

Predicting long-term outcomes for children affected by HIV and AIDS: perspectives from the scientific study of children's development

Alan Stein^a, Christopher Desmond^b, James Garbarino^c,
Marinus H. Van IJzendoorn^d, Oscar Barbarin^e, Maureen M. Black^f,
Aryeh D. Stein^g, Susan D. Hillis^h, Seth C. Kalichmanⁱ, James A. Mercy^j,
Marian J. Bakermans-Kranenburg^d, Elizabeth Rapa^k, Janet R. Saul^l,
Natasha A. Dobrova-Krol^d and Linda M. Richter^m

The immediate and short-term consequences of adult HIV for affected children are well documented. Little research has examined the long-term implications of childhood adversity stemming from caregiver HIV infection. Through overviews provided by experts in the field, together with an iterative process of consultation and refinement, we have extracted insights from the broader field of child development of relevance to predicting the long-term consequences to children affected by HIV and AIDS. We focus on what is known about the impact of adversities similar to those experienced by HIV-affected children, and for which there is longitudinal evidence. Cautioning that findings are not directly transferable across children or contexts, we examine findings from the study of parental death, divorce, poor parental mental health, institutionalization, undernutrition, and exposure to violence. Regardless of the type of adversity, the majority of children manifest resilience and do not experience any long-term negative consequences. However, a significant minority do and these children experience not one, but multiple problems, which frequently endure over time in the absence of support and opportunities for recovery. As a result, they are highly likely to suffer numerous and enduring impacts. These insights suggest a new strategic approach to interventions for children affected by HIV and AIDS, one that effectively combines a universal lattice of protection with intensive intervention targeted to selected children and families.

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^aSection of Child & Adolescent Psychiatry, University of Oxford, Oxford and School of Public Health, University of Witwatersrand, ^bHuman and Social Development Research Programme, Human Sciences Research Council, Durban, ^cDepartment of Psychology, Loyola University, Chicago, ^dCentre for Child and Family Studies, Graduate School of Social and Behavioural Sciences, Leiden University, The Netherlands, ^eCenter for Children, Families and Schools, Tulane University, New Orleans, ^fDepartment of Pediatrics, University of Maryland School of Medicine, Baltimore, ^gHubert Department of Global Health, Emory University, Atlanta, ^hNational Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, ⁱDepartment of Psychology, University of Connecticut, Storrs, ^jDivision of Violence Prevention, National Center for Injury Prevention and Control, ^kSection of Child & Adolescent Psychiatry, University of Oxford, Oxford, ^lDivision of Global HIV/AIDS, Center for Global Health, Centers for Disease Control and Prevention, Atlanta, and ^mHIV/AIDS, STIs, and TB Research Programme, Human Sciences Research Council, Durban.

Correspondence to Christopher Desmond, Human and Social Development research program, Human Sciences Research Council, 750 Francois Road, Intuthuko Junction, Cato Manor, Durban, KwaZulu-Natal, South Africa 4001.

E-mail: cdesmond@hsrc.ac.za

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Introduction

Studies of the impact of caregiver HIV and AIDS on children are currently limited to identification of immediate and short-term health, development, educational and social consequences. Partly because the epidemic is relatively new, we have little longitudinal work to guide our understanding of caregiver HIV on children's longitudinal development, whether or not the children are infected themselves. Thus, we need to use the research on the impact of other kinds of related childhood adversities to inform our understanding and the development of interventions.

Over the course of more than 100 years, the science of children's development has built up a formidable body of evidence. Utilizing a wide range of methodologies, naturalistic and experimental, as well as longitudinal and cohort studies, we now understand how children develop and what affects their development [1]. This science can be used to better understand the short and long-term implications of HIV and AIDS for children, and how best to protect them from harm, and to mitigate harm should it occur. Following the Second World War, in efforts to understand the needs of separated and orphaned children, the work of John Bowlby, Mary Ainsworth and others demonstrated the value of applying basic science to complex social problems affecting children [2]. We aim to consider lessons from the broader science of child development to inform how best to protect and assist children affected by HIV and AIDS. By definition, the broader literature does not deal specifically with HIV-affected children, but there is a considerable knowledge base about how children face similar challenges, including parental death and separation, parental mental illness, family break-up, abandonment, institutionalization, undernutrition and violence. This wealth of literature provides valuable insights to guide timely policy and programmes for children affected by adult HIV.

