focusing on family and community responses has been key in achieving good outcomes for children. COVID-19 may decimate the scant resources many communities have been relying on to address the risks and vulnerabilities they face.

Ester Levison, captured teaching her grandson (Isaac Simklaitsa ,3) how to wash hands using a hand-made tap (Chimponda giya) Trans-global Estate T/A Loyitele, Lilongwe, Malawi.

We can only fully understand the impact of this pandemic by counting the numbers of children experiencing the death of parents and other caregivers. Parents, guardians, and co-residing grandparents and other caregivers matter to the physical and mental health of children, to their socialization and participation in their communities, and to their protection. Their deaths can be devastating, but there are family and community-based options that can provide bereaved children with both immediate and enduring hope and resilience. This report draws on the best evidence available to show how a COVID-19 response can be strengthened to address the needs of these most vulnerable of children.

INTRODUCTION

In fourteen months of the COVID-19 pandemic, as of May 31, 2021, over 175 million people have been infected, with over 3.8 million deaths from the virus[7]. Many of those infected have gone on to experience the extended debilitating symptoms of long-COVID[8]. In every country, deaths from the virus have been accompanied by indirect mortality from impacts of reduced access to healthcare and other services and supports[9]. These deaths have been primarily among adults, although child and adolescent deaths are devastating and increasing in numbers.

Our immediate global and national responses to this pandemic have understandably been to focus on public health necessities: preventing infections, advancing treatment, reducing mortality, and developing and distributing vaccines. Yet this overlooks one of its most urgent and tragic consequences: the multitude of children bereaved through the abrupt death of a parent or grandparent who lived with and cared for them. By the end of May 2021, because of COVID-19, data from the Hillis et. al.[10] estimate that nearly 2 million children aged under 18 years have lost a mother, father, and/or grandparent caregiver who lived in their household. Children of countries in every world region have faced the sudden loss of parents and caregivers from COVID-19-associated deaths. The Economist Intelligence Unit forecasts that the best-case scenario for over 85 low- and middle-income countries is that it will be 2023 or later before these countries have widespread vaccine coverage, in the range of the 60-70% coverage needed to reach herd immunity[11]. The combination of variations in equitable access to vaccine, high levels of vaccine hesitancy, increasing circulation of variants of concern (whose increased transmissibility and potential for reinfection raise the herd immunity threshold), and potential waning immunity suggest that, given data as of April 2021, many of the countries with the highest rates of COVID-19-associated deaths may not reach herd immunity for more than 4 years[12 13]. With this scenario, a conservative estimate is that over 4 million more children may suffer the death of parents and caregivers, through COVID-19, in the next several years.

"CHILDREN OF TIMES OF HARDSHIP CAN ALSO ALLOW FOR CREATIVE OPPORTUNITY: TO BUILD STRONGER RELATIONSHIPS WITH OUR CHILDREN AND ADOLESCENTS."

Lucie Cluver
Oxford University

The impact of these parental and caregiver deaths differs across families, communities, and nations. Yet, there is one commonality: a child's life often falls apart when he or she loses a parent or grandparent caregiver. With the pandemic far from over, and vaccination of the global population a delayed prospect, COVID-19 is expected to continue bringing mass bereavement compressed into short timespans — particularly during times of surges — with severe consequences lasting at least through the age of 18 years for children affected[10]. Thus, the long-lasting impacts upon children and young people are expected for at least a decade[3 10].

Thus, our global and national responses to the pandemic must urgently attend to the exponentially rising numbers of children losing parents or other caregivers due to COVID-19. The necessity of this has been graphically demonstrated in previous major epidemics – HIV/AIDS, Ebola, and the 1918 Influenza pandemic – with important lessons. We know that children who lose a parent or other primary caregiver, but who are well supported and cared for, show resilience and recovery[14 15]. We know, too, that a slow response, or a response lacking an evidence base, too often results in serious negative consequences for children. For example, one response to the orphanhood crisis of the HIV/AIDS epidemic has been consigning orphaned children to institutional residential care, such as orphanages or children's homes. Thirty years of global research show sharply increased risks of developmental delays and of exposure to severe sexual, physical and emotional abuse in such institutional contexts[5 6 16].

Children: The Hidden Pandemic 2021 presents statistical data from 192 countries on children experiencing COVID-19-associated orphanhood and death of grandparent caregivers, a description of the trends in these data, a real-time COVID-19 Calculator for Death of Parents and Caregivers, and strategies and principles for integrating care for children bereaved by the virus into every nation's COVID-19 response planning. This report includes data from March 1, 2020 through April 30, 2021, and provides the most extensive estimates yet on the current and projected number of children experiencing orphanhood and death of caregivers. The report is a collaboration between the U.S. Centers for Disease Control and Prevention, Imperial College London, the World Health Organization, U.S. Agency for International Development (USAID), the World Bank, University of Oxford, Harvard University, University College London, and University of Cape Town.

The report demonstrates that protecting children from the dire, potentially irreversible threats of this health emergency demands both immediate and sustained action at all levels.

We identify the following critical points as foundational for developing well-coordinated and compassionate responses among families, communities, governments, donors, and others:

- COVID-19 has created an urgent global orphanhood and caregiver crisis, affecting children in almost every nation. This wide-scale tragedy strips children of the mothers, fathers, grandparents and others who care for them and will require radically scaled-up national, regional,

and community responses for at least two decades—especially in those nations where children's lives have been most impacted.

- **COVID-19 threatens children's current and future wellbeing.** The rapidity with which COVID-19 can cause serious illness and death, leaves little time to prepare children for the trauma of bereavement. Children experiencing the unanticipated death of a caregiver often suffer psychosocial distress, mental health problems, and material hardship, and they are at increased risk of physical, emotional and sexual violence[17]. Such consequences may be even more severe for children in reguee or other humanitarian settings. These adverse experiences in turn increase their life-long risks of suicide, diseases such as HIV/AIDS, adolescent pregnancy, cardiovascular diseases, cancer, and early death[18].

- **COVID-19 also increases the vulnerability of non-bereaved children.** The safety, well-being, and flourishing of children living in those countries hardest hit by COVID-19 are increasingly threatened when the virus and the measures to contain it affect their households and communities. Many millions of children are spending long durations out of school, often with inadequate supervision and without access to virtual education. With the pandemic leading many families into extreme poverty, such families may experience decreased access to food and consequent hunger.

Bekaa valley, Lebanon. A portrait of Hanane, in a Syrian refugee at the Delhamiyeh informal settlement.
© UNICEF/UNI373022/

- **Countries and communities with a high burden of COVID-19-associated orphanhood require immediate support.** Areas with high rates of COVID-19, as well as those with COVID-19 surges, especially those insufficiently vaccine-protected, will experience surges in numbers of children losing their caregivers. Communities and hot spots at the center of surges are often stretched beyond their own capacity to respond. Therefore, international-, national- and local-level emergency response planning and provision must anticipate and address the needs of children facing orphanhood and the adverse associated consequences.

- **Responses must be family-based.** Children need families, and families need support to care for children. Investments should direct resources to ensuring that each affected child has a supported, safe, and nurturing family – and does not end up in institutional residential care. This can be achieved through a "cash plus care" approach that combines income and parenting support for families caring for children who have experienced orphanhood, drawing on evidence and good practice.

On October 8, 2020 at Gurei Health Care Centre in Juba, South Sudan, Elisabeth Abraham Loro, nurse and vaccinator, collects vaccines from a solar-powered refrigerator.

- **Broadscale collaboration is essential.** The numeric figures for current and forecast COVID-19-associated orphanhood and caregiver bereavement presented here is the first unified collaborative effort to calculate minimum numbers of children affected. This work shows the potential of strengthened collaboration and sets the stage for supporting an urgent new agenda – expanding support for those children most affected by COVID-19.

- **Rapid and equitable vaccine access is critical to reducing further COVID-19-associated orphanhood.** Avoiding a dramatic rise in orphanhood over the years ahead requires governments working together to provide the most resource-poor countries and impoverished populations with access to COVID-19 vaccines.

KEY CONCEPTS

What is orphanhood? According to UNICEF, an orphan is a child (under the age of 18) who has lost one or both parents due to any cause of death. A key focus of this is on those children who lack care through COVID-19-associated mortality of a parent. To avoid labelling the children themselves, we use the term "orphanhood" to refer to the state of being orphaned.

Who is a custodial grandparent? A grandmother or grandfather who lives in the child's household and provides care for the child in the place of the parents, as the parents are absent from the household.

Who is a co-resident grandparent caregiver? A grandmother or grandfather who lives in the child's household and with the parents and provides care for the child. Beyond orphanhood, this report also focuses on children facing death of a co-resident grandparent caregiver.

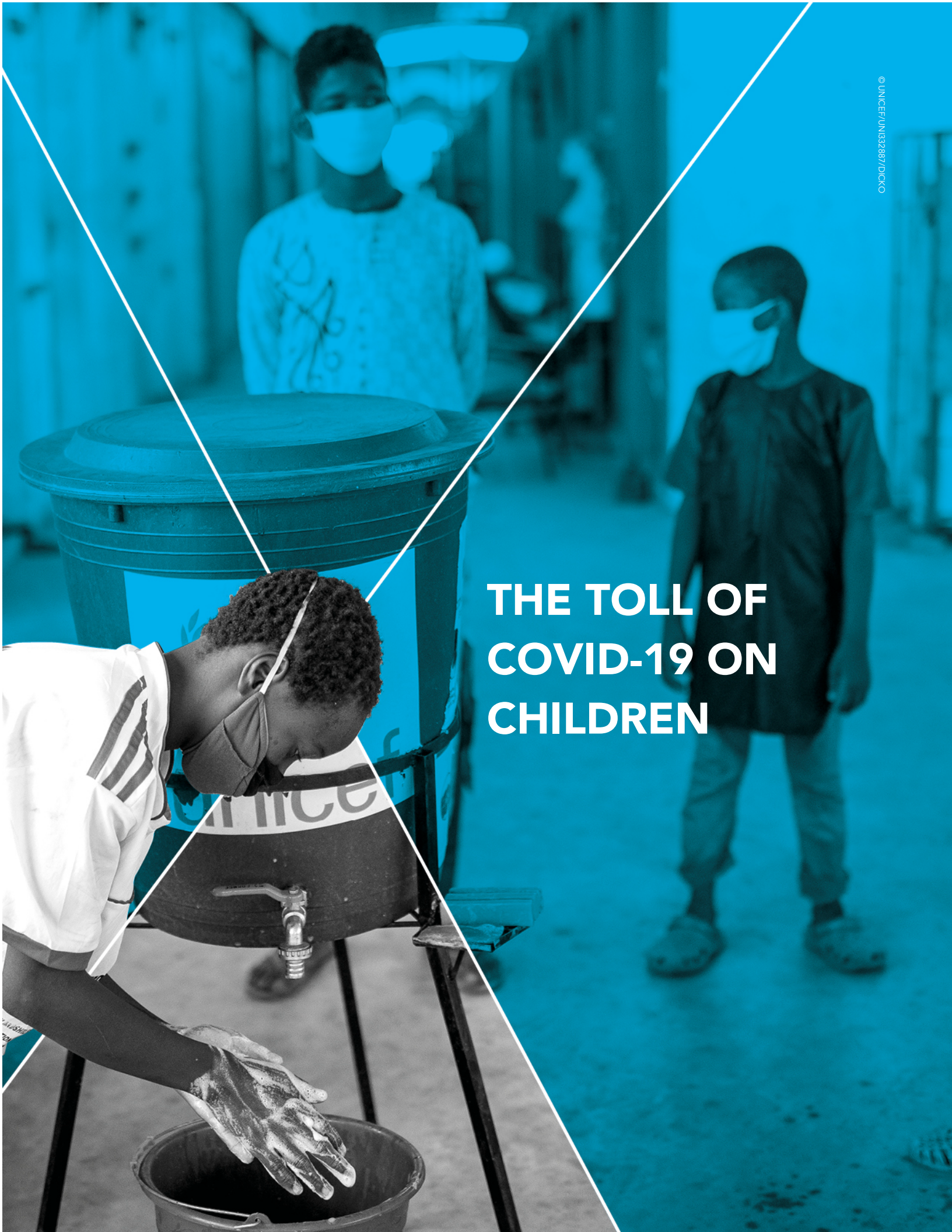
What is loss of a primary caregiver? Refers to all children experiencing death of one or both parents, or death of one or both custodial grandparents.

What is loss of a primary or secondary caregiver? Refers to all children experiencing death of one or both parents, death of one or both custodial grandparents, and/or death of other co-residing grandparents (who live with the grandchild and parents of that child).

What is residential care? A publicly or privately managed and staffed collective living arrangement for children that is not family-based, such as an orphanage, children's institution, or infant home. Evidence shows that these settings are harmful for children.

What is family strengthening? Providing evidence-based resources and responses to a family unit to support it in caring for its children.

Which children are vulnerable in the context of this report? Children whose parent(s) or caregiver(s) are experiencing acute COVID-19 or those who are orphaned or lose their co-resident family caregivers due to COVID-19-associated death. Children whose parents have Long COVID rendering them too ill to provide sufficient care. (Up to 75% of those who are hospitalized for COVID-19 continue experiencing symptoms 6 months later, including weakness, muscle fatigue, anxiety and depression, and severe respiratory problems[9]. Very significantly, vulnerable children include those suffering second-order impacts of the pandemic, including extreme poverty, food insecurity, and violence against children.



THE TOLL OF COVID-19 ON CHILDREN

Estimating the Toll

This report includes the most current and comprehensive data on the minimum number of children facing COVID-19-associated death of a parent or grandparent caregiver during the first 14 months of the pandemic (March 1, 2020 through April 30, 2021 as published in The Lancet)[10]. A description of our methods is found in Appendix II.

