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## LITERATURE REVIEW

# HIV and Caregiver Common Mental Disorder

Synergistic Impacts on Child Development and Entry Points for Interventions



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**Cover photo**

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## Acronyms

AIDS	Acquired immunodeficiency syndrome
ARV	Antiretroviral medication
CBO	Community-based organization
CHWs	Community health workers
CMDs	Common mental disorders
HIC	High-income countries
HIV	Human immunodeficiency virus
LMICs	Low- and middle-income countries
MDGs	Millennium development goals
MLH	Mothers living with HIV
NGO	Non-governmental organization
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PLWH	Persons living with HIV
PMTCT	Prevention of mother-to-child transmission
PND	Postnatal depression
PTSD	Post-traumatic stress disorder
RCT	Randomized controlled trial
SDGs	Sustainable development goals

## Definitions of Common Mental Disorders

### DEPRESSION

Depression (clinical diagnosis: major depressive disorder) is characterized by disturbances in cognition, affect, sleeping patterns and appetite. Depression also causes severe symptoms that may affect an individual's capacity ability to carry out the tasks of daily living.

### POSTNATAL DEPRESSION

Similar in manifestation to major depressive disorder (depression), postnatal depression affects women after having a baby. It's a common problem, affecting more than one in every 10 women within a year of giving birth.

### ANXIETY

Anxiety disorders are characterized by excessive levels of anxious arousal, which endure for an extended period of time. People with generalized anxiety disorder – the most common anxiety disorder – display excessive anxiety or worry for months, and face several anxiety-related symptoms, which include somatic, cognitive, and affective symptoms.

### POST-TRAUMATIC STRESS DISORDER

Post-traumatic stress disorder (PTSD) is a mental health disorder that develops in some people who have experienced a traumatic event. Symptoms, which include re-experiencing the traumatic event, intrusive thoughts about the event, and other somatic, cognitive, and emotional disturbances, usually begin within 3 months of the traumatic incident. Symptoms must last more than a month and must interfere with normative functioning.

### SUBSTANCE USE DISORDERS

Substance use disorder, commonly termed drug addiction, is a condition in which an individual's use of one or more psychoactive substances leads to clinically significant distress and/or impairment in functioning. Substance use disorders lead to negative physical and mental health sequelae for the user.

### ALCOHOL USE DISORDER

Alcohol use disorder (AUD) is a chronic mental health disorder characterized by problems controlling alcohol intake, compulsive alcohol use and a negative emotional state when not using alcohol (or withdrawal symptoms). AUD, which may be mild, moderate or severe, has a debilitating impact on an affected individual's capacity to function, and may cause long-term damage to the body and brain.

## Executive Summary

### INTRODUCTION

For children to thrive they must have their needs met in multiple domains and across the life-course; yet, millions of children under the age of five will not meet their developmental potential. Part of the reason for this is due to the burden of HIV coupled with the high prevalence rate of common mental disorders in many low- and middle-income countries (LMICs). In this paper we review published literature on the mental health status of mothers living with HIV (MLH) and how this affects their children; we outline the pathways between maternal HIV, maternal mental health problems, and negative child outcomes; and then describe a number of intervention entry points that we argue have the potential to enhance impact across PEPFAR platforms.

### METHOD OF REVIEW

Papers were considered eligible for inclusion if they pertained to HIV; mothers living with HIV and their children; the psychosocial correlates of HIV; and depression as a risk factor. Studies were identified using the following search terms (HIV; AIDS; mothers living with HIV; MLH; children affected by HIV; AIDS-affected children; depression; maternal depression; maternal mental health; families affected by HIV; HIV-affected families; and AIDS orphan) and a search of the following electronic databases: PubMed, Medline, The Cochrane Library, PsycINFO, EBSCO Host, and Google Scholar.

### DISCUSSION

Poverty, HIV and mental health problems present a cumulative and mutually reinforcing burden for women in LMICs: HIV puts women at risk for mental illness and mental illness puts women at risk for HIV, and that both conditions impact on caregiving; that children of mothers with HIV and mental disorder, and non-maternal caregivers with mental disorders are at especial risk of negative developmental outcomes; and that there is a cumulative negative impact of maternal or caregiver HIV and mental disorder on children.