Methodology

United States President's Emergency Plan for AIDS Relief (PEPFAR)/United States Agency for International Development (USAID) commissioned nine papers from acknowledged experts in relevant fields of child development to extract insights from their knowledge relevant to children affected by HIV and AIDS [3–11]. To inform this process, the authors were provided with a summary of the literature on the consequences of adult HIV on affected children (see paper by Sherr *et al.* [12] in this edition). This paper is an overview of the child development contributions, summarizing key points that emerge from each of the large bodies of literature available on each topic, pointing to key references when appropriate.

The current paper begins with a discussion of the importance of taking an ecological perspective on child

development. Context is paramount when trying to take lessons from one body of research and applying them to another, including the history and characteristics of those involved, and where and how they live. We highlight insights regarding the parent–child relationship, including divorce, parental mental health and parental death, as well as the critical role of parent–child attachment (the emotional bond between a child and his/her protective caregiver). We also discuss relevant lessons learned from the long-term follow-up of children affected by violence and undernutrition. Finally, we seek to identify common insights and discuss how they may inform our understanding of the long-term implications for children of being affected by adult HIV and AIDS, and identify implications for policies and programmes.

An ecological perspective¹

One of the core insights of an ecological perspective is that child development does not take place in isolation. However, it occurs as a complex interaction of a child's biology and psychology with the influences of family, neighbourhood, school, community, culture and society [13]. Thus, efforts to understand the link between short and long-term consequences of HIV and AIDS must consider the child's context, ranging from the family to the society. In addition, because children differ genetically, temperamentally and by age and sex, effects found in one child may not generalize to other children, even in the same context.

Thus an ecological perspective draws attention away from single influences and towards the accumulation of both risks and developmental assets. Child characteristics, caregivers' actions and supportive aspects of the environment can protect children against long-term harm [14]. However, this depends on the balance between risks and assets. Informed by mainstream developmental science, we know that predicting long-term outcomes for children affected by HIV and AIDS is best undertaken, not by identifying a single causal chain from a specific risk factor to a long-term outcome, but by identifying the accumulation of risks and the depletion of assets which are likely to lead to long-lasting harm. The evidence reviewed, including in the field of HIV, suggests that, when faced with a single risk factor, the vast majority of children are able to function relatively normally [11]. However, as the number of risk factors increase, so do the proportion of children who suffer harm – to the point where the majority of those with multiple risks suffer significant developmental difficulties in adjustment, cognitive functioning and social behaviour.

Resilience refers to the capacity of a dynamic system to adapt successfully to challenging circumstances that

¹ Based on [3].

threaten system function, viability, or development [15]. Resilience, comprising both risk and protective factors, is therefore a key concept in understanding whether and how each child will deal with adversity, and whether they will develop further problems [16]. Whereas risk and protective factors may impact children differently at different developmental stages, certain factors may also be culturally-specific [17,18]. There is no single path to resilience, and it manifests as a multilevel process operating on an individual, familial and community level. Social support is critical to enable resilience. In particular, regardless of context, parental love and acceptance are central to child development, and children who experience this form of deprivation do not thrive [19]. Although individual differences may result in a child being resilient to some risks and vulnerable to others, as risks accumulate, it becomes more difficult for any child to display resilience [20].

Disruptions of the parent–child relationship²

Parent availability and well being are fundamental to child development and thus strong predictors of child well being, especially in times of adversity. Without love and acceptance from a parent (or an alternative primary caregiver), it is extremely difficult for children to cope with adversity. HIV and AIDS can lead to parents and caregivers facing a range of adversities, including physical illness, emotional strain, financial pressures and social disruptions. If families do not have the emotional, social and material resources to cope with these adversities, their children are more likely to suffer negative consequences.

Divorce and parental death

The extensive evidence on the effects of divorce [21,22] and parent death [23] on children covers similar emotional, financial and social disruptions to those experienced by children affected by HIV.

Parent death deprives a child of the material and socio-emotional support they would have received from that parent, and potentially exposes the child to risks from which their parent might have protected them. Parental loss can lead to child depression, higher rates of accidents, poor school performance, anxiety and pessimism about the future. Some of these negative consequences can continue into adulthood in the form of higher levels of anxiety, depression and hostility [24–27]. These consequences, however, do not stem simply from the loss, but rather are largely explained by the quality of the relationship between the parent and child before death and the care the child receives after parental death [28]. Paradoxically, poorer-quality relationships predict more difficulties in coping with the loss [29].

² Based on [4,5].