Our study set comprises 21 countries accounting for 77% of all COVID-19 deaths in 2020, Using the data from these countries, we derive a global extrapolation for the total number of children experiencing COVID-19-associated death of a parent or grandparent caregiver. For this report, we use "COVID-19-associated deaths" to mean the total number of excess deaths caused directly by COVID-19 and those caused indirectly by causes linked to COVID-19, such as lockdowns, restrictions on gatherings and movement, decreased access or acceptability of health care and of treatment for chronic diseases. Where excess deaths were not routinely reported for a country, we calculated them by subtracting the monthly deaths in 2020/2021 from the monthly average during the five years before the pandemic. Where monthly data for 2020/2021 were not available, we used COVID-19 deaths as reported by Johns Hopkins University[19].

To convey the scale of this caregiving crisis, and to maintain consistency with UNICEF's standard global definition, we define a child facing COVID-19-associated "orphanhood" as one under the age of 18 years who has experienced the death of one or both parents. Our use of the term "orphanhood" is both conscious and considered, encompassing our shared determination rapidly to advance urgently needed investments in support of family-based care, and to ensure every effort is made to avoid residential care, including orphanages and other institutionalization of children.

> "
>
> INTEGRITY IS DOING THE RIGHT THING EVEN WHEN NO ONE IS WATCHING.
>
> "
>
> CS Lewis. UK

Our inclusion of grandparents living with their grandchildren in multi-generational households is equally conscious and considered. This report describes data on death of parents and grandparent caregivers, as these groups are those which were the focus for the Lancet modelling publication from which our data come[10]. This arises from our shared determination to recognize those adult caregivers who are indispensable in caring for children. Unfortunately, detailed data about other types of important extended family caregivers such as aunts, uncles, or cousins, are not widely available in standard population data. We include two categories of grandparents aged 60-84 years: 1) custodial grandparents

lived with their grandchildren in the absence of the parents (e.g., after parental death from AIDS or other causes, or as legal guardians for parents unable to care for children due to substance abuse, incarceration, migration for work); 2). Other co-residing grandparents living with their grandchildren and the parents of these children.

The Magnitude of the Toll

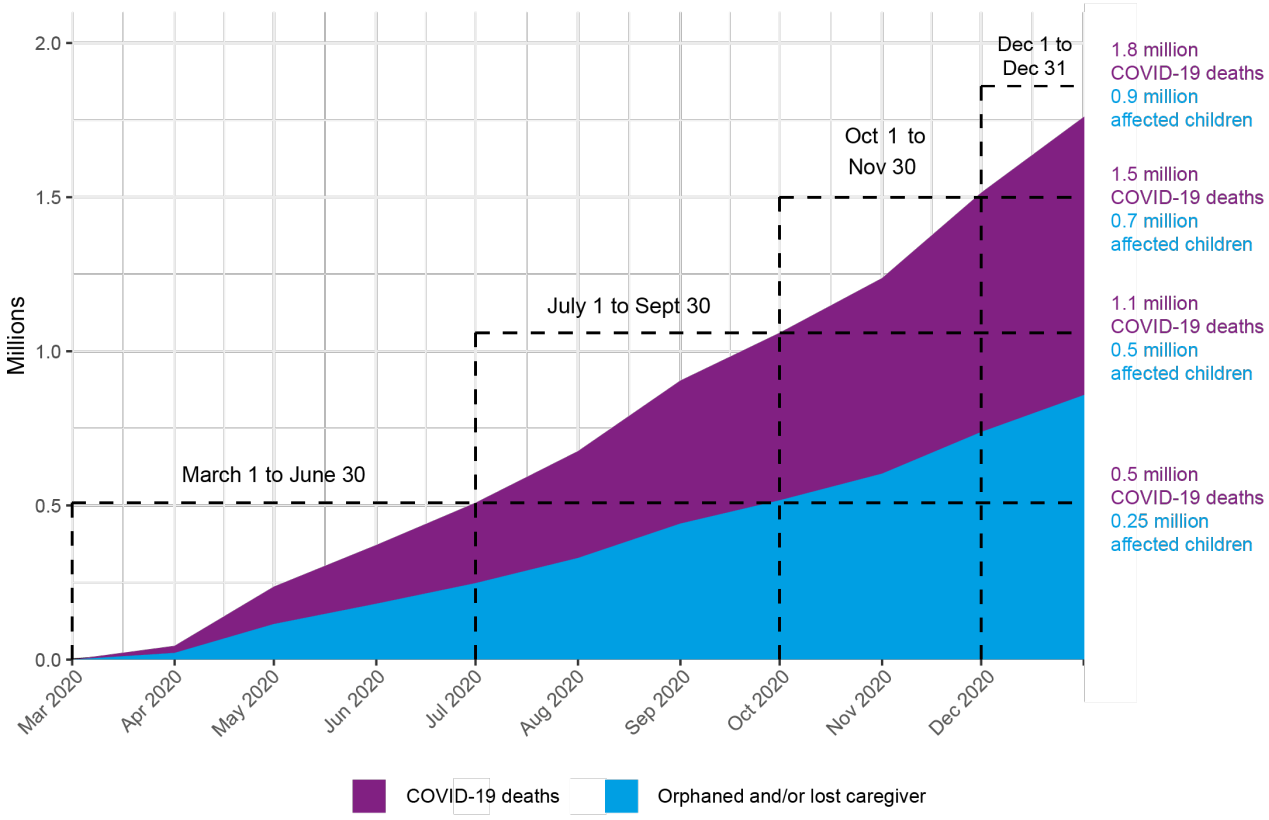
We describe global, regional, and national results, as well as scenario estimates for COVID-19-asscociated deaths, orphanhood, and death of grandparent caregivers in this section that follows. Specifically, we report select salient findings for one or more of these three categories of children:

- Children facing death(s) of one or both parents.
- Children facing death of their primary caregivers (a parent and/or custodial grandparent).
- Children facing death of their primary or secondary caregivers (a parent, custodial grandparent, and/or co-residing grandparent.

1. The Global Toll: Rapid global escalation in the number of COVID-19 deaths was accompanied by a rapid global escalation in the number of children experiencing death of parents and grandparent caregivers.

The World Health Organization declared COVID-19 a global pandemic in March 2020. During the next 10 months, from March 2020 through December 2020, a total of 1.8 million COVID-19 deaths occurred, affecting almost every country in the world. We all witnessed in terror the acceleration trajectory in the death rate: It took 120 days for 500,000 deaths to occur, then 90 days for this number to double to 1 million, followed by just 60 days to mount to 1.5 million, then only 45 days to reach 1.8 million (Figure 1). Unseen in the shadow of that death curve, hidden behind the closed curtains of bereaved households, were the hundreds of thousands of children who had lost a parent or other caregiver: by the end of 2020, 900,000 children had experienced the death of a parent or grandparent caregiver.

FIGURE 1: Trends in COVID-19 deaths and children affected by orphanhood and death of caregivers, March 1 – Dec 31, 2020 [10 20].

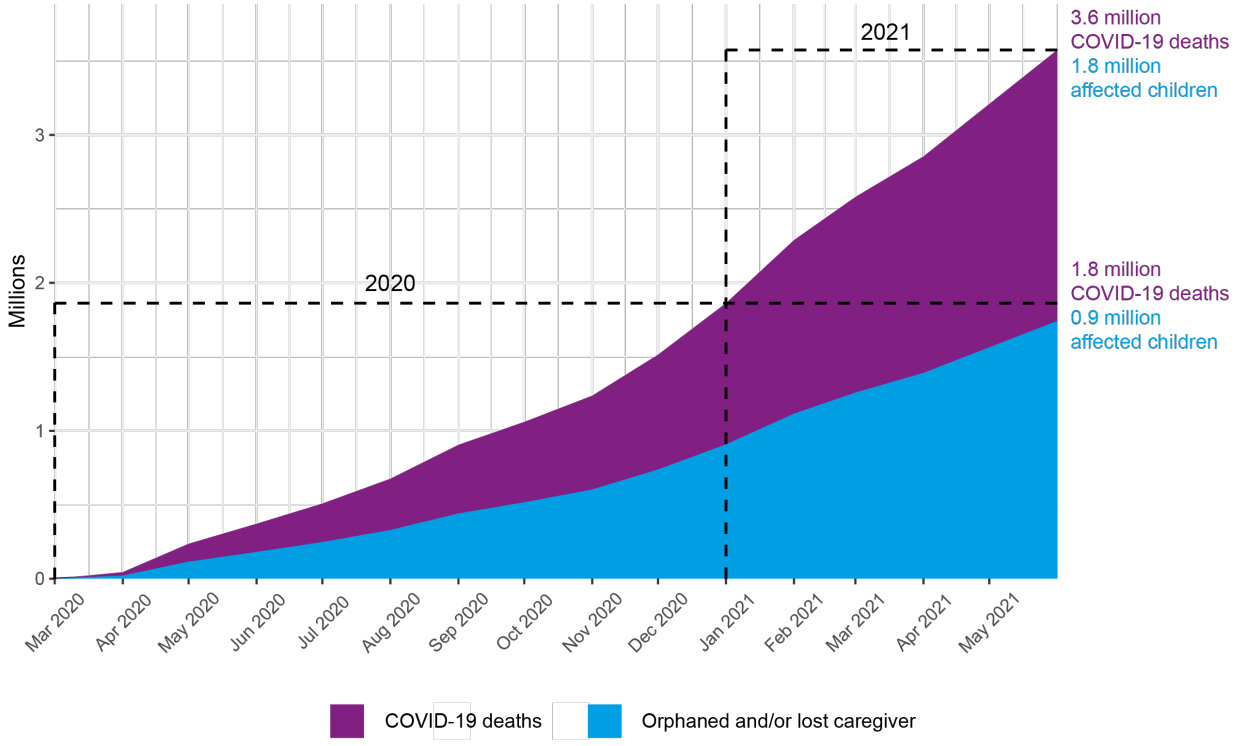


1.8M
COVID-19 Deaths

900,000 (0.9M)
Children orphaned and/or lost caregivers

With the January 2021 dawning of a new year, announcements of the licensing of effective vaccines raised hopes for a post-pandemic world returning to a pre-pandemic life. For most countries, however, COVID-19 deaths continued to accelerate, at such a rate that it took only five months – from January through May 2021 – for the next 1.8 million COVID-19 deaths to occur. This is a doubling of the deaths which had accumulated through the pandemic's initial ten months to end of 2020 (Figure 2). Also doubling during those first five months of 2021 was the number of children bereaved of a parent or grandparent caregiver. By the end of May 2021, COVID-19 had caused a total of 3.6 million deaths, which resulted in at least 1.8 million children facing orphanhood or death of a caregiver.

***FIGURE 2**: COVID-19 deaths and children affected by orphanhood and death of caregivers: Comparison of trends between March 1 – Dec 30, 2020, and Jan 1 – May 31, 2021* [10 20].



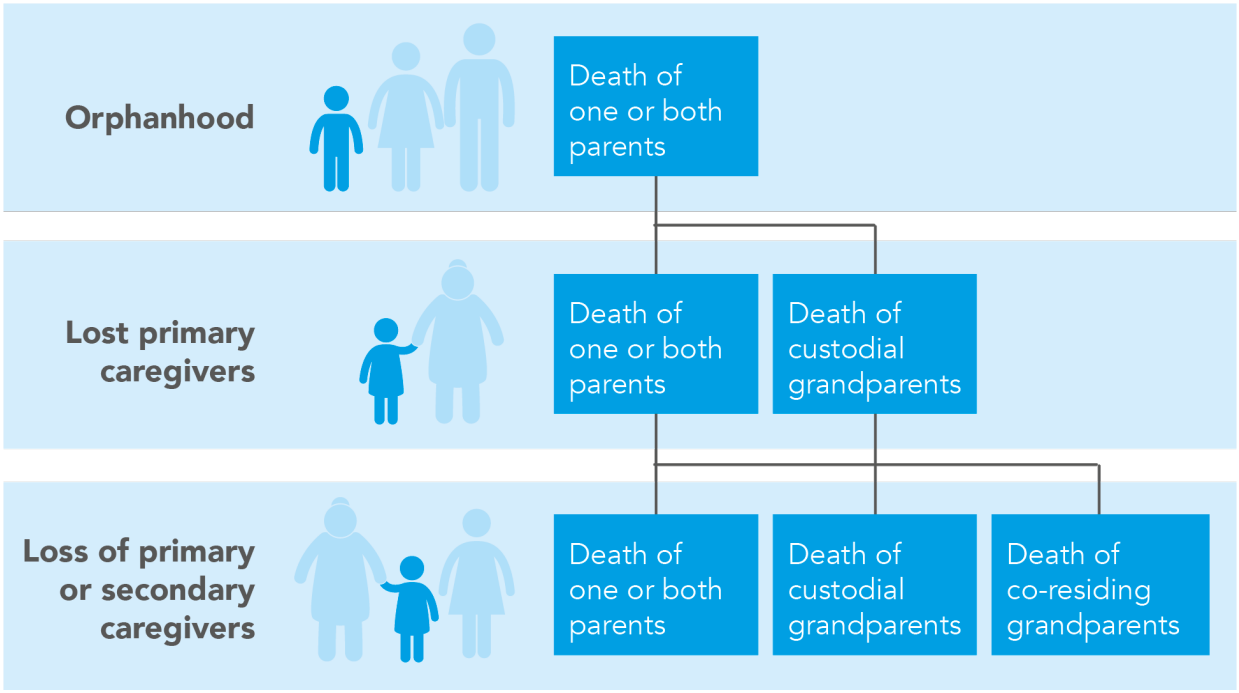
3.6M
COVID-19 Deaths
Mar 2020 - May 2021

1.8M
Children orphaned or lost grandparents /caregivers
Mar-Dec 2020
Doubles to equal an additional 1.8M
between Jan-May 2021

Sali died giving birth to triplets. Saki is now together with her three sisters taking care of the 10-day-old babies.

2. The Regional Toll: The number of children experiencing death of a parent or other caregiver is higher in the Americas than in all other regions combined.