### IMPLICATIONS

Drawing on these findings, we outline possible entry points for intervention with particular emphasis on platforms of interest for PEPFAR programming. First and foremost, we highlight the importance of integrating screening for mental disorders into primary health care settings and at the community level. Secondly, we note that delivering effective interventions to caregivers and children in adverse settings will require a mix of types of interventions and delivery platforms. These include community platforms, such as community-based organizations, home visiting interventions and school-based platforms. At the level of health care, developing systems of collaborative stepped care to link communities to the health care system is imperative, as are family-based interventions. Finally, at the population level, structural interventions, such as microfinance and cash transfers, can address the structural drivers of HIV risk and mental illness, and are therefore essential in order to complement other preventive and curative efforts. Given the links between maternal mental health and maternal HIV and child outcomes, we also consider how targeted interventions might interrupt these pathways.

## CONCLUSIONS AND RECOMMENDATIONS

This review shows that children affected by concurrent maternal HIV and depression may be more negatively affected than they would by either one on its own, and that the vulnerabilities they experience are multifaceted, enduring and may accumulate over time. These include vulnerability to negative outcomes in the realm of physical and emotional health, education and psychological adjustment. We argue that the links between HIV and mental health are bi-directional and cumulative. Finally, we describe a number of possible delivery platforms and types of intervention entry points with potential to enhance impact across PEPFAR platforms. We recommend a number of strategies to ensure a more integrated and holistic response to HIV infection, risk and caregiver depression.

### RESEARCH PRIORITIES SHOULD INCLUDE:

- There is increased research into the mutually reinforcing detrimental synergy between HIV and depression among mothers, and its effects on their children;
- More needs to be done to understand the pathways from maternal depression to HIV, and from HIV to depression.

### IMPLEMENTATION PRIORITIES SHOULD INCLUDE:

- The CBO workforce becomes involved in screening and referral;
- Home visiting becomes an essential component of community provision, particularly in the context of inaccessible formal health infrastructure;
- Home visiting, with local-tailored content addressing local health risks, strong supervision and accountability, offers a viable strategy to address HIV risk and maternal depression, and is scalable globally;
- CBOs that reach the most vulnerable and marginalized children become important platforms that offer children more specialized support and not only the broad spectrum of services that they currently offer;
- Funders and countries adopt a family-based approach to ensure that the broader system implications of HIV and depression are not ignored, and that interventions are able to leverage wider resources within families;
- Schools are used as entry points for parenting programs and referral to clinical tier platforms that use nurses to screen children for mental health problems and refer up to specialist care;
- Care, support and parenting programs are implemented in conjunction with cash transfers in order to enhance the impact of single interventions, and CBOs may be uniquely placed to provide this;
- Countries establish an enabling environment with transformative policies to ensure effective implementation at scale.

- There is an active effort to improve stakeholder recognition of the unique burden placed on mothers and children affected concurrently by HIV and depression;
- Funders of CBO programs should invest in developing and adapting existing capacity development programs in the area of mental health;
- Pathways to care, or “collaborative stepped care” models, are adopted to improve linkages between communities and the health care system;
- Screening at primary health care (PHC) and community levels for mental health disorders is adopted;
- Screening tools become an integral part of stepped care approaches in the recognition and treatment of common mental disorders.

## Introduction

For children to thrive they must have their needs met in multiple domains and across the life-course. Approximately 250 million children under the age of five will not meet their developmental potential due to poverty and stunting [1]. Deprivation at this age negatively impacts subsequent development, and in contexts where poverty and other risks are endemic, children and adolescents face multiple threats to their development. Linked to the transition from the Millennium Development Goals (MDGs) to the Sustainable Development Goals (SDGs), the United Nations has developed “The Global Strategy for Women’s, Children’s and Adolescents’ Health” [2]. The strategy proposes a three-pillar response – Survive (end preventable deaths), Thrive (ensure health and well-being) and Transform (expand enabling environments) agendas [2]. The Thrive agenda is a core framework in which to consider interventions to improve the welfare and development of children in LMICs.