Studies of divorce illustrate challenges that may arise for children when their parents are under stress and households are disrupted. Short-term implications include internalizing and externalizing problems, social–interpersonal difficulties and cognitive impacts, which can lead to further negative consequences [30]. For example, externalizing problems can lead to higher rates of school dropout and delinquency [31]. By adulthood, average levels of schooling for children of divorced parents are lower, unemployment rates higher and social relationships are of poorer quality [31]. As a group, children of divorced parents have been observed to exhibit riskier health behaviours, marry earlier, face a higher risk of divorce and be more likely to suffer from depression [32,33]. The number of negative consequences which persists into adulthood is large, but the proportion of children who will experience them is small. The negative consequences cluster within a minority of children, and most children of divorce function well. It is difficult to separate the negative developmental consequences of pre-divorce parental conflict from the divorce itself, although parental relationship quality prior to the divorce seems to be more influential to the developing child than the separation itself [34,35]. Thus, in the context of family disruption and HIV, it is likely that the quality of relationships with caregivers will be critical for child development.

Parental mental health

The relationship between parents' mental health and child outcomes is important in the context of HIV and AIDS. An HIV diagnosis can lead to adult mental health problems, as can health, financial and social stresses associated with HIV and AIDS. Depression in the context of HIV has been associated with a twofold increase in mortality for women with chronic depression compared to no depression and a reduction in adherence to antiretroviral medication [36,37]. Furthermore, following treatment for depression, people with HIV are 80% more likely to adhere to antiretroviral medication [38]. Given that these adults are often responsible for children's care and medication, this emphasizes the importance of attending to parental mental health.

There is a large body of evidence that mental health disorders in parents and caregivers are associated with an increase in a range of psychological and developmental disturbances in children, including in the longer term [39,40]. Three domains of child psychological development are at an increased risk: attention and cognition; emotional and behavioural adjustment, including depression and antisocial behaviour; and attachment or the quality of the parent–child relationship. There is also evidence that children of mothers with depression in low and middle-income countries (LMICs) may have compromised growth and are exposed to more environmental risks for disease through, for example, poor hygiene [41]. However, whereas parental disorder may

serve as a risk factor for children, the transmission of psychopathology is by no means inevitable.

The quality of care a child experiences from a caregiver is a key mediator in the association between parental mental health and child development and well being. Parental mental health may affect quality of care through changes in parental availability, emotions, behaviours and cognitions. Of particular concern is when the adults become preoccupied as a result of deterioration in their mental health. Preoccupation interferes with attention and responsiveness [42]. From the first few months of life, infants are sensitive to their carers' communications, and seek out the responses of parents. Parental preoccupation has the potential to adversely affect parenting and ultimately child development. In addition to emotional withdrawal, parents can also transmit negative cognitions about self, the family and the outside world, thus reducing a child's ability to cope and be resilient.

Attachment and institutional care³

Despite evidence of harm, the number of orphanages in HIV-affected countries continues to grow [43]. HIV-positive children are more likely to live in institutions [44] and parental loss (from death or serious illness) may increase the risk that affected children are placed in institutions.

Institutional care has been called a form of structural neglect of young children [45]. The nature of orphanages (large group care residential environments) – regimented, with shift workers, high staff turnover and often low staff-to-child ratios – prevent children from forming a close relationship with at least one stable caregiver [46]. Such relationships are central to children's healthy development, and despite an abundance of food, orphans often fail to thrive [47]. Young children in particular need a continuous and predictable attachment to develop their psychological and interpersonal capacities, to feel supported and safe, and to be protected from being overwhelmed by threatening events. The parent-child relationship creates the environment in which children grow physically and mentally [48]. Poor attachment in institutions predicts severely impaired physical and neural growth [49], problem behaviours and lower levels of social competency [50]. Indiscriminate friendliness to adults is common among institutionalized children and often a concomitant of poor attachment. Whereas it is potentially an effective strategy to gain attention from visitors and staff, in the long term, it is dysfunctional and potentially leads to negative long-term implications for social development [51].

Institutional care, particularly dormitory-style orphanages, are arguably outside the range of average expectable environments to which children have been biologically equipped to adapt. The detrimental effects of institutional

group care are now widely acknowledged, for example, in a consensus statement of child development experts for the American Orthopsychiatric Association [52]. However, long-term negative consequences are not inevitable or irreversible. Some children exhibit incredible resilience [53]. Recent evidence suggests that genetic differences may partially explain some of the large variation in resilience to institutional care [54]. Relatedly, physical attractiveness, temperamental reactivity and better cognitive development might provoke a richer and more sensitive rearing environment [55]. Even when a child in an institution is on a negative trajectory, radical changes in the care environment, such as adoption or foster care into a more stable caregiving environment, can help to improve short-term outcomes and long-term prospects [52,55].