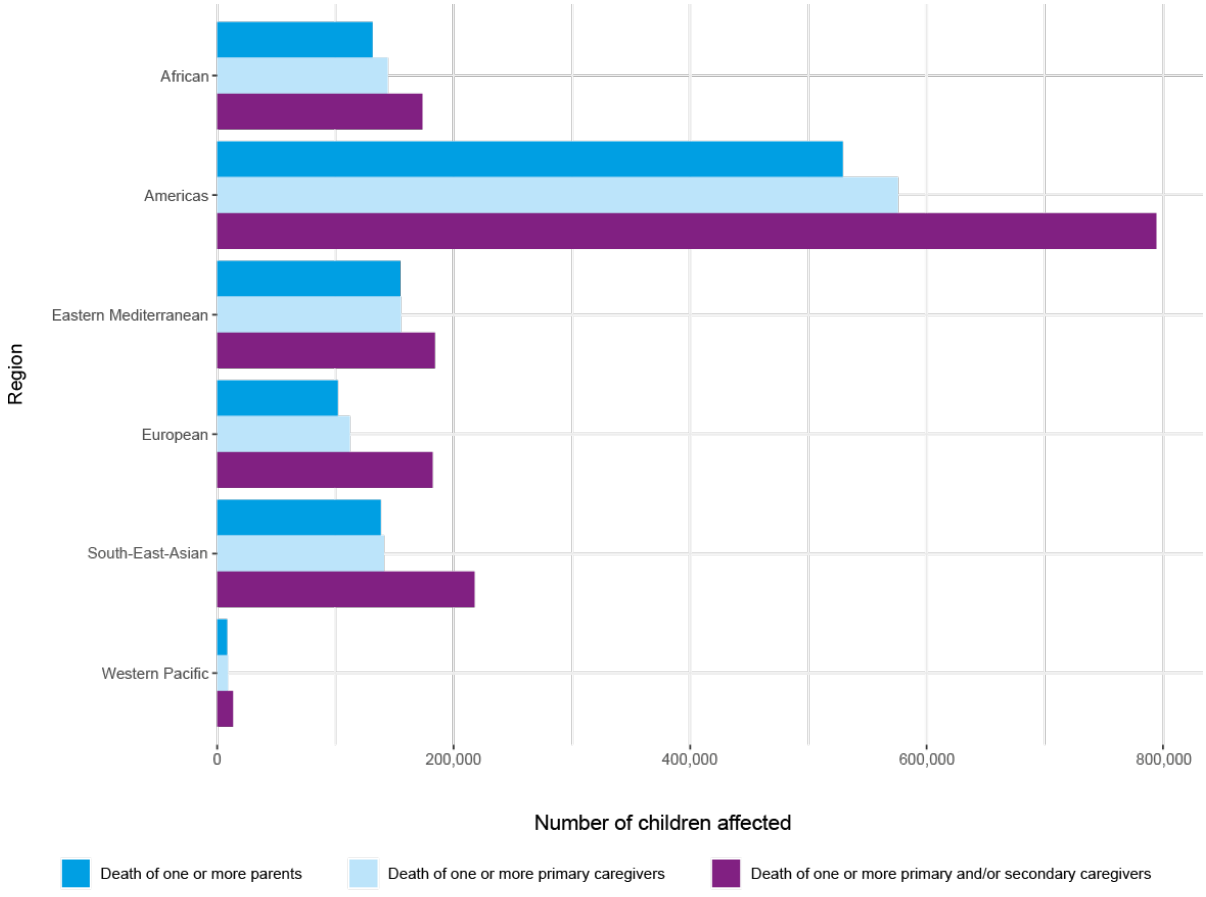
We found marked regional differences in the number of children experiencing COVID-19-associated orphanhood, death of primary caregivers (parents or custodial grandparents), and death of primary and secondary caregivers (parents, custodial grandparents, or other grandparent caregivers) (See Figure 3 and Table 1).



The largest number of children experiencing these adverse and enduring second-order impacts of COVID-19 was in the Americas, which had more children experiencing death of caregivers than all other regions combined. After the Americas, the next highest burden of caregiver loss was in the Eastern Mediterranean, then South-East Asian, and finally, the African region. Within the Americas, the number of children experiencing the death of a mother or father was 2.4 times higher than the total number of children losing any caregiver — parent, custodial grandparent, or co-residing grandparent — in any other region. Our estimates show substantial numbers of children experienced death of a grandparent caregiver in most regions (Figure 3 next page, included in light purple bar).

A grandmother caring for children after their mother died of COVID-19, through exposure at the hospital where she worked, Zambia.
Forgotten Voices Zambia

FIGURE 3: Regional minimum estimates of numbers of children who suffered orphanhood (death of one or more parents), primary caregiver loss (death of parent or custodial grandparent), or primary and/or secondary caregiver loss (death of parent, custodial grandparent, or other co-residing grandparent caregiver).



We report in Table 1 (below), the total absolute numbers as displayed in the previous Figure 3, to assist regional multilateral, bilateral, organizational, and network offices in advancing and informing investments that support children experiencing COVID-19-associated orphanhood or death of caregivers.

TABLE 1: Regional minimum estimates children's of loss of caregivers, March 1, 2020 through April 30, 2021

Region	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Africa	131,300	144,000	173,600
Americas	529,100	575,800	794,400
Eastern Mediterranean	154,900	155,500	184,100
Europe	102,100	112,100	182,200
South-East Asia	138,300	141,200	217,700
Western Pacific	8,300	9,020	13,330

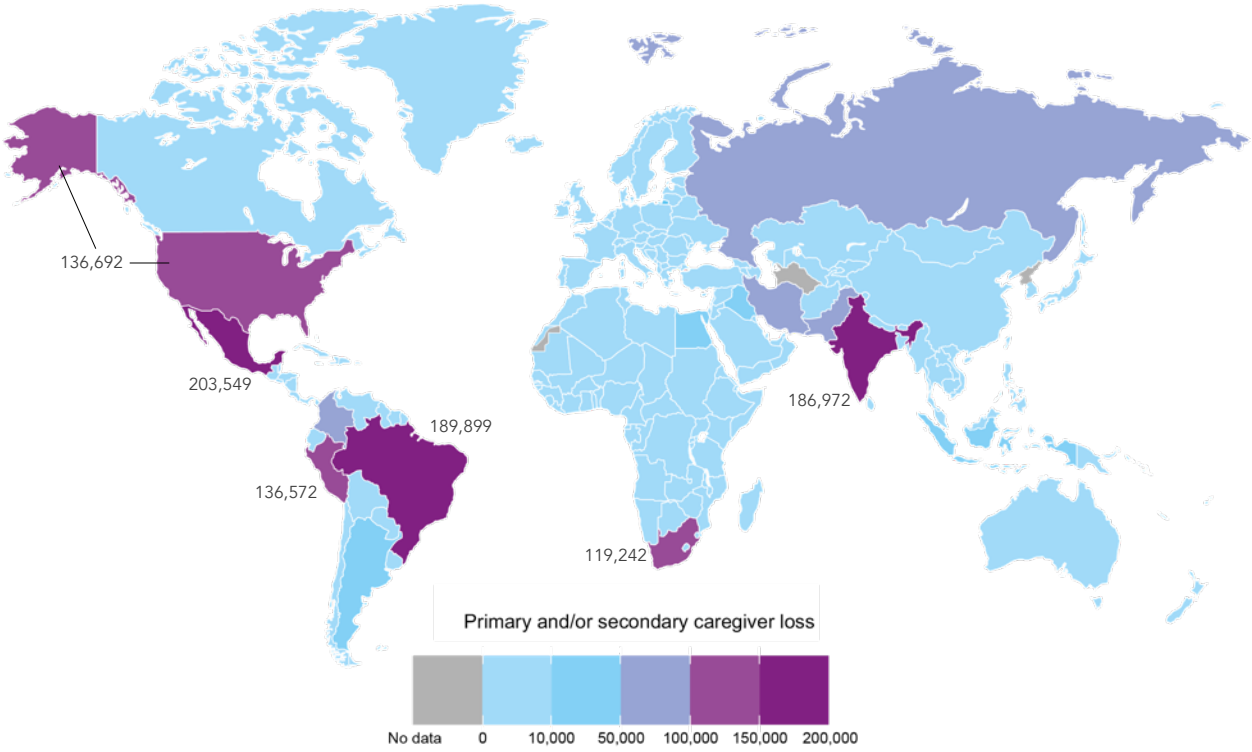
3. The National Toll: Countries having the highest numbers of children facing loss of caregivers due to COVID-19 are distributed widely across global regions.

We observed marked differences between countries in COVID-19-associated orphanhood or death of caregivers. We report in Appendix I estimates for the numbers of children experiencing such loss from March 1,2020 through April 30, 2021, for every country in the world that reported deaths due to COVID-19. We observed the largest burden of orphanhood and death of grandparent caregivers in India, Mexico, and Brazil, each with approximately 200,000 children affected by death of their caregivers (Figure 4 below). Countries with more than 100,000 children experiencing the death of a caregiver included Peru, South Africa, and the United States, and those with more than 50,000 children facing death of a caregiver included Islamic Republic of Iran, Russian Federation, and Colombia.

A widow in Zambia whose husband passed from COVID-19 on July 15, 2021. She is left behind with 3 children and 4 grandchildren. She is currently in self quarantine at home and not feeling well.

A grandmother left to care for her grandchildren after their father migrated for work at the beginning of the pandemic and never returned, Cartagena, Colombia.

FIGURE 4: Country-specific minimum primary and/or secondary caregiver loss estimates. No death data are provided by Johns Hopkins for the countries in grey.



Every Child Needs a Family

The idea that every child needs a family may seem like a nice but unrealistic aim to achieve, particularly as the pandemic takes an ever-increasing number of parents and other caregivers, but it's not. It is a socio-biological reality, as decades of research have shown[a]. Simply put, the evidence shows that to develop their full physical, intellectual, and social capacities, infants and young children require stable, nurturing care from a parent or other continuing caregiver.

Older children and adolescents need the opportunities as part of a family to learn how to develop and sustain relationships and become well-functioning members of their society[b]. And it's not only in childhood that we need to be part of a family because those connections can provide the first line of support when, as adults, we experience emotional, economic or psychological challenges. Notwithstanding these realities, the perception is common that an orphanage or boarding school is an adequate alternative for a child who loses their caregiver.

This misconception is evidenced by massive amounts of private and government resources that support private and public residential care facilities[c], and this despite the studies that have shown the shortcomings and potential harm of such institutionalization, and the lower cost per child of supporting family care for children[d]. In sum, the absence of caring, family connections leave an isolated child, teen, or adult more vulnerable, while the presence of nurturing, lifelong family support promotes recovery and sustains resilience. We each need a family for life.

---

[a] "Institutionalisation and deinstitutionalisation of children 1: a systematic and integrative review of evidence regarding effects on development," Marinus H van IJzendoorn, et al. Published online June 23, 2020, https://doi.org/10.1016/S2215-0366(19)30399-2 .

[b] "Institutionalisation and deinstitutionalisation of children 1: a systematic and integrative review of evidence regarding effects on development," Marinus H van IJzendoorn, et al. Published online June 23, 2020, https://doi.org/10.1016/S2215-0366(19)30399-2 .

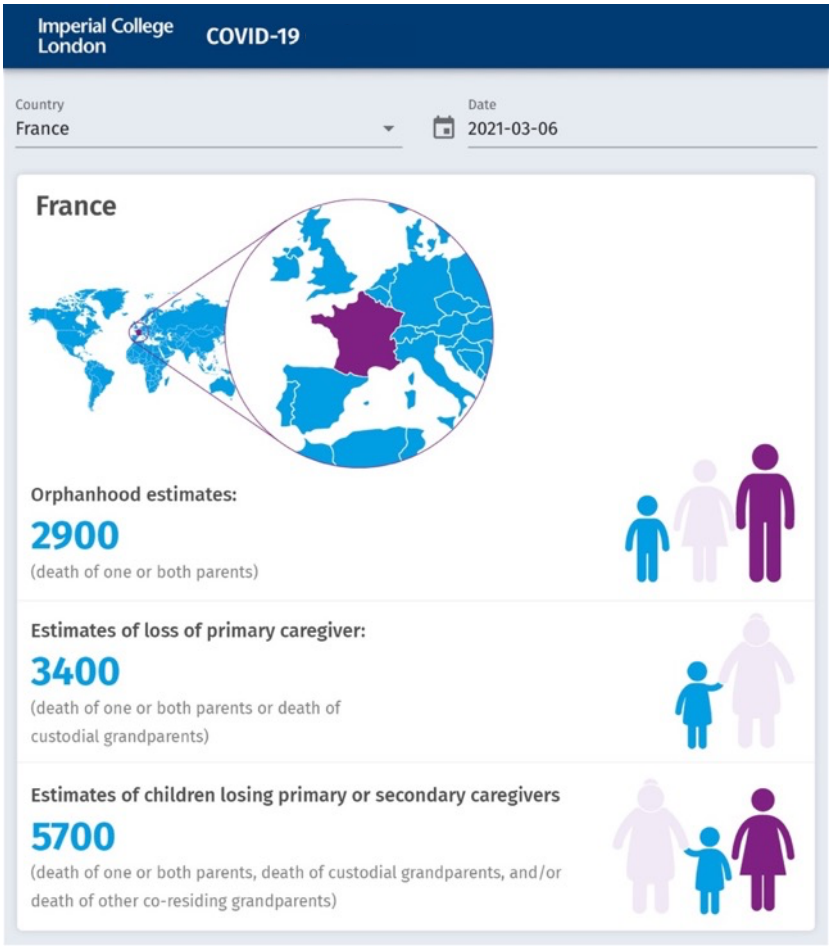
[c] The median estimate produced through a recent study was 5.37 million children globally living in institutions. "Prevalence and number of children living in institutional care: global, regional, and country estimates," Chris Desmond, et al. www.thelancet.com/child-adolescent Vol. 4 May 2020. While no total of government funding for residential institutions is available, a recent study found that Christian individuals in the United States alone contribute 3.3 billion annually to support residential facilities for children.