Globally, between 34 and 39.8 million people are living with HIV [3]. Of these, about 17.8 million are women of childbearing age, most of whom live in LMICs. The burden of infection is not evenly distributed within societies, and intersections of gender, socioeconomic status and power make women particularly vulnerable to the detrimental effects of HIV [4]. Depression is a leading cause of disability globally [5], but despite these high levels, data for LMICs is limited – particularly in the context of HIV. This despite the fact that rates of a host of common mental disorders are higher among women with HIV than in the general population. It is hard to come by exact data concerning the relative risk of MLH to mental health disorders compared with the general population. However, past studies have shown that the prevalence of depression among MLH is between 41% [36] and 64% [37], whereas the general prevalence of depression among women is 5.5% [6]. Similarly, the prevalence of anxiety disorders among PLWH is 38%, whereas among the general population, it is 30.5% [7]. Where relative risk statistics are available (in the US), prevalence of HIV among people with mental health disorders has been reported to be between 5% and 23%, compared with a range of 0.3% to 0.4% in the general population [8]. It is worth noting, briefly, that tools used to assess maternal depression and anxiety vary widely, as does the application of cut-offs for each tool. For instance, some studies report postnatal depression or perinatal anxiety, specifically, while others report counts of depressive or anxiety symptoms, and an individual is considered depressed or anxious if the symptom count reaches a certain threshold. Further still, there is variation in studies between reporting on depressive or anxiety symptoms and major depression or an anxiety disorder (the latter being a mental health disorder, diagnosed according to formal criteria).

Additionally, the psychological impact of HIV is felt not only by those who are infected, but by their relatives, household and community members. HIV may diminish the physical and psychological resources of caregivers living in contexts characterized by poverty and psychosocial

stressors, placing these women at high risk for developing mental health disorders and their children for negative behavioral and developmental outcomes [4].

Both maternal and paternal HIV and mental health disorders are likely to impact child outcomes. Research in the area, however, has tended to focus on mothers. There is evidence that maternal and paternal mental health have sustained impacts on child development [9]. Depression, particularly, is common among mothers and fathers of young children [10]. Research indicates that paternal depression detrimentally impacts children's early behavioral and emotional development, and that these impacts are persistent (Ramchandani et al., 2005 [10]). However, given the current dearth of data concerning fathers, and the fact that mothers – particularly in LMICs – tend to act as primary caregivers, therefore having the most direct contact with (and likely influence on) children, the present review limits its scope to female caregivers. However, future work examining the impacts of HIV, mental health and caregiving must address paternal mental health, not only as it impacts family-wide functioning, but specifically in its influence on children.

Still, given the focus of the majority of published research, this review focuses on maternal mental health in the context of HIV. HIV is often comorbid with depression and other mental health disorders that play a substantial role in children's long-term outcomes. Mothers are thus the target of much intervention work that aims to improve developmental outcomes among children.

The extent to which the gap between small-scale efficacy studies and effective interventions at scale can be bridged will depend to a large extent on holistic programs that target the broader health concerns of women, families and children. PEPFAR's history of substantial contributions to maternal and child health around the globe, and in LMICs in particular, position them well to develop and deliver such programs. In this regard, PEPFAR's Coordinating Comprehensive Care for Children (4Children) study is already making headway. This study will evaluate the impact of adding a household-based parenting program to a standardized governmental care package in Uganda aimed at improving the reintegration of children living in residential care back into family-based care (Cluver, 2017; personal correspondence). Such work, which is focused on sustainability, intersectoral partnerships and vulnerable populations, will be key to furthering the health and development agendas of LMICs. However, particularly as concerns the mental health impacts of HIV on individuals, populations and states, further information is required in order for agents of intervention, such as PEPFAR, to invest in research and practice.

In this document we review the peer-reviewed and grey literature on the mental health status of mothers living with HIV (MLH) and how this affects their children; we outline the pathways between maternal HIV, maternal depression and negative child outcomes; and then describe a

number of intervention entry points that we argue have the potential to enhance impact across PEPFAR platforms.

Generically, mental health interventions fall into four broad categories based on two dimensions – prevention/promotion or treatment, first, and targeted or generalist, second. Thus, individuals can be targeted either:

1. As part of a broad-based mental illness prevention or mental well-being promotion intervention for whole communities (prevention, generalist).
2. As part of a targeted mental illness prevention or mental well-being promotion intervention for those considered at risk (prevention, targeted).
3. As part of a treatment intervention for entire communities or groups in which burden of disease is high.
4. As part of a treatment intervention for individuals who screen positive for mental health disorders.