Violence against children⁴

Children affected by HIV have been shown to be at increased risk of exposure to violence, including abuse [11]. The evidence linking exposure to violence to long-term impacts on children provides an indication of what outcomes we might expect for HIV-affected children who experience violence.

Mounting evidence suggests that more than one billion children are exposed to violence each year – including physical, sexual and emotional forms of abuse or neglect, and witnessing violence between adults. This violence may occur at home, or in schools and communities. Children affected by interpersonal violence may live in settings that are also affected by armed conflict. Such exposure causes immediate harm to children, and has the potential to have a lasting impact, affecting the outcomes of the worst affected children over their lifetime [56]. Moreover, children do not always get the support they need because interpersonal violence in the home is generally invisible and the effects may only become evident many years later.

There is strong evidence supporting the occurrence of long-term negative outcomes, including risks of injury, infectious diseases, mental health problems, reproductive health problems, and non-communicable diseases [56–60]. Of particular concern to the HIV field is that childhood exposure to violence is associated with risky sexual behaviour later in life [56,61,62]. Child maltreatment and exposure to intimate partner violence in girls is associated with earlier sexual debut, an increased number of sexual partners and higher rates of teen pregnancy [56,63,64]. When combined with other adversities, the consequences appear to be magnified. For example, street children who are also exposed to violence have increased risk of HIV acquisition [65,66]. Moreover, exposure to violence in childhood is associated with an increased

³ Based on [6].

⁴ Based on [7].

likelihood in adulthood of becoming a perpetrator of sexual and intimate partner violence among men, and being a victim of violence among women [67]. This emphasizes the importance of dealing with violence in the prevention of HIV.

Growth and development⁵

As described in the paper by Sherr *et al.* [11] in this series, a number of factors associated with being affected by HIV and AIDS have the potential to limit children's growth and development. Children may acquire HIV through prenatal exposure or breast feeding, which can affect their growth and development [68]. HIV-exposed, but uninfected children, are also at increased risk of adverse outcomes, in part, because of their rearing environment (economic hardship, parental mental ill health or neglect following the death of a caregiver), but also because exposure *in utero* to HIV affects immune function and thereby increases the risk of perinatal problems, including low birth weight and subsequent growth [69,70]. There is also some suggestion that antiretroviral therapy during pregnancy, although critically reducing HIV transmission, is also associated with problems such as preterm birth and low birth weight [71]. Although there is increasing evidence of an impact on growth in the context of HIV, significant gaps in knowledge remain, including the impact of prolonged antiretroviral exposure, the cause of HIV-associated growth faltering, the effects of early-infancy testing on continuation of breastfeeding and specific nutrition interventions needed for HIV-infected children [68–71].

There is a close association between early nutrition and both short and long-term human capital outcomes [72,73]. Growth (height-for-age) is typically used as an indicator of nutritional status. Growth failure can indicate an energy deficiency or the absence of sufficient micronutrients required for growth; it can also occur as a result of emotional stressors, independent of food availability, as indicated earlier with respect to orphanages. The first 1000 days (pregnancy and the first 2 years) are particularly important because it is a period of rapid brain, psychological and physiological development. Inadequate nutrition during this period results in slower linear growth and delayed psychosocial development [74,75].

Deficits in height at the age of 2 years have been linked to a range of adverse outcomes [76]. Evidence from a follow-up study in Guatemala of more than 40 years has shown that children who are stunted by age 2 experience poorer cognitive development and complete fewer years of schooling. As adults, these children also have less educated partners, a lower average age at birth of their first child, higher fertility rates, reduced income and higher

rates of poverty [77]. Thus, the impact of caregiver HIV and AIDS on child growth in the early years of life may have major long-term consequences.

Common insights

Several common themes emerge: the importance of context and individual differences; the increased likelihood of children developing difficulties when exposed to multiple or enduring hardships in the absence of personal, social and material assets; and the possibility of resilience, with some children, in some circumstances, being able to cope with some adversities with few apparent negative consequences. Poor parental mental health, separation, death, undernutrition, institutionalization and exposure to violence have all been demonstrated to have the potential to seriously limit children's health, well being and capacity. These effects may occur in both the short and long term, with effects enduring well into adulthood. However, none of these adversities, considered independently, inevitably leads to poor outcomes. The prevention of adverse effects through protection, and the mitigation of their effects through affectionate and stable family relationships, social support and normalization can make a critical difference to a child's ability to cope [15].