[d] Families, not Orphanages, John Williamson and Aaron Greenberg, Better Care Network, 2010. Published online august 31, 2010, https://bettercarenetwork.org/library/particular-threats-to-childrens-care-and-protection/effects-of-institutional-care/families-not-orphanages

COVID-19-Calculator Widget

We developed an open-source widget for country-specific estimates, to provide real-time updates of the numbers of children who have lost a parent or co-residing grandparent caregiver due to COVID-19-associated death. This widget can be imported into your own digital networks and platforms and is shown on right. Our aim is for this widget to help inform and catalyze investments in evidence-based approaches to helping care for children in need.

For Imperial College's Country Calculator giving up-to-date minimum estimates by country of minimum estimates of children affected by COVID-19 orphanhood and death of caregivers:
https://imperialcollegelondon.github.io/orphanhood_calculator
For imperial College's Interactive Visualization enabling comparisons between countries and over time of minimum estimates of children affected by COVID-19 orphanhood and death of caregivers:
https://imperialcollegelondon.github.io/orphanhood_trends



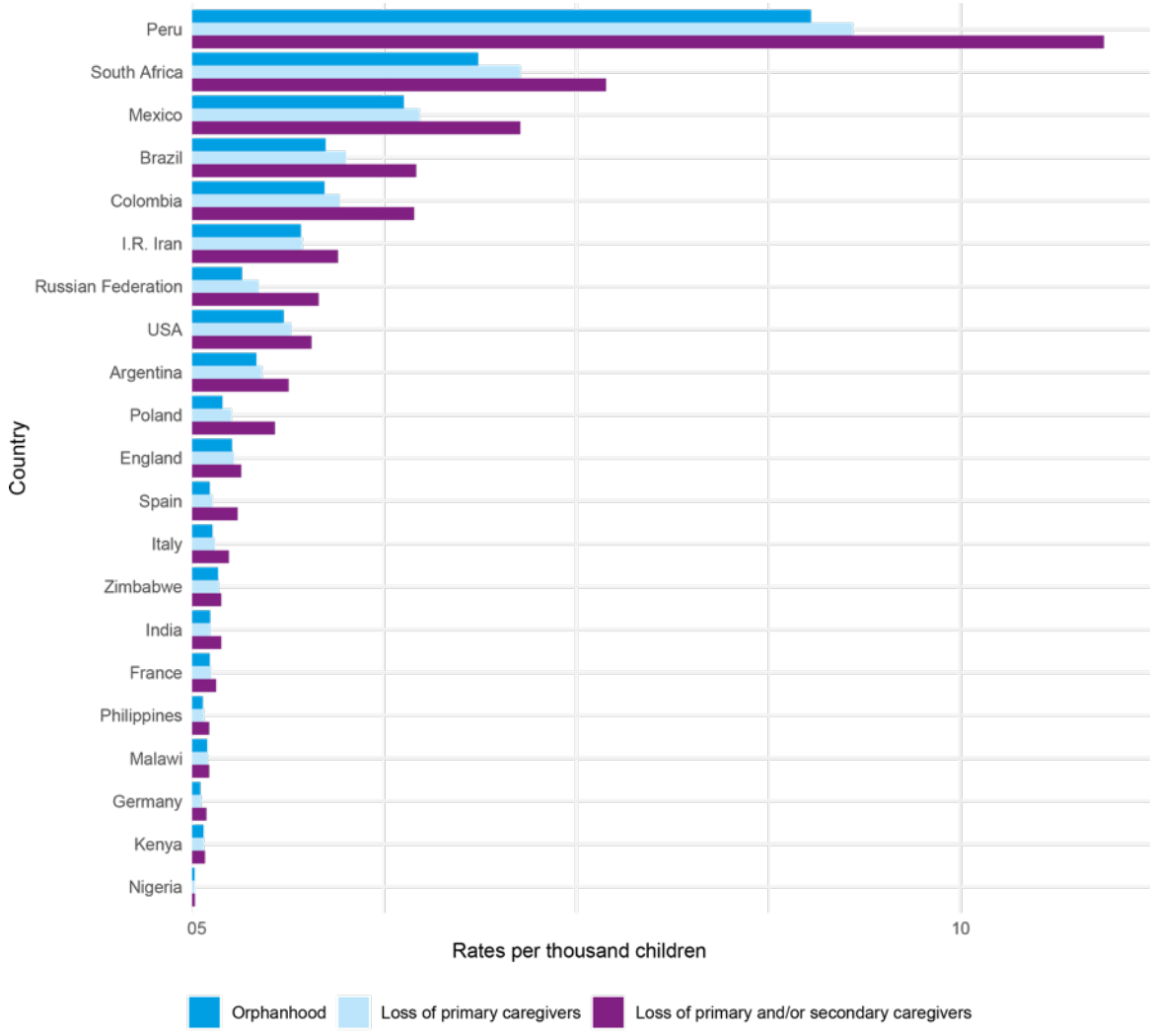
"THERE CAN BE NO KEENER REVELATION OF A SOCIETY'S SOUL THAN THE WAY IN WHICH IT TREATS ITS CHILDREN."

Nelson Mandela. South Africa

4. The National Toll: In 10 countries, high rates of children have experienced death of a caregiver

The results described previously were modelled using findings from our 21 study countries[10]. Of particular concern are those nations where more than 1 of every thousand children have experienced death of a parent or other caregiver during the first 14 months of the pandemic. These 10 countries include Peru, South Africa, Mexico, Brazil, Colombia, Islamic Republic of Iran, Russian Federation, United States, Argentina, and Poland, all having a rate per thousand above 1 (Figure 5 below). All these countries, except the Russian Federation and Poland, also have rates over 1 per thousand children, for primary caregiver loss of parents and custodial grandparents serving as parents.

FIGURE 5: Estimated rates of children affected per thousand children for 21 study countries ranked in order of descending loss of primary and/or secondary caregivers.

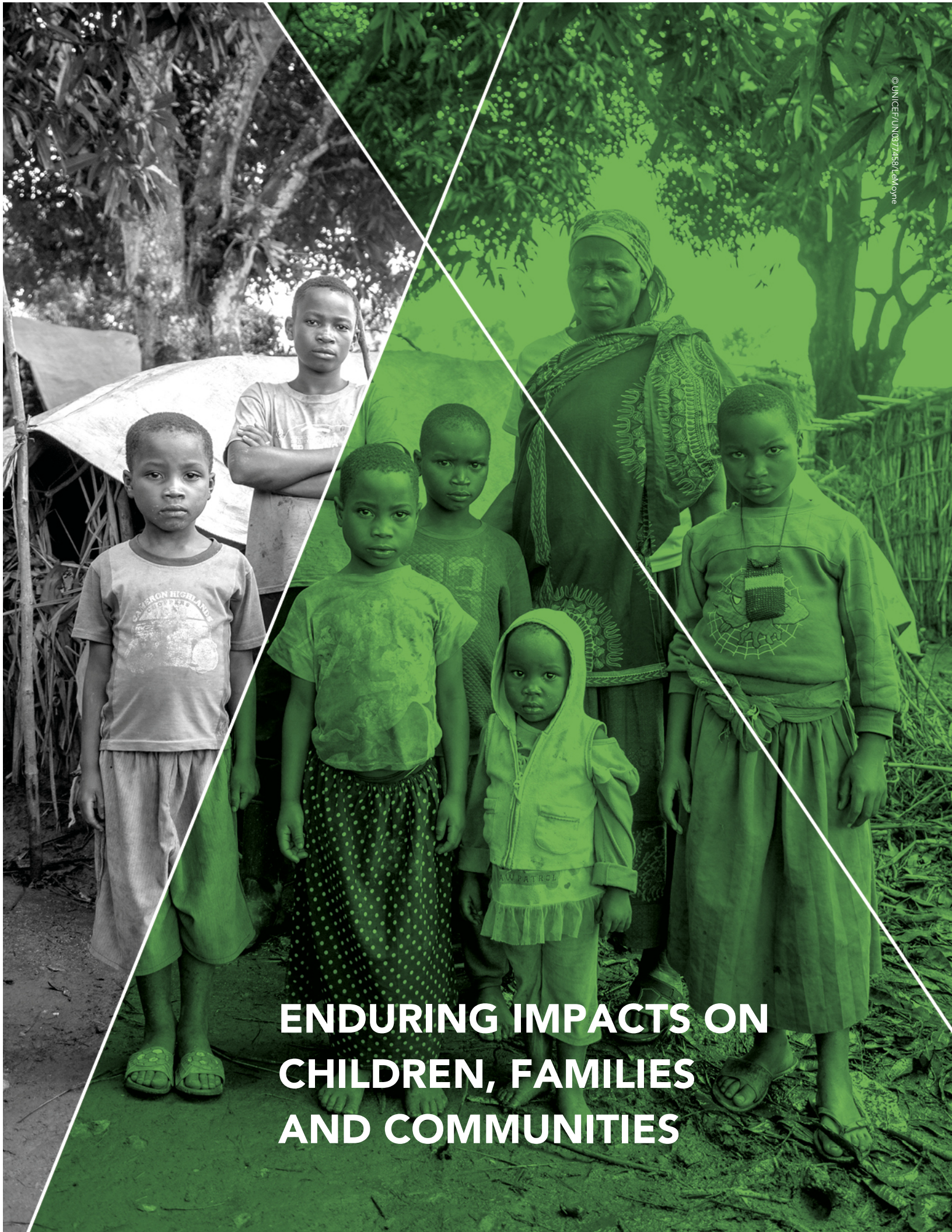


5. Consideration of Scenarios: The number of children facing COVID-19-associated death of parents and other caregivers will continue to rise for at least the next 2 to 5 years.

Estimates of future scenarios for death of parents and other caregivers are complicated by the increasing emergence of virus variants of concern, the potential for waning immunity among vaccinated populations, and the anticipated time to reach herd immunity. On the basis of current vaccine deployment rates, it will take more than 5 years for a number of the countries most affected to reach herd immunity[21].

Monitoring the Toll

Modelling provides an avenue for generating preliminary minimum estimates of the magnitude of COVID-19-associated orphanhood and death of caregivers, but what is most needed is to identify and care for the children behind the numbers. Thus, there is an immediate need to strengthen and scale up child-focused monitoring systems, so governments and partners can provide a real-time response to children in need.



ENDURING IMPACTS ON CHILDREN, FAMILIES AND COMMUNITIES

The death of a close family member, such as a parent or grandparent caregiver, is one of the most traumatic events a child can experience and has potential for profound lifelong impacts on children's health, safety, and wellbeing[22] [23]. While most children impacted by COVID-19-associated death of family members lose one rather than both parents, they often experience multiple bereavements, when the virus fatally transmits within extended family groups. When a parent dies, a child often experiences mental health problems, including depression, anxiety, and post-traumatic stress symptoms, as well as dropping out of school, low self-esteem, and increases in sexual risk behaviors[22-26]. Death of a parent often reduces a family's income, making it more difficult to provide for its children's basic needs[27]. The loss of a parent or other caregiver is almost invariably an adverse event for children, and independently or in combination with other forms of adversity, leads to heightened risk of suicide, teen pregnancy, infectious diseases including HIV/AIDS, and chronic diseases[28-30]. The death of grandparents can also reduce the psychosocial, practical, and/or financial support for their grandchildren[31]. These types of vulnerabilities often place children in need of alternative or supplementary care, such as kinship or foster care[32]. However, public health responses to the pandemic, such as stay-at-home orders and the constraints of conducting child protection evaluations remotely, have severely reduced the capacity of established child protection systems and services to provide much needed child safety interventions and support[33].

During past epidemics and emergencies, donors have often supported residential care facilities such as orphanages and children's homes. Such support has been a common response not only for children whose mother, father, and/or caregiver grandparent died, but also for children facing exceptional vulnerability due to extreme poverty and associated food insecurity, familial violence and other forms of abuse, and severe debilitating illness in parents or caregivers. Evidence shows that such facilities have a negative impact on the physical, cognitive, emotional and social development of children, and expose children to significant risk of physical, sexual and emotional abuse[6]. Residential care is also costly, and equivalent sums can support far more children within family settings that provide far better outcomes[34]. Therefore, residential care should be understood as an option of last resort, one which generates the worst outcomes at the most expense[32]. To prioritize responses that effectively address children's best interests, our guiding goal must be ensuring every child has safe and nurturing family-based care.

"CHILDREN ARE LIVING BEINGS - MORE LIVING THAN GROWN-UP PEOPLE WHO HAVE BUILT SHELLS OF HABIT AROUND THEMSELVES. THEREFORE, IT IS ABSOLUTELY NECESSARY FOR THEIR MENTAL HEALTH AND DEVELOPMENT THAT THEY SHOULD NOT HAVE MERE SCHOOLS FOR THEIR LESSONS, BUT A WORLD WHOSE GUIDING SPIRIT IS PERSONAL LOVE"

Rabindranath Tagore, India

Hungry children awaiting food provided by a local FBO in India, for the children and widows who lost their husbands to COVID-19
Courtesy of Vanitashray NGO, India

Beyond COVID-19-associated death of a parent or other caregiver, the prevalence of social vulnerabilities children may face are exceptionally high. A Save the Children survey of 46 countries documents that COVID-19 has created a new group of disproportionately affected children[35]. For example, the Survey found that 82% of poorer households reported a loss in income, and one-third of children represented by the survey experienced physical or emotional violence in their homes. During COVID-19, children living in households which had lost all or most of their income, were four times as likely to experience familial violence, compared with households which retained their pre-pandemic income level. Those children whose schools were closed were twice as likely to experience violence as those whose schools remained open. Low income also threatened children's access to adequate nutrition. Nearly two-thirds of those surveyed reported being unable to provide an adequate diet for their children, with the main reason being the cost of food. Loss of income and decreased ability to provide adequate care and supervision is common among parents and other caregivers who experience ongoing debilitating symptoms of Long COVID for months following the acute initial illness.

Alongside these multiple and severe negative impacts on children, families, and communities, the pandemic has substantially reduced the financial resources and operational engagement of most national governments and many donors, diminishing their capacity to reach children through services such as schools and healthcare centers[36].