Most interventions, however, fall broadly into either 1, 2, or 4: interventions that are generalist, health-promoting programs for whole communities, or those at risk, or treatment programs for those affected by mental health disorders.

In both respects, there is growing emphasis on delivering interventions that are evidence-based, thus justifying the commitment of often scarce economic and human resources to large programs [11, 12]. In the realm of caregiver mental health, programs such as Cooper et al.'s [13] Health Visitor Preventive Intervention Programme in Cape Town, South Africa (prevention, generalist), and that of Rahman, Malik, Sikander and Creed [14] in Pakistan (treatment, targeted) are exemplary in this regard, with evidence pointing to their utility easy to come by.

Despite the necessity of such interventions, however, in communities in which additional health risks abound, interventions must take these into consideration. Particularly in the case of HIV, where research has shown that unique mental health vulnerabilities are germane, mental health promotion and treatment interventions must take these into account. It is within these specific contexts that this review is concerned.

## **Context of global health and global mental health**

Between 1990 and 2015, both global neonatal and under-five mortality rates were halved, resulting in 48 million more children reaching their fifth birthday [15]. Despite this, many countries (often those with high HIV prevalence) have made less progress. In southern Africa, HIV is a significant contributor to high levels of child mortality, while under-nutrition contributes to about a third of all child deaths. Current estimates of maternal mortality suggest that there are about

350,000 maternal deaths occurring annually, but other estimates put the figure closer to 500,000 [16].

In Global Burden of Disease estimates, mental and behavioral disorders were the largest contributors to global years lived with disability (YLD) accounting for 22.7% of all YLD [17]. Despite the high prevalence of mental disorders and known correlation with poverty [18], data for LMICs is limited. The vast majority of people with a mental disorder in LMICs do not receive basic mental health care. This “treatment gap” is 50% across all countries globally, but reaches a staggering 90% for some disorders in many LMICs [19].

Mental disorders such as depression and anxiety more commonly affect women across diverse societies and social contexts [20]. Women and girls have different susceptibility and exposure to mental health risks than men, and the risk of depression for women is nearly twice that of men [21-24]. Gender also plays an important role in access to resources and treatment [25]. For girls and women between the ages of 14 and 44 years of age, anxiety and depression are the third leading cause of disease burden, while in LMICs approximately 16% of women suffer from common mental disorders (depression and anxiety) during pregnancy, and 20% postnatally [26]. Depression places adolescent girls at risk for HIV infection, other sexually transmitted infections (STIs) and unintended pregnancy [27-29]. In South Africa, rates of postnatal depression are between 34 and 48% [30, 31], while globally, the leading cause of death during pregnancy is suicide [32].

There is considerably less data from LMICs on mental disorders such as anxiety as there is for depression. In this review, we will focus predominantly on depression and anxiety. We will use the term common mental disorders (CMDs) to describe other mental disorders such as anxiety, PTSD and alcohol use disorders. Prevalence rates of mental health disorders, including depression, anxiety, and substance abuse disorders, are extremely high [36] [37]. Each of these, in turn, has consequences for parenting, and child outcomes, including child mental health, emotional well-being, cognitive development and physical health. The present review is concerned with exploring, through a review of the literature, the relationship between maternal mental and HIV, and the effects of maternal mental health on child development, adjustment and well-being, with the goal of offering a model for thinking about how the impact of mental health disorders and HIV is felt dyadically between caregivers, particularly mothers, and their children.