In this issue, Sherr *et al.* [11] highlight how many children affected by HIV and AIDS experience multiple adversities – particularly when the impacts occur in the context of poverty, high levels of stigma and a lack of social and other services. The poor mental health outcomes of affected children reported in the HIV-specific literature provide a clear indication of the overwhelming impact of multiple stressors on the developing child. The common insight that multiple stressors (including of the type experienced by HIV-affected children) can lead to serious long-term negative outcomes when combined, suggests that we should be much more concerned about long-term outcomes for children affected by multiple risks than is currently the case. Enabling affected children to enter adolescence and the period of risk for HIV infection with protection support and resilience is an indispensable aspect to ensuring 'the end of AIDS'.

Policies, programmes and interventions

Universal policies and programmes designed to support families' capacity to protect and nurture children and improve child-rearing conditions help shield children from the worst effects of hardship. Policies, services (including free health and education for all children) and social norms that promote parenting, child safety and child nurture can help all families. In the context of high HIV prevalence, these include efforts to strengthen families economically through cash transfer programmes,

⁵ Based on [8,9].

health insurance, savings initiatives and livelihood activities [75]. Laws against discrimination are essential to protect individuals and families affected by HIV, as well as minorities, migrants and members of stigmatized groups, including sex workers. Institutionalization can be averted through alternative placements, such as adoption, foster care and short-term care in group homes until a permanent home can be found for a child. These measures require commitment at all levels of government, as well as support at the community level through civic mobilization to provide the much needed social support and help to break down the isolation often experienced by affected groups. Families and children with mental health problems, substance abuse, violence, bereavement and other life stresses, including HIV, need assistance through accessible social services and support [78]. There is now encouraging evidence that interventions provided by non-professionals at the community level, either through home visits or small groups for identified high-risk groups, are effective for a number of family and personal challenges. Apart from information, social support and companionship, many of the interventions involve normalization, re-framing and other techniques drawn from cognitive behaviour therapy. Successes have been demonstrated with these approaches, among others, with respect to maternal and child survival and child development [79], maternal depression and exposure to interpersonal violence [80], psychological distress [81], parenting [82], and HIV-positive women during pregnancy [83].

A small proportion of families and children – those who experience major physical, psychological or social disturbances – require intensive multidimensional interventions provided or complemented by professional teams. These services are only available in very few countries that are highly affected by HIV; yet, individuals and families with poor health and adjustment, little education, and limited social connections contribute disproportionately to social costs and to the ongoing cycle of HIV infection. Current interventions for children affected by adult HIV tend to be low intensity and not always supported by evidence, and opportunistically targeted depending on the operational sites of the international non-governmental and local community organizations that undertake this work [84].

The results of this paper and the Sherr *et al.* [11] synthesis papers suggest that the overall strategy for responding to children affected by HIV could be strengthened by simultaneously pursuing two main critical goals. Firstly, it would be important to create a scaffold of universal supports, services and protections for all HIV-affected children. In high HIV-prevalence environments, these may help to prevent, minimize and mitigate pre-existing and HIV-related hardships experienced by children and their families. Secondly, children experiencing multiple and/or enduring adversity, who have low levels of physical, psychological, and social resources, need to be

targeted for intensive, longer-term interventions to help ensure they live in safe, caring and stable family environments with opportunities to remain in school and participate in community life. To achieve this would require a range of economic, social, educational and psychological interventions to be directed to this smaller group of children in especially challenging circumstances.

In conclusion, to date, research on children affected by HIV and AIDS has been limited to impacts over the short term. Longer-term follow-up and cohort studies in LMICs are urgently needed to better understand the nature, duration and extent of impacts on children. However, the absence of evidence of long-term negative implications of childhood adversity associated with HIV and AIDS should not be interpreted as evidence that these long-term negative implications do or will not occur. While we wait for better data, we can draw on the knowledge we have in other areas of child development, which, although not directly transferable to the context of HIV and AIDS-related childhood adversity, is highly informative. The impact on children of the adversities examined can be pervasive, but it is also individually determined and dependent on context. The majority of children do not suffer enduring harm because of the nurturance and support they receive from family, friends and others. However, a smaller proportion of children, especially those who suffer multiple or enduring adversity without protective assets, will suffer impairments and these in turn are likely to diminish or disturb their cognitive, emotional and social capacities for the rest of their lives. This insight suggests a new strategic framework may be needed, including universal, targeted and selected interventions, to ensure the appropriate investment of resources where they are likely to be most effective. The scale of the problem, the possibility of long-term implications and the level of funding required necessitate that responses to children affected by HIV and AIDS are informed by the best available science. This may not always be available within the specific field of HIV studies, but it is available in the scientific literature on children and families. We must draw on these bodies of knowledge if we are to do our best in preventing and mitigating both the short and long-term consequences for children growing up in the HIV epidemic.

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Conflicts of interest

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