This leaves the very communities which have been depleted by the loss of caregivers without the support mechanisms through which they can recover and rebuild. The strategy below sets out an alternative path, through which the trauma of bereavement can turn from a trajectory of ongoing tragedy to an avenue of hope.

A woman in India whose husband died and is now a single head of household for three children has no job and is unable to feed her children. She is a beneficiary of an NGO COVID-19 Relief Programme that provides eggs, milk, and monthly groceries.
Courtesy of Vanitashray NGO, India

A STRATEGY FOR CARING ACTION

The findings described in this report manifest an immediate need to fully to integrate care for children into Emergency Response priorities – in the current COVID-19 pandemic and indeed, in every pandemic or other emergency. Increases in mortality of parents and other caregiver in the COVID-19 pandemic are accompanied by increases in extreme vulnerability from loss of livelihoods, schooling, health recovery and usual sources of service provision and support.

This convergence of consequences suggests that the most effective prevention and response approaches will combine 1) equitable access to vaccines, 2) evidence-based programs and services for children facing death of parents or other caregivers and other forms of exceptional vulnerability, and 3) a particular focus on those regions, nations, and sub-national hot-spots with the highest COVID-19-associated burden.

Thus, we propose adding a new 'fourth pillar' of Emergency Response, adding "care for children", to the existing three pillars, "detect, prevent, respond". This new pillar, "care for children" would support a comprehensive three-pronged approach – "prevent, prepare, and protect". The aims of this approach include:

Care for Children: Fourth Pillar of Emergency Response

Prevent
the COVID-19-associated death of caregivers by accelerating equitable access to vaccines and appropriate mitigation.

Prepare
safe and loving family-based care support services.

Protect
children using evidence-based strategies that address their increased risks of childhood adversity and violence, and strengthen their recovery and resilience.

> "WHEN WE STRIVE TO BECOME BETTER THAN WE ARE, EVERYTHING AROUND US BECOMES BETTER TOO."
>
> Paulo Coelho. Brazil

Because social determinants of health drive both the need for and the access to each of these prongs, their successful implementation will require intentional investment to address individual, familial, community, and structural inequalities. Interventions for all children should be age appropriate and inclusive. Effective action to reduce health disparities and protect children from direct and secondary harms from COVID-19 is both a moral and a public health imperative[37 38].

1. Prevent the COVID-19-associated death of caregivers by accelerating equitable access to vaccines.

Safe and effective vaccines raise hopes for ending both the pandemic and its associated consequences for all people, but these hopes are threatened by the lack of vaccine access in low- and middle-income countries. These disparities in vaccine access are made ever more concerning by the progressively increasing prevalence of virus variants of concern, some of which appear associated with faster spread and greater severity[21].

The COVID-19 Vaccines Global Access, known as COVAX, is a global initiative that aims to advance equitable access to COVID-19 vaccines, especially for low- and middle- income countries[39]. Directed by Gavi, the Vaccine Alliance, the Coalition for Epidemic Preparedness Innovations, and the World Health Organization, COVAX coordinates global resources to support equitable access to COVID-19 tests and treatment, in addition to vaccines. By July 2020, 165 countries had joined COVAX. WHO has emphasized that "with a fast-moving pandemic, no one is safe, unless everyone is safe"[39]. This global vision makes clear that aiming for herd immunity through 70% vaccinated population is the path forward for assuring that every child is safe, secured from the direct and second-order impacts of COVID-19.

Select countries with rapidly advanced vaccination programs have seen reductions in cases and deaths from COVID-19[40]. However, the opposite has been true for many countries, such as India and others in South Asia, where widespread vaccination is yet to be achieved. In India, the impact of the COVID-19 surge in India on associated deaths among caregivers[41] shows all too graphically why access to vaccines is essential **before** a surge strikes; this is the best solution for warding off such surges, and therefore, for protecting children, parents and other caregivers, and communities.

Despite numerous challenges, COVAX aims to deliver 2 billion doses of vaccines worldwide in 2021, and 1.8 billion doses to 92 lower-income countries by early 2022. These ambitious aims will require governments and the private sector urgently to commit new doses and new funding, to support this massive global vaccination effort – an effort that is essential for protecting our generations and those to come. Every vaccine administered can help end pandemic-associated orphanhood and death of caregivers. The time to act is now.

2. Prepare safe and loving family-based care support services.

COVID-19 severe illness and death is often alarmingly swift – happening within weeks or just days after initial infection. This means that families have very little time in which to make alternative care arrangements for their children[42]. It is essential to ensure that children are not consigned to orphanages or children's homes but continue to be cared for within protective and nurturing families. There are key roles for governments, NGOs, faith-based organizations, and local communities in identifying and supporting children at risk of losing family-based care through death of a caregiver or other COVID-19 impacts[43]. Often, local communities or faith networks have already organized themselves to help provide assistance to children who are most vulnerable, but they could be more effective if outside organizations provided additional support.

As soon as a primary caregiver becomes seriously ill with COVID-19, or a family becomes seriously impacted by other pandemic-associated factors, that family should receive comprehensive evaluation including testing, tracing, and appropriate and supported quarantine of exposed family members. The family should be supported in developing a plan for how children might be cared for if their caregiver were to die[44]. If their immediate family is unable to care for the children, possibilities within the wider extended family should be considered, and if that is not available, a safe and caring family in the child's community should be identified and supported. Siblings should be kept together. Family-based alternative care options include kinship care, foster care, kafalah and adoption[45]. It is valuable to talk with children about whom they would want to live with[46].

On August 6 2020, phycologist Olena Davydova (right) works with a child in Bilokurakyno, Eastern Ukraine after disruptions caused by COVID-19

When death of a caregiver occurs, each child should be supported by a social worker, or other professional trained in the use of a case management system whenever possible[47]. In all cases, the children and families should be supported and regularly monitored, both of which can be done remotely when needed[48 49]. Children and families can also be helped by participation in psychosocial support groups[50].

Governments have the responsibility to ensure that children who fall through the safety nets of both family and community are protected and have access to essential social services. Yet, many governments in low-resource countries rely extensively on external aid to support child protection programs, devoting minimal public expenditure for family-strengthening and alternative care[44]. Recent estimates show that billions of dollars annually are being spent on harmful residential care by well-meaning individual philanthropic donors and faith groups, when those funds would be far better utilized for strengthening family-based care[51]. In fact, economic evaluations show that up to ten children can be effectively supported in family settings for everyone in residential care[34]. Global guidance describing resource implications for family strengthening and alternative care systems are readily available to inform governments and donors[52].

3. Protect children using evidence-based strategies that address their increased risks of childhood adversity and violence and strengthen their recovery and resilience.

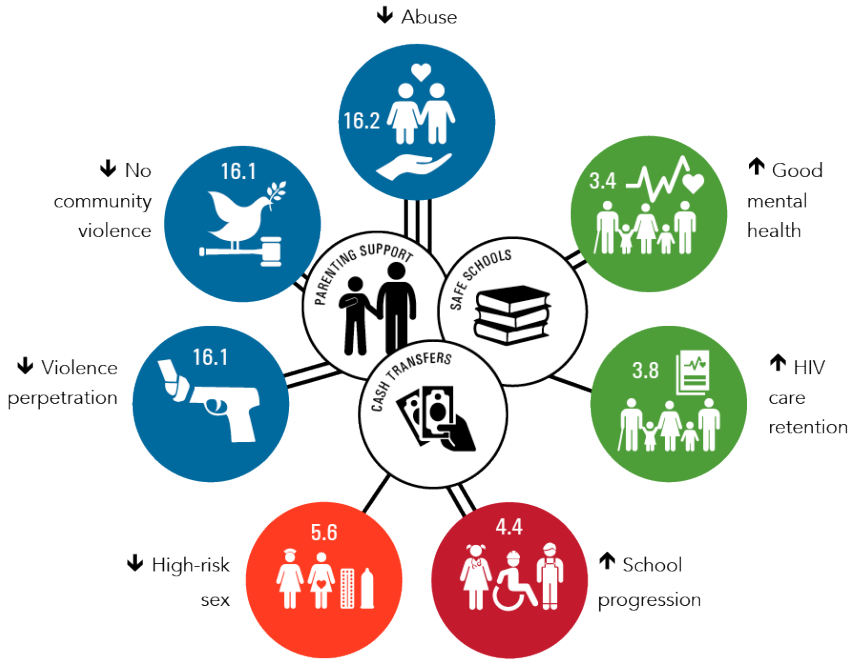
The caring response needs to be effective, flexible, and affordable, so that large numbers of children and families can be reached, even when there are COVID-19 restrictions in force. First, it is necessary to identify those services that have a proven track record in addressing child poverty and improving multiple outcomes, including reducing violence, boosting school enrollment, and preventing early marriage and/or pregnancy, and under-nutrition. These are often called "development accelerators" and they can be especially vital during COVID-19, when it may be harder to reach children and families with multiple stand-alone programs. Second, it is essential to innovate to adapt services to remote delivery, given the movement restrictions and service closures that are expected to continue over the next three to five years of vaccine rollout in low- and middle-income countries[53].

"I SUSTAIN MYSELF WITH THE LOVE OF A FAMILY"

Maya Angelou.
USA

UNICEF and other key partners identified the most effective responses for children and adolescents in the AIDS and Ebola epidemics[54]. Collaborators on this report also analyzed new data to find the best

combinations for children whose caregivers had died or become unwell. Findings showed that the three important accelerators for orphaned and epidemic-affected children are: i) economic support (cash transfers), for families caring for children and adolescents; ii) parenting support for bolstering nurturing relationships, supporting child mental health and reducing family violence; and iii) education support (safe schools), for enabling children (especially girls) living in poverty to attend school and reach their potential. Each accelerator is described below.



Cluver, Orkin, Toska, Campeau, Webb, Carlqvist, Sherr, (2019) Lancet CAH

Income and economic strengthening provide support to poor families to help them care for their children and adolescents. Income and economic strengthening provide support to families living in poverty to help them care for their children and adolescents. While the most cost-effective way to do this is often cash transfers to families with children, other approaches that work include microfinance, supported savings groups, and support for livelihoods[55] [56]. Strong evidence from experimental research shows that economic support improves wellbeing for children and adolescents in health crises[57] [58], as shown by their reduced risks of becoming victims of violence and sexual exploitation[59-61]. Studies show that economic support through cash transfers in humanitarian emergencies provided over $2 of benefits for each $1 provided to beneficiaries[62]. Many programs have shown that economic support can be delivered remotely during COVID-19, even to the poorest families, through mobile money transfers and cash cards[63].

Evidence-based parenting support is valuable for all families during the COVID-19 pandemic and is especially important for families who are experiencing the stress of bereavement, illness, poverty, homelessness, and mental health distress. These simple programs help parents or caregivers to build stronger relationships with their children and adolescents, to manage behavioral challenges, and to protect children in the community and online. They also help caregivers to manage their own stress and worries, and support families with budgeting even on a very low income[64]. Non-commercial parenting programs are extremely effective, at a low cost for delivery. More than 100 research studies of parenting programs in low-resource countries show positive impacts for children[65]. These include reductions in violence, mental health problems, drug and alcohol use disorders and extreme poverty[66] [67]. Emotional reactions to bereavement are well documented, but the infrastructure to identify, refer and respond to mental health is often limited – especially in resource poor settings. Therefore, investments in family strengthening and infrastructure for appropriate referrals is urgently needed. A strong study of cost-effectiveness analyses in South Africa showed a $6 benefit for every $1 spent, because of the severe abuse cases prevented. New initiatives co-led by CDC, WHO, USAID, and UNICEF have shown the capacity to provide evidence-based parenting support remotely, reaching more than 190 million families across 198 countries during COVID-19 lockdowns[68]. These have led to mobile-phone based parenting programs which can be delivered – with phone-based or in-person support from local NGOs, FBOs (Faith-based Organizations), and community workers – for around $6 per family.

Gabriel Project Mumbai, trained teachers to conduct parenting sessions at Gabriel Project's Joshua Learning Center at Kalwa, in India. Parents were taught the importance of using the COVID-19 Parenting resources in their lives. Courtesy of COVID-19 Parenting

School support includes provisions for children to attend school, such as fees, uniforms and books. This type of support for orphaned girls reduced school dropouts by 82%. Notably, school-based mental health support, such as an anti-bullying program in Uganda, also show cost-effectiveness, with $2.50 saved for each $1 spent in preventing physical violence in schools[69] [70]. Research in Indian schools shows positive impacts of remotely delivered light-touch mental health resources[71].

Children eat a meal at the school in Mbuene village, Magude district, Maputo Province, Mozambique. This is the only meal of the day for many of the students at the school.
© UNICEF/UN051605/Rich

Combined income strengthening and parenting support programs, often referred to as "cash and care" programs, are simple and effective when provided together. This combination approach can maximize family strengthening by providing material and psychosocial support at the same time. Such "cash and care" programs show greater benefit than either program offered alone, in improving children's health, nutrition, cognitive development, and in reducing risks of violence[72]. Evaluations in Niger, Colombia, Mexico, Peru, and Bangladesh have confirmed the enhanced benefit of these programs, as well as of programs that combine cash transfers and behavior change communication[73] [74].

Conclusion

This COVID-19 pandemic is unprecedented: Few of us alive today have personal prior experience of a pandemic on this global scale. But collectively we do hold the remembrances and reference points of documented history. And more than that, many parts and populations of our world retain lived experience of the extended impacts of HIV/AIDS, Ebola, and other epidemics; we would do well to be guided by their hard-gained expertise and wisdom.

So, in whatever ways the unique variants of this virus take us by surprise, this pandemic does not catch us entirely unprepared. Strong evidence exists to guide child-protective response measures harnessing cost-effective economic, parenting and education support in combinations known to accelerate positive outcomes and avoid the risks of residential institutions. Simple, pragmatic, contextually relevant and low-cost services are available to support children's families and communities to continue caring for them. Vaccines can be made accessible to prevent a deluge of children from growing up in orphanhood through the decades ahead.