## Literature Review Method

Papers were considered eligible for inclusion in this review if they pertained to HIV, mothers living with HIV and their children, the psychosocial correlates of HIV and depression as a risk factor. The review draws on case studies, RCT interventions and other forms of interventions, such as cohort or observational studies. We also reviewed the available grey literature – non-peer-reviewed publications, policy briefs and reports from non-governmental organizations (NGOs), and governmental reports from the last 10 years. All literature included here was published in English. Given the broad spectrum of literature included here, the types of participants included in the literature also vary. Perhaps the majority of literature on the impacts of parental mood on child outcomes, and indeed of HIV and child outcomes, has focussed on under-fives. The literature present here represents that weighting; however, we have not limited our scope to this age range, and evidence regarding elder children is also presented. Findings relating to women and children affected by HIV and women affected by depression, as well as each of these categories (women, children, HIV and depression) in Africa and low-income settings were included, and findings from high-income countries (HICs) were used in a supplementary manner in instances where local or low-income setting evidence was lacking. Studies were identified using the following search terms (HIV, AIDS, mothers living with HIV, MLH, children affected by HIV, AIDS-affected children, depression, maternal depression, maternal mental health, families affected by HIV, HIV-affected families and AIDS orphan) and through a search of the following electronic databases: PubMed, Medline, the Cochrane Library, PsycINFO, EBSCO Host and Google Scholar.

Following the initial drafting of this report, the document was circulated to six experts in the fields of Early Child Development, HIV and maternal health. Once their comments were incorporated into the report, it was circulated to key stakeholders from the 4Children Network of community-based organizations for comment. A Skype meeting was held between the authors and these stakeholders, and stakeholders' comments and ideas were incorporated into the discussion and recommendations sections of the document.

## Understanding the Problem

### POVERTY, HIV AND MENTAL HEALTH

As noted in the introduction to this review, the burden of HIV infection is not evenly distributed within societies, and women are particularly vulnerable to the detrimental effects not only of the illness, but of its consequences (for instance, women fall under the bulk of the burden of care for deceased relatives' affected and infected children, even if not infected themselves) [4]. Equally,

mental disorders such as depression and anxiety are also more common among women worldwide [11].

A discussion of the latter – gendered vulnerabilities to mental health problems – is beyond the scope of the present work [12-15]. However, it is worth briefly exploring the intersection of gender and HIV as it pertains to women’s mental health, as this relates to the forthcoming discussion.

Gender plays an important role in HIV risk, access to resources and treatment [16]. Women are at increased risk of sexual abuse and sexual violence, leading to forced sexual debut and coercive sexual encounters in which they have no control, let alone over the use of prophylaxis [33]. Women are also more likely to remain with errant or abusive partners due to financial dependence, and young women are especially vulnerable to exposure during the course of transactional relationships with older men [34]. Women are also more vulnerable to HIV due to their physiology, and male-to-female transmission of HIV is between two and four times more efficient than female-to-male transmission [33].

Women may also lack the necessary access to resources that might protect against infection or aid in seeking treatment. The delayed economic empowerment of female workers in many countries, as well as the fact that the bulk of invisible, unpaid care and domestic work falls upon women, also contribute to women’s increased risk of acquiring HIV/AIDS [35]. Finally, in terms of HIV treatment, women often also face additional barriers to access. As mentioned above, gender-driven responsibilities of domestic work and childcare may delay or prohibit help-seeking, or women may lack the financial means or education with which to access treatments [36-38].

The relationship between poverty and mental illness is bi-directional, with two prominent pathways [18]. The first is through what is known as social causation, when people living in poverty have an increased risk of mental illness due to stress, food insecurity and the social exclusion that often comes with living in adversity [18]. The second pathway occurs when people with a mental illness drift into poverty (social drift pathway) as a result of stigma, loss of employment and reduced productivity [18]. In a similar way, people living in poverty are more likely to become HIV positive, while HIV increases the chances of an HIV-positive individual drifting into poverty as a result of illness, stigma and loss of employment [39]. HIV has been linked with depression, post-traumatic stress disorder and suicidal behavior in a range of contexts [26, 40]. HIV infection is associated with a number of negative outcomes related to disease progression, side effects of medication and financial burden of being ill [41]. In addition, HIV can exhaust income through unemployment, reduced productivity and the cost of accessing health care [42]. Families may also face significant caregiving responsibilities for sick family members and orphaned and vulnerable children [43]. There

is a substantial evidence base showing how HIV-infected women, particularly those with children, are at high risk for mental health problems [44-46]. Mental illness in the context of HIV is associated with stigma [47, 48], lack of education and family support [48], younger age, being a single parent [49], housing instability and family breakdown [47, 50]. Prevalence rates of depression among MLH range from 41% [51] to 64% [52]. Adherence to ARV treatment is affected by depression [53]. Depression, however, is only one of several mental health sequelae of HIV. Anxiety disorders [54-56] and substance abuse disorders [57] are often co-morbid with HIV. Each of these, in turn, has consequences for parenting and child outcomes. In the next section we explore in-depth the effects of maternal mental health on child development, adjustment and well-being. We also attempt to build a framework for thinking about how the impacts of mental illness and HIV are felt dyadically between caregivers and their children.