This knowledge equips us to act with clarity, capability and confidence in achieving good outcomes. We have every reason to move forward in hopefulness. This time, together, we know what to do.

February 10 2020, children in the annex of Al-Hol camp in the northwest Syria, where more than 7,100 children from around 60 countries are sheltered.

APPENDIX 1

Estimates by Country for COVID-19-associated Orphanhood and Death among Caregivers

Country	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss	Country	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Africa				Kenya*	4312	4500	4869
Algeria	3400 [2200 - 4400]	3600 [2400 - 4700]	4100 [2900 - 5200]	Lesotho	400 [200 - 500]	430 [300 - 600]	470 [300 - 600]
Angola	1200 [1100 - 1200]	1200 [1200 - 1300]	1300 [1300 - 1400]	Liberia	160 [100 - 200]	170 [100 - 200]	180 [100 - 200]
Benin	190 [100 - 200]	200 [100 - 300]	220 [200 - 300]	Madagascar	1200 [1100 - 1300]	1300 [1200 - 1300]	1400 [1300 - 1500]
Botswana	640 [400 - 900]	680 [400 - 1000]	800 [500 - 1100]	Malawi*	2233	2367	2532
Burkina Faso	310 [300 - 400]	320 [300 - 400]	350 [300 - 400]	Mali	950 [900 - 1000]	980 [900 - 1000]	1100 [1000 - 1100]
Burundi	**	**	**	Mauritania	880 [800 - 900]	920 [900 - 1000]	1000 [900 - 1100]
Cabo Verde	65 [0 - 200]	71 [0 - 200]	100 [0 - 200]	Mauritius	**	**	**
Cameroon	2100 [2100 - 2200]	2200 [2100 - 2300]	2400 [2400 - 2500]	Mozambique	1600 [1500 - 1600]	1600 [1600 - 1700]	1800 [1700 - 1900]
Central African Republic	170 [100 - 200]	180 [100 - 200]	190 [100 - 200]	Namibia	970 [700 - 1100]	1000 [800 - 1200]	1100 [900 - 1300]
Chad	330 [300 - 400]	350 [300 - 400]	380 [300 - 400]	Niger	370 [300 - 400]	390 [300 - 400]	430 [400 - 500]
Comoros	280 [200 - 300]	290 [200 - 300]	310 [300 - 400]	Nigeria*	3853	3947	4487
Congo	280 [200 - 300]	290 [200 - 300]	320 [300 - 400]	Rwanda	620 [500 - 700]	640 [600 - 700]	700 [600 - 800]
Cote d'Ivoire	550 [500 - 600]	580 [500 - 600]	630 [600 - 700]	Sao Tome and Principe	67 [0 - 100]	70 [0 - 100]	76 [0 - 100]
Democratic Republic of the Congo	1500 [1400 - 1500]	1600 [1500 - 1600]	1700 [1700 - 1800]	Senegal	2100 [2100 - 2200]	2200 [2200 - 2300]	2400 [2400 - 2500]
Equatorial Guinea	220 [200 - 300]	220 [200 - 300]	240 [200 - 300]	Seychelles	**	**	**
Eritrea	**	**	21 [0 - 100]	Sierra Leone	150 [100 - 200]	150 [100 - 200]	170 [100 - 200]
Eswatini	710 [400 - 1000]	750 [500 - 1000]	860 [600 - 1100]	South Africa*	82422	94625	119242
Ethiopia	6900 [6500 - 7100]	7200 [6800 - 7400]	7800 [7400 - 8100]	South Sudan	220 [200 - 300]	230 [200 - 300]	250 [200 - 300]
Gabon	260 [200 - 300]	270 [200 - 300]	290 [200 - 300]	Togo	230 [200 - 300]	240 [200 - 300]	270 [200 - 300]
Gambia (Republic of The)	340 [300 - 400]	350 [300 - 400]	390 [300 - 400]	Uganda	660 [600 - 700]	690 [600 - 700]	760 [700 - 800]
Ghana	1400 [1300 - 1500]	1500 [1300 - 1600]	1600 [1400 - 1700]	United Republic of Tanzania	41 [0 - 100]	42 [0 - 100]	47 [0 - 100]
Guinea	280 [200 - 300]	290 [200 - 300]	320 [300 - 400]	Zambia	2400 [2300 - 2500]	2500 [2400 - 2600]	2800 [2700 - 2800]
Guinea Bissau	130 [100 - 200]	130 [100 - 200]	150 [100 - 200]	Zimbabwe	2667	2798	2987

Country	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Americas			
Antigua and Barbuda	**	**	**
Argentina*	13003	14117	19504
Bahamas	19 [0 - 100]	21 [0 - 100]	36 [0 - 100]
Barbados	**	**	**
Belize	110 [0 - 200]	120 [0 - 300]	160 [0 - 300]
Bolivia (Plurinational State of)	9600 [5800 - 14200]	10000 [6300 - 15200]	13000 [8400 - 16800]
Brazil*	113150	130363	189899
Canada	1200 [600 - 2600]	1400 [600 - 2800]	2600 [1400 - 4600]
Chile	1800 [800 - 3500]	2100 [900 - 3900]	3700 [2000 - 6500]
Colombia*	29851	33293	50083
Costa Rica	280 [100 - 600]	320 [100 - 700]	550 [300 - 1000]
Cuba	42 [0 - 100]	47 [0 - 100]	85 [0 - 200]
Dominica	**	**	**
Dominican Republic	1300 [600 - 2200]	1400 [700 - 2400]	1900 [1100 - 3000]
Ecuador	8300 [4700 - 13600]	9000 [5200 - 14700]	12000 [7600 - 18400]
El Salvador	390 [200 - 800]	430 [200 - 800]	670 [300 - 1200]
Grenada	**	**	**
Guatemala	6600 [4200 - 9000]	7100 [4600 - 9600]	8300 [5800 - 10800]
Guyana	140 [0 - 300]	160 [0 - 300]	210 [100 - 400]
Haiti	250 [100 - 400]	260 [100 - 400]	300 [200 - 400]
Honduras	2300 [1200 - 4000]	2600 [1400 - 4400]	3400 [2000 - 5100]
Jamaica	130 [0 - 300]	140 [0 - 300]	220 [100 - 400]
Mexico*	131325	141132	203549
Nicaragua	73 [0 - 200]	80 [0 - 200]	110 [0 - 200]
Paraguay	2900 [1500 - 4700]	3100 [1700 - 5000]	4200 [2500 - 6300]
Panama	3000 [1600 - 5000]	3300 [1800 - 5400]	4300 [2600 - 6300]
Peru	92702	98975	136572
Saint Kitts and Nevis	**	**	**
Saint Lucia	**	**	**
Saint Vincent and the Grenadines	**	**	**
Suriname	89 [0 - 200]	98 [0 - 200]	130 [0 - 200]
Trinidad and Tobago	14 [0 - 100]	16 [0 - 100]	28 [0 - 100]
Uruguay	440 [200 - 900]	490 [200 - 1000]	770 [400 - 1300]
USA*	104884	113708	136692
Venezuela (Bolivarian Republic of)	690 [300 - 1200]	760 [300 - 1300]	1100 [600 - 1700]
Eastern Mediterranean			
Afghanistan	4900 [4700 - 5100]	5100 [4900 - 5300]	5600 [5300 - 5800]
Bahrain	99 [0 - 200]	110 [0 - 300]	180 [100 - 300]
Djibouti	96 [0 - 200]	100 [0 - 200]	130 [0 - 200]
Egypt	20000 [15500 - 22500]	21000 [16500 - 23500]	22000 [18200 - 25200]
I.R. Iran*	40426	40996	54180
Iraq	27000 [23600 - 28400]	28000 [24900 - 29600]	30000 [27500 - 32000]
Jordan	6500 [3900 - 9400]	7000 [4300 - 10100]	8500 [5700 - 11400]
Kuwait	350 [100 - 700]	380 [200 - 800]	570 [300 - 1000]
Lebanon	1600 [800 - 2800]	1700 [900 - 3000]	2600 [1400 - 4300]
Libya	820 [400 - 1400]	910 [400 - 1600]	1300 [700 - 2200]
Morocco	3800 [2000 - 6400]	4100 [2300 - 6900]	5600 [3300 - 8200]
Oman	1500 [900 - 2300]	1700 [1000 - 2400]	2000 [1300 - 2800]
Pakistan	28000 [22800 - 31300]	30000 [24200 - 32700]	32000 [27000 - 35400]

Country	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Qatar	52 [0 - 200]	58 [0 - 200]	97 [0 - 200]
Saudi Arabia	2200 [1100 - 3900]	2400 [1200 - 4200]	3400 [2000 - 5300]
Somalia	1400 [1300 - 1400]	1400 [1400 - 1500]	1600 [1500 - 1700]
Sudan	4500 [4400 - 4600]	4700 [4600 - 4800]	5100 [5000 - 5200]
Syrian Arab Republic	1300 [700 - 1900]	1400 [800 - 2000]	1700 [1100 - 2300]
Tunisia	2800 [1400 - 5000]	3100 [1600 - 5400]	4500 [2600 - 7100]
United Arab Emirates	56 [0 - 200]	63 [0 - 200]	130 [0 - 300]
Yemen	2100 [1800 - 2300]	2200 [1900 - 2400]	2400 [2100 - 2600]
Europe			
Albania	140 [0 - 300]	160 [0 - 400]	300 [100 - 600]
Andorra	**	**	**
Armenia	440 [200 - 900]	490 [200 - 1000]	830 [400 - 1500]
Austria	660 [300 - 1400]	740 [300 - 1500]	1300 [700 - 2400]
Azerbaijan	900 [400 - 1700]	1000 [500 - 1900]	1500 [900 - 2500]
Belarus	260 [100 - 500]	290 [100 - 600]	490 [200 - 900]
Belgium	2400 [1200 - 4600]	2700 [1300 - 5000]	4600 [2500 - 8300]
Bosnia and Herzegovina	210 [100 - 500]	230 [100 - 500]	490 [200 - 900]
Bulgaria	1200 [500 - 2400]	1300 [600 - 2600]	2400 [1300 - 4300]
Croatia	290 [100 - 600]	320 [100 - 700]	640 [300 - 1200]
Cyprus	**	**	21 [0 - 100]
Czech Republic	2600 [1200 - 5000]	2900 [1400 - 5500]	5000 [2700 - 8400]
Denmark	280 [100 - 600]	310 [100 - 600]	520 [200 - 900]
England & Wales*	8495	8886	10450
Estonia	89 [0 - 200]	100 [0 - 200]	180 [0 - 400]
Finland	39 [0 - 100]	43 [0 - 100]	84 [0 - 200]
France*	4064	4371	5542
Georgia	870 [400 - 1600]	970 [500 - 1800]	1500 [800 - 2400]
Germany*	1590	1832	2794
Greece	280 [100 - 600]	320 [100 - 700]	660 [300 - 1200]
Hungary	1600 [800 - 3300]	1800 [900 - 3700]	3400 [1800 - 6000]
Iceland	**	**	**
Ireland	570 [200 - 1100]	630 [300 - 1200]	1100 [500 - 1900]
Israel	7800 [5700 - 9700]	8300 [6200 - 10200]	9200 [7100 - 11200]
Italy*	3201	3568	5782
Kazakhstan	2700 [1600 - 3800]	2900 [1800 - 4000]	3400 [2300 - 4700]
Kosovo	91 [0 - 200]	100 [0 - 300]	200 [100 - 400]
Kyrgyzstan	1800 [1100 - 2300]	1900 [1200 - 2400]	2100 [1500 - 2700]
Latvia	220 [100 - 500]	240 [100 - 500]	410 [200 - 800]
Liechtenstein	**	**	**
Lithuania	360 [100 - 700]	400 [200 - 800]	700 [300 - 1300]
Luxembourg	33 [0 - 100]	37 [0 - 100]	73 [0 - 200]
Malta	22 [0 - 100]	25 [0 - 100]	47 [0 - 100]
Monaco	**	**	**
Montenegro	150 [0 - 400]	170 [0 - 400]	290 [100 - 500]
Netherlands	1500 [800 - 2800]	1700 [900 - 3200]	3000 [1600 - 5100]
North Macedonia	230 [100 - 500]	260 [100 - 600]	500 [200 - 1000]
Norway	70 [0 - 200]	78 [0 - 200]	130 [0 - 300]
Occupied Palestinian Territory	4000 [2800 - 4900]	4200 [3000 - 5200]	4700 [3600 - 5700]
Poland*	3159	4097	8617
Portugal	590 [200 - 1200]	660 [300 - 1300]	1300 [700 - 2500]

Country	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Republic of Moldova	180 [0 - 400]	200 [100 - 500]	420 [200 - 800]
Romania	2200 [1100 - 4500]	2500 [1200 - 5000]	4400 [2400 - 7600]
Russian Federation	22293	29724	56514
San Marino	**	**	**
Scotland & Northern Ireland	1100 [500 - 2000]	1200 [600 - 2200]	2000 [1100 - 3600]
Serbia	270 [100 - 600]	300 [100 - 600]	590 [300 - 1100]
Slovakia	720 [300 - 1500]	800 [400 - 1600]	1500 [800 - 2700]
Slovenia	330 [100 - 700]	370 [100 - 700]	660 [300 - 1200]
Spain*	2309	2669	5979
Sweden	1900 [900 - 3800]	2100 [1000 - 4200]	3500 [1800 - 5800]
Switzerland	660 [300 - 1300]	740 [300 - 1500]	1400 [700 - 2500]
Tajikistan	150 [100 - 200]	160 [100 - 200]	170 [100 - 200]
Turkey	8100 [4100 - 14000]	8900 [4600 - 15400]	14000 [8100 - 22500]
Ukraine	2000 [1000 - 4300]	2300 [1100 - 4700]	4400 [2300 - 8200]
Uzbekistan	280 [100 - 500]	310 [100 - 600]	410 [200 - 700]
South-East Asia			
Bangladesh	1900 [1000 – 3800]	2200 [1100 – 4200]	3400 [1900 – 5600]
Bhutan	**	**	**
India*	116263	119170	186972
Indonesia	16000 [9000 – 26700]	18000 [9900 – 29100]	24000 [14600 – 37400]
Maldives	**	**	**
Myanmar	790 [400 – 1500]	870 [400 – 1600]	1300 [700 – 2100]
Nepal	390 [200 – 800]	440 [200 – 900]	730 [400 – 1300]
Sri Lanka	190 [100 – 400]	210 [100 – 400]	300 [100 – 500]
Thailand	**	**	21 [0 – 100]
Timor-Leste	**	**	**
Western Pacific			
Australia	110 [0 - 300]	120 [0 - 300]	200 [100 - 400]
Brunei Darussalam	**	**	**
Cambodia	48 [0 - 100]	53 [0 - 100]	68 [0 - 100]
China	450 [200 - 900]	500 [200 - 1000]	870 [500 - 1600]
Fiji	**	**	**
Japan	370 [100 - 800]	420 [200 - 900]	830 [400 - 1500]
Lao People's Democratic Republic	**	**	**
Malaysia	250 [100 - 500]	280 [100 - 600]	440 [200 - 800]
Marshall Islands	**	**	**
Micronesia (Federated States of)	**	**	**
Mongolia	110 [0 - 200]	120 [0 - 200]	140 [0 - 200]
New Zealand	**	**	**
Papua New Guinea	180 [100 - 200]	190 [100 - 300]	200 [100 - 300]
Philippines*	6502	7227	10402
Republic of Korea	29 [0 – 100]	33 [0 – 100]	74 [0 – 200]
Samoa	**	**	**
Singapore	**	**	**
Solomon Islands	**	**	**
Vanuatu	**	**	**
Viet Nam	**	**	**

* This denotes our 21 study countries where no uncertainty estimates are given[10].

** Data are not reported due to small numbers

APPENDIX 2

Modelling methods and additional global regional results

Minimum estimates for 21 study countries

This report is based on the paper published in *the Lancet Online First*, July 20, 2021, by the Global Reference Group on Children Affected by COVID-19 (Hillis et. al.)[10]. The paper and this linked Report use methods similar to Lotka et al.[75] and those used by the UNAIDS Reference Group for estimating AIDS orphanhood, to estimate COVID-19-associated orphanhood[76]. Hillis et al.[10] incorporates deaths of co-residing grandparents ages 60-84 years because they assume grandparents help provide some type of relational, practical, or financial caregiving for grandchildren with whom they share a home.

Minimum estimates of pandemic-associated orphanhood and caregiver deaths using excess mortality and COVID-19 mortality were calculated for 21 countries (Argentina, Brazil, Colombia, England & Wales, France, Germany, India, Islamic Republic (I.R.) of Iran, Italy, Kenya, Malawi, Mexico, Nigeria, Peru, Philippines, Poland, Russian Federation, South Africa, Spain, U.S.A., and Zimbabwe), which accounted for 76.4% of global COVID-19 deaths through April 2021.

Mortality. Excess deaths and COVID-19 deaths were extracted for March 1, 2020–April 30, 2021 using 5-year age bands, or the level of disaggregation provided[10]. For countries reporting COVID-19 and excess deaths, larger value between the COVID-19 and excess deaths per age band was calculated so all orphans associated with the pandemic could be calculated.

Fertility Rates. Fertility rates at the same disaggregation level as deaths (5-year age bands) for the years children ages <18-years-old were born (2003 – 2020) were extracted and adjusted for child mortality where necessary[10]. Fertility rates for women over age 50 were assumed to be zero but data for men was used up to age 80. In the UK, country-specific data was available for both men and women; for countries included in the Demographic and Health Survey data, the own-child method was used to calculate male and female fertility, and for all other countries, UN World Prospects were used for female fertility rates and male fertility rates

were calculated using UN Statistics Division data on men's fertility and fatherhood, alongside population estimates[77].

Paternal, Maternal, or Double Orphans. The average number of children aged <18 years that each adult will have was calculated by summing the average number of children born to a man or woman over each of the past 17 years, for the age they were that year[10]. The average number of children was then multiplied by the number of male and female deaths in corresponding parental age bands. These were then adjusted for possible clustering of deaths between parents using an estimate of secondary attack rates and infection fatality ratio.

COVID-19-associated deaths in Co-residing Grandparents. Two UN Population Division measures of household composition were used to calculate associated deaths in co-residing grandparents:

1) *Custodial grandparents:* prevalence of skip-generation grandparents, defined as aged 60-84 years who lived with their grandchildren in absence of parents;

2) *Other co-residing grandparents (or kin):* prevalence of grandparents ages 60 – 84 years (or other co-residing kin ages 60-84, e.g., aunts or uncles) who lived in multi-generation households with >one family member ages 0 – 17, along with parent(s).

A single mother in acute emotional crisis after the death of her husband -- with 3 children. She was exploited in the community. The oldest girl began to go as domestic help to earn bread after her father death. NGO community workers, directed them to the local authorities for temporary shelter and immediate help for the mother and children.
Courtesy of Vanitashray NGO, India

Deaths were truncated at 85 to produce a conservative estimate, which was then adjusted to avoid over-counting children who lost both parents and grandparents.

Global extrapolation

Global extrapolations for the impact of COVID-19-associated deaths were developed from the 21 study country data that relied on the high correlation between total fertility rate (TFR) and the ratio of orphans to deaths (Pearson $r^2 = 0.93$)[10]. A logistic model was fit using least squares to estimate the two logistic parameters and gamma, a scaling parameter. Collated COVID-19 deaths from each country from Johns Hopkins University was used alongside TFRs from the UN Population Division World Prospects data.

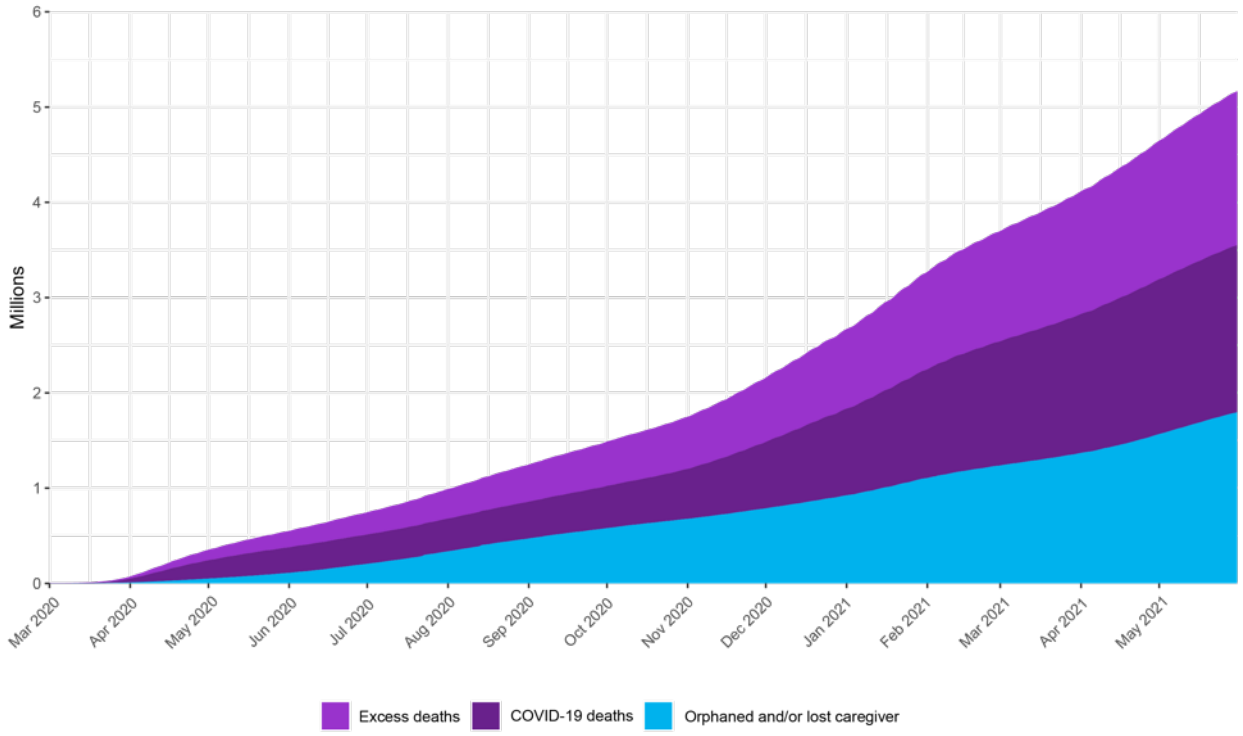
Additional Regional and Global Results

TABLE 2.1: Regional minimum estimates of loss of care, and uncertainty intervals, March 1, 2020 through April 30, 2021

Region	Minimum estimates of orphanhood	Minimum estimates of primary caregiver loss	Minimum estimates of primary and/or secondary caregiver loss
Africa	131,300 [130,100 – 132,500]	144,000 [142,800 – 145,200]	173,600 [172,400 – 174,800]
Americas	529,100 [521,900 – 537,700]	575,800 [568,600 – 584,300]	794,400 [786,400 – 803,900]
Eastern Mediterranean	154,900 [147,200 – 162,000]	155,500 [147,700 – 162,600]	184,100 [176,100 – 191,300]
Europe	102,100 [94,500 – 110,500]	112,100 [104,500 – 120,500]	182,200 [172,600 – 193,800]
South-East Asia	138,300 [130,000 – 149,200]	141,200 [132,900 – 152,100]	217,700 [207,000 – 230,000]
Western Pacific	8,300 [7,800 – 8,900]	9,020 [8,500 – 9,600]	13,330 [12,600 – 14,200]

In conclusion, we also show here the trends over time in global minimum estimates for excess deaths, COVID-19 deaths, and associated orphanhood and death of caregivers among children, from March 2020 through May 31, 2021 (Figure 2.1).

Figure 2.1: Global Estimates for Excess deaths and COVID-19 deaths, and for associated orphanhood and death of caregivers among children, March 2020 through May 31, 2021.



REFERENCES

1. Bell P, Binagwaho A. The joint learning initiative on children and HIV/AIDS. *Lancet* 2006;368(9550):1850-1. [published Online First: 2006/11/28]
2. Richter LM, Sherr L, Adato M, et al. Strengthening families to support children affected by HIV and AIDS. *AIDS Care* 2009;21 Suppl 1:3-12. [published Online First: 2009/01/01]
3. UNAIDS, UNICEF, USAID. Children on the Brink 2004. A Joint Report of New Orphan Estimates and a Framework for Action: UNICEF, 2004.
4. Richter L, Foster G, Sherr L. Where the heart is: Meeting the psychosocial needs of young children in the context of HIV/AIDS. The Hague, Netherlands: Bernard van Leer Foundation, 2006.
5. Sherr L, Roberts KJ, Gandhi N. Child violence experiences in institutionalised/orphanage care. *Psychol Health Med* 2017;22(sup1):31-57. [published Online First: 2017/01/10]
6. van IJzendoorn MH, Bakermans-Kranenburg MJ, Duschinsky R, et al. Institutionalisation and deinstitutionalisation of children 1: a systematic and integrative review of evidence regarding effects on development. *Lancet Psychiatry* 2020;7(8):703-20. [published Online First: 2020/06/27]
7. U.S. Centers for Disease Control and Prevention. COVID Data Tracker: U.S. Centers for Disease Control and Prevention; 2021. [Available from: https://covid.cdc.gov/covid-data-tracker/#global-counts-rates, accessed June 23 2021].
8. U.S. Centers for Disease Control and Prevention. Post COVID conditions Atlanta, GA: U.S. Centers for Disease Control and Prevention; 2021. [Available from: https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects.html, accessed June 23 2021].
9. Cortinovis M, Perico N, Remuzzi G. Long-term follow-up of recovered patients with COVID-19. *Lancet* 2021;397(10270):173-75. [published Online First: 2021/01/12]
10. Hillis S, Unwin HJT, Chen Y, et al. Global minimum estimates of children affected by COVID-19-associated orphanhood and deaths of caregivers: a modeling study. *Lancet* 2021. [published Online First: July 20, 2021]
11. Economic Intelligence Unit. The EIU's latest vaccine rollout forecasts Washington, DC: The Economist; 2021 [updated April 2021]. [Available from: https://www.eiu.com/n/eiu-latest-vaccine-rollout-forecasts/, accessed June 20 2021].
12. Hall VJ, Foulkes S, Charlett A, et al. SARS-CoV-2 infection rates of antibody-positive compared with antibody-negative health-care workers in England: a large, multicentre, prospective cohort study (SIREN). *Lancet* 2021;397(10283):1459-69. [published Online First: 2021/04/13]
13. Hansen CH, Michlmayr D, Gubbels SM, et al. Assessment of protection against reinfection with SARS-CoV-2 among 4 million PCR-tested individuals in Denmark in 2020: a population-level observational study. *Lancet* 2021;397(10280):1204-12. [published Online First: 2021/03/21]