### MATERNAL MENTAL HEALTH AND CHILD DEVELOPMENT

Depression, much like HIV, is a multigenerational disorder in that its effects are felt by all members of the family and not solely by the person who is depressed. Depression that manifests during the perinatal period will be acutely felt by others (particularly children) in the household. Depression in the perinatal period is important in that the emerging social capacities make infants and young children particularly vulnerable to early disruptions to interactions with their caregivers [58, 59]. Maternal depression is associated with disturbances in the mother-infant relationship, child growth and compromised child development [30, 59-61]. In a South African study, mothers who were depressed in the early postpartum period were significantly less sensitive in interaction with their infants in early face-to-face interactions than were non-depressed mothers, and infants of depressed mothers were also less positively engaged with their mothers [30]. One of the consequences of such disturbances in the mother-infant relationship may be an irritable and withdrawn infant [62] and elevated rates of behavioral and emotional problems in children [63]. Likewise, it is possible that, if for reasons of prenatal exposure to maternal dysregulation, the infant is irritable and withdrawn, this can aggravate the mother's postnatal depression or make parenting more challenging [64-66].

In LMICs, differences between attentive and inattentive care may be more pronounced as a result of violence, food insecurity and poor sanitation, while suboptimal care from the mother may have detrimental effects for the health of her child [67]. Children of depressed mothers are more likely to experience temperamental difficulties [68], behavioral problems [69], childhood depression [68], delays in cognitive development and diminished educational attainment [68, 70-72]. When mothers are living with depression, their capacity for sensitive, attuned caregiving is often

diminished, and their availability to provide stimulating childcare is reduced [59]. Child under-nutrition in the context of maternal depression is associated with poor infant and child growth and has been linked to poor self-care skills, poor illness detection and poor care-seeking behavior [73-75]. As will be expanded upon presently, however, there are several salient genetic, environmental and social factors that mediate the relationship between maternal depression and child outcomes. Thus, there is not a one-to-one relationship between maternal depression, anxiety or other mental health disorders and detrimental effects on children, and some children of these mothers may go on to thrive if these mediating factors act in their favour.

As noted in the previous section, depression is not the only mental disorder associated with HIV. Anxiety during pregnancy has increasingly been shown to be associated with numerous adverse outcomes for women, as well as for children across the lifespan [76-79]. Anxiety disorders during the perinatal period are associated with delays in breastfeeding [76], substance use [80], and are a strong predictor of depression [81]. Predictors of anxiety include a previous history of mental illness, lack of social support, substance abuse and poor relationship with a partner [82]. Regardless of caregiver HIV status, maternal anxiety increases the risk of behavioral problems in early childhood [77, 83], due to the direct effect of maternal anxiety and stress on fetal brain development. Most women in LMICs are likely to receive an HIV test for the first time when attending an antenatal clinic. It would not be unreasonable to think that anxiety might be amplified in the case of HIV-positive women, who may experience anxiety regarding the possibility of transmission to their unborn child, anxiety about the potentially life-threatening disease with which they are living, or anxiety stemming from past experiences of stigma to which their children may now be exposed. In fact, past research has shown that the strongest effects of anxiety on infant development and behavior were found for mothers with pregnancy-specific anxieties, such as fear for the health and integrity of the unborn baby and fear of [pain during] delivery [84].

Antenatal maternal anxiety has been shown to predict behavioral and emotional problems in boys and girls, and after co-varying maternal anxiety up to 33 months postnatally, antenatal anxiety still predicted problems in boys and girls [77]. Indeed, during ultrasound observation, fetuses of high anxious women have been found to be more active than those of low anxious women [85, 86]. Mulder, De Medina et al. note that pregnant women with high stress and anxiety levels are at increased risk for spontaneous abortion and preterm labor and for having a malformed baby or baby exhibiting growth retardation (reduced head circumference in particular) [87]. Exposure to prenatal maternal stress is also often regarded as an important factor underlying several forms of psychopathology, including attention deficit hyperactivity disorder (ADHD), schizophrenia and depression [88, 89].