14. Rutter M. Resilience as a dynamic concept. *Dev Psychopathol* 2012;24(2):335-44. [published Online First: 2012/05/09]
15. Ungar M. Designing resilience research: Using multiple methods to investigate risk exposure, promotive and protective processes, and contextually relevant outcomes for children and youth. *Child Abuse Negl* 2019;96:104098. [published Online First: 2019/08/04]
16. Berens AE, Nelson CA. The science of early adversity: is there a role for large institutions in the care of vulnerable children? *Lancet* 2015;386(9991):388-98. [published Online First: 2015/02/02]
17. Meinck F, Cluver LD, Boyes ME, et al. Risk and protective factors for physical and sexual abuse of children and adolescents in Africa: a review and implications for practice. *Trauma Violence Abuse* 2015;16(1):81-107. [published Online First: 2014/03/22]
18. Hillis SD, Mercy JA, Saul JR. The enduring impact of violence against children. *Psychol Health Med* 2017;22(4):393-405. [published Online First: 2016/03/17]
19. Johns Hopkins University. COVID-19 Data Repository Baltimore, MD: Center for Systems Science and Engineering (CSSE) at Johns Hopkins University; 2020. [Available from: https://github.com/CSSEGISandData/COVID-19, accessed June 20 2021].
20. Institute for Health Metrics and Evaluation. Estimation of total mortality due to COVID-19 Seattle, WA: Institute for Health Metrics and Evaluation (IHME); 2021. [Available from: http://www.healthdata.org/special-analysis/estimation-excess-mortality-due-covid-19-and-scalars-reported-covid-19-deaths, accessed June 24 2021].
21. Griggs P. COVID-19 vaccinations per country 2021. [Available from: https://timetoherd.com, accessed April 14 2021].
22. Luecken LJ. Long-term consequences of parental death in childhood: Psychological and physiological manifestations. In: Stroebe MS, Hansson RO, Schut H, et al., eds. Handbook of bereavement research and practice: Advances in theory and intervention: American Psychological Association 2008:397-416.
23. Tremblay GC, Israel AC. Children's Adjustment to Parental Death. *Clinical Psychology: Science and Practice* 1998;5(4):424-38.
24. Mack KY. Childhood family disruptions and adult well-being: the differential effects of divorce and parental death. *Death Stud* 2001;25(5):419-43. [published Online First: 2002/01/25]
25. Pham S, Porta G, Biernesser C, et al. The Burden of Bereavement: Early-Onset Depression and Impairment in Youths Bereaved by Sudden Parental Death in a 7-Year Prospective Study. *Am J Psychiatry* 2018;175(9):887-96. [published Online First: 2018/06/21]
26. Rotheram-Borus MJ, Weiss R, Alber S, et al. Adolescent adjustment before and after HIV-related parental death. *J Consult Clin Psychol* 2005;73(2):221-8. [published Online First: 2005/03/31]
27. Cas AG, Frankenberg E, Suriastini W, et al. The impact of parental death on child well-being: evidence from the Indian Ocean tsunami. *Demography* 2014;51(2):437-57. [published Online First: 2014/02/28]
28. Mercy JA, Hillis SD, Butchart A, et al. Interpersonal Violence: Global Impact and Paths to Prevention. In: Mock CN, Nugent R, Kobusingye O, et al., eds. Injury Prevention and

Environmental Health. 3rd ed. Washington (DC): The International Bank for Reconstruction and Development / The World Bank 2017.
29. Phillips SP, Carver L. Early parental loss and self-rated health of older women and men: a population-based, multi-country study. *PLoS One* 2015;10(4):e0120762. [published Online First: 2015/04/02]
30. Wilcox HC, Kuramoto SJ, Lichtenstein P, et al. Psychiatric morbidity, violent crime, and suicide among children and adolescents exposed to parental death. *J Am Acad Child Adolesc Psychiatry* 2010;49(5):514-23; quiz 30. [published Online First: 2010/05/01]
31. Sadruddin AFA, Ponguta LA, Zonderman AL, et al. How do grandparents influence child health and development? A systematic review. *Soc Sci Med* 2019;239:112476. [published Online First: 2019/09/21]
32. Goldman PS, van Ijzendoorn MH, Sonuga-Barke EJS, et al. The implications of COVID-19 for the care of children living in residential institutions. *Lancet Child Adolesc Health* 2020;4(6):e12. [published Online First: 2020/04/25]
33. Musser ED, Riopelle C, Latham R. Child maltreatment in the time of COVID-19: Changes in the Florida foster care system surrounding the COVID-19 safer-at-home order. *Child Abuse Negl* 2021;116(Pt 2):104945. [published Online First: 2021/02/07]
34. Desmond D, Gow J. The cost-effectiveness of six models of care for orphan and vulnerable children in South Africa, 2001.
35. Edwards J. Protect a generation. The impact of COVID-19 on children's lives. London, UK: Save the Children, 2021.
36. World Bank Group. Global economic prospects: A Strong but Uneven Recovery Washington, DC: World Bank Group; 2021 [updated June 2021]. [Available from: https://openknowledge.worldbank.org/bitstream/handle/10986/35647/9781464816659.pdf, accessed June 22 2021].
37. Brown SM, Orsi R, Chen PCB, et al. The Impact of the COVID-19 Pandemic on Child Protection System Referrals and Responses in Colorado, USA. *Child Maltreatment*;0(0):10775595211012476. [published Online First: 2021/04/26]
38. Kaiser Permanente. The important role of policy in addressing childhood trauma during COVID-19 and beyond: Institute for Health Policy Kaiser Permanente; 2020 [Available from: https://www.kpihp.org/blog/the-important-role-of-policy-in-addressing-childhood-trauma-during-covid-19-and-beyond/, accessed 14 June].
39. World Health Organization. COVAX: Working for global equitable access to COVID-19 vaccines Geneva, Switzerland: World Health Organization; 2021 [updated 2021]. [Available from: https://www.who.int/initiatives/act-accelerator/covax, accessed June 20 2021].
40. World Health Organization. COVAX Joint Statement: Call to action to equip COVAX to deliver 2 billion doses in 2021 Geneva, Switzerland: World Health Organization; 2021 [updated 2021. [Available from: https://www.who.int/news/item/27-05-2021-covax-joint-statement-call-to-action-to-equip-covax-to-deliver-2-billion-doses-in-2021, accessed June 20 2021].
41. Slater J. These twins are 5 years old. They lost both parents to COVID-19. India's devastating coronavirus surge turned children into orphans. *Washington Post* 2021 June 17.

42. Xu J, Yang X, Yang L, et al. Clinical course and predictors of 60-day mortality in 239 critically ill patients with COVID-19: a multicenter retrospective study from Wuhan, China. *Crit Care* 2020;24(1):394. [published Online First: 2020/07/08]
43. Better Care Network, Save the Children, The Alliance for Child Protection in Humanitarian Action, et al. Guidance for Alternative Care Provision During COVID-19. Johannesburg, South Africa: Better Care Network, 2020:69.
44. Changing the Way We Care. Program guidance: preventive and responsive support to children, families and alternative care providers during COVID-19, 2020.
45. United Nations General Assembly. Rights of the child. Resolution adopted by the General Assembly on 18 December 2019. New York, NY: United Nations General Assembly, 2019.
46. Better Care Network. Key recommendations for the 2019 UNGA Resolution on the Rights of the Child with a focus on children without parental care: Better Care Network; 2020 [updated 2020. [Available from: https://bettercarenetwork.org/sites/default/files/2019-12/17%20December%202019%20Key%20Recommendations%20for%20UNGA%20Final.pdf, accessed June 20 2021].
47. Save the Children. COVID-19 child protection case management guidance 2020 [updated 2020]. [Available from: https://bettercarenetwork.org/sites/default/files/2020-04/Save%20the%20Children%27s%20COVID-19%20CP%20Case%20Management%20Guidance%20FINAL.pdf, accessed June 22 2021].
48. Changing the Way We Care. Key messages and guidance to prevent and respond to COVID-19 for: children, parents/caregivers, communities, residential care facilities 2020 [updated 2020]. [Available from: https://bettercarenetwork.org/sites/default/files/2020-05/Key%20messages%20%20COVID.pdf, accessed June 22 2021].
49. Changing the Way We Care, USAID, GHR Foundation, et al. Guidelines for virtual monitoring of children, their families and residential care facilities during the COVID-19 pandemic: Changing the Way We Care; 2020 [updated 2020]. [Available from: https://bettercarenetwork.org/sites/default/files/2020-07/46.01_EN_COVID19%20Virtual%20Monitoring%20of%20Children_EN_14May2020_ver1.1.pdf, accessed June 22 2021].
50. Kentor RA, Kaplow JB. Supporting children and adolescents following parental bereavement: guidance for health-care professionals. *Lancet Child Adolesc Health* 2020;4(12):889-98. [published Online First: 2020/11/21]
51. Faith to Action Initiative. Importance of family 2020. [Available from: https://www.faithtoaction.org/, accessed Sep 2 2020].
52. Goldman P, Kurtishi S. Public expenditure and children's care: guidance note: Changing the Way We Care; 2021 [updated January 2021. [Available from: https://bettercarenetwork.org/sites/default/files/2021-02/135.11_EN_Public%20Expenditure%20and%20Children%27s%20Care.pdf, accessed June 22 2021].
53. U.S. Centers for Disease Control and Prevention. Reaching Rural and Remote Workers with COVID-19 Vaccinations Atlanta, GA: U.S. Centers for Disease Control and Prevention;

2021. [Available from: https://www.cdc.gov/vaccines/covid-19/health-departments/essential-workers/rural.html, accessed June 22 2021].
54. Sherr L, Cluver L, Tomlinson M, et al. Beyond Masks Societal impacts of COVID-19 and accelerated solutions for children and adolescents. Florence, Italy: UNICEF, 2020.
55. International Labour Organization, UNICEF. Towards universal social protection for children: Achieving SDG 1.3. New York and Geneva: UNICEF and ILO, 2019.
56. World Bank Group. The State of Social Safety Nets 2018. Washington, DC: World Bank Group, 2018.
57. Bastagli F, Hagen-Zanker J, Sturge G. Cash transfers: what does the evidence say? London, UK: ODI; 2016 [updated 2016]. [Available from: https://odi.org/en/publications/cash-transfers-what-does-the-evidence-say-a-rigorous-review-of-impacts-and-the-role-of-design-and-implementation-features/, accessed June 20 2021].
58. Glassman A. Millions Saved: New Cases of Proven Success in Global Health. Washington, DC: Center for Global Development, 2016.
59. Chiang L, Howard A, Butchart A. Taking Action to Prevent Violence Against Adolescents in the Time of COVID-19. *J Adolesc Health* 2021;68(1):11-12. [published Online First: 2020/11/14]
60. Handa S, Halpern CT, Pettifor A, et al. The Government of Kenya's Cash Transfer Program Reduces the Risk of Sexual Debut among Young People Age 15-25. *PLOS ONE* 2014;9(1):e85473.
61. Tirivayi N. Barriers to and Facilitators of Contraceptive Use Among Married Adolescent Girls in Six Sub-Saharan African Countries. In: Konte M, Tirivayi N., ed. Women and Sustainable Human Development Gender, Development and Social Change: Palgrave Macmillan, 2020.
62. Tappis H, Doocy S. The effectiveness and value for money of cash-based humanitarian assistance: a systematic review. *Journal of Development Effectiveness* 2018;10(1):121-44.
63. Gentilini U. A game changer for social protection? Six reflections on COVID-19 and the future of cash transfers Washington, DC: World Bank Group; 2021 [Available from: https://blogs.worldbank.org/developmenttalk/game-changer-social-protection-six-reflections-covid-19-and-future-cash-transfers, accessed June 20 2021].
64. Ward CL, Wessels IM, Lachman JM, et al. Parenting for Lifelong Health for Young Children: a randomized controlled trial of a parenting program in South Africa to prevent harsh parenting and child conduct problems. *J Child Psychol Psychiatry* 2020;61(4):503-12. [published Online First: 2019/09/20]
65. Garder F, Knerr W, Lachman JM, et al. Parenting for preventing risk of child maltreatment in low and middle-income countries (LMICs): updated global systematic review and meta-analysis. SPR meeting. Washington DC, 2019.
66. Cluver L, Meinck F, Steinert J, et al. Parenting for Lifelong Health: A pragmatic cluster randomised controlled trial of a non-commercialised parenting programme for adolescents and their families in South Africa. *BMJ Global Health* 2018;3(e000539)

67. Puffer ES, Annan J, Sim AL, et al. The impact of a family skills training intervention among Burmese migrant families in Thailand: A randomized controlled trial. *PLoS One* 2017;12(3):e0172611. [published Online First: 2017/03/30]
68. Cluver L, Lachman JM, Sherr L, et al. Parenting in a time of COVID-19. *Lancet* 2020;395(10231):e64. [published Online First: 2020/03/30]
69. Greco G, Knight L, Ssekadde W, et al. Economic evaluation of the Good School Toolkit: an intervention for reducing violence in primary schools in Uganda. *BMJ Global Health* 2018;3(2):e000526.
70. Lund C, Orkin K, Witte M, et al. Economic Impacts of Mental Health Interventions in Low and Middle Income Countries: A Systematic Review and Meta-Analysis. Working Paper, 2020.
71. Michelson D, Malik K, Krishna M, et al. Development of a transdiagnostic, low-intensity, psychological intervention for common adolescent mental health problems in Indian secondary schools. *Behaviour Research and Therapy* 2020;130:103439.
72. Betancourt TS, Jensen SKG, Barnhart DA, et al. Promoting parent-child relationships and preventing violence via home-visiting: a pre-post cluster randomised trial among Rwandan families linked to social protection programmes. *BMC Public Health* 2020;20(1):621. [published Online First: 2020/05/08]
73. Arriagada AM, Perry J, Rawlings L, et al. Promoting Early Childhood Development through Combining Cash Transfers and Parenting Programs. Policy Research Working Paper; No 8670. Washington, DC: World Bank Group, 2018.
74. Hoddinott J, Ahmed A, Karachiwalla NI, et al. Nutrition behaviour change communication causes sustained effects on IYCN knowledge in two cluster-randomised trials in Bangladesh. *Matern Child Nutr* 2018;14(1) [published Online First: 2017/08/07]
75. Lotka AJ. Théorie analytique des associations biologiques. Deuxième Partie. Analyse démographique avec application particulière à l'espèce humaine. Paris: Hermann et Cie 1939.
76. Improved methods and assumptions for estimation of the HIV/AIDS epidemic and its impact: Recommendations of the UNAIDS Reference Group on Estimates, Modelling and Projections: The UNAIDS Reference Group on Estimates, Modelling and Projections. *AIDS* 2002;16(9):W1-W14.
77. United Nations Population Division. World Population Prospects - Population Division - United Nations United Nations; 2020. [Available from: https://population.un.org/wpp/Download/Standard/Mortality/, accessed June 30, 2021].