## CHILDREN OF MOTHERS LIVING WITH HIV (MLH)

Most HIV-infected women are in their childbearing years [90, 91] and children are affected by HIV long before the illness affects their parents' capacity to function [92]. In the case of families with an HIV-infected family member, it has been estimated that 16% of children will be orphaned by the age of 18 [93]. In total, 35% of all children living in high-prevalence settings will be affected by maternal HIV [93]. The children of MLH are a high-risk group for significant mental health and behavioral problems [94, 95]. Children of all ages experience the socioemotional, health and economic implications of living with a MLH [96-98]. It has been shown that HIV-infected parents, living with seronegative children, may avoid physical contact with their children out of fear that they might endanger the child [99, 100]. Caregiver fear of stigma impacts on disclosure to children and families, and consequently limits children's opportunities for social support [47, 101, 102]. The death of a parent causes instability in the child's life; instability that is often exacerbated by a parent's failure to plan for guardianship of their children in the event of their death [103].

Perinatal depression may interfere with effective perinatal HIV care, is correlated with maternal substance abuse during pregnancy, and is related to viral load, in that women who are more ill are more likely to experience PND [57]. Finally, MLH with PND are significantly more likely to have antiretroviral (ARV) medication adherence problems during pregnancy, putting their children at risk for HIV [57]. In the case of anxiety, cross-sectional and prospective research in South Africa has shown that children orphaned by HIV/AIDS or living with a caregiver with HIV/AIDS are at elevated risk of experiencing symptoms of anxiety [104-106].

Children may also take on additional caregiving responsibilities, excessive to those appropriate to their age group and maturity level, which can strain their psychological resources [92]. They may also drop out of school to reduce household costs or provide care for sick relatives or young siblings [92, 107, 108]. These children receive less, and lower quality, social and emotional support than children not affected by HIV. Lack of instrumental and social support are in turn associated with childhood depression and behavioral difficulties [109]. HIV-affected children, and not only HIV-positive children, experience more depressive and anxious symptoms, and more conduct problems and functional impairments, in comparison to their HIV-unaffected peers [101]. There is also an association between maternal HIV and internalizing and externalizing behaviors among these children [110, 111].

Children whose mothers are living with HIV may also experience anxiety, either as a result of being HIV-positive themselves, or fearing that they may contract the virus. Illness disclosure – whereupon parents notify their child of their own and/or the child's infection – has been

encouraged by the American Academy of Pediatrics, as well as other agencies. Research indicates that positive outcomes are associated with early disclosure, including the promotion of trust, improved adherence and better long-term health and emotional well-being in children [112-116]). Conversely, it is known that inordinate delays in disclosure of HIV infection to children may potentially result in negative consequences, including impaired treatment participation and increased psychological and behavioral problems [117, 118].

Despite the necessity of disclosure, however, the literature suggests that children may feel anxiety, fear and/or depression upon learning of a parent's – or their own – diagnosis [119]. Yet, again, findings are mixed and researchers such as Riekert et al. found that children who know their diagnosis are less depressed and anxious than children who do not [120].

Children orphaned by HIV, as well as HIV-affected children, may be lonelier than their non-HIV-affected counterparts [121]. A US study examining single-parent MLH with an HIV-negative child age 8 to 12 found that over the course of two years every child had a score in the clinical range for a psychological disorder, and clinically significant symptoms were most likely when mothers were sickest [122]. HIV-affected children have also been found to experience significantly more motor and language expression delays than children not affected by HIV [123]. It is unclear as to whether this is a result of perinatal exposure to the virus or the effects of PMTCT medication regimens, or – rather – a result of some other effect of maternal stress or illness.

Parental HIV has also been associated in past studies with increased vulnerability to abuse among children. For instance, Cluver et al. and Meinck, Cluver, Boyes, and Ndhlovu [124, 125] found that caregiver AIDS-sickness or caregiver experience of AIDS-related stigma put children at increased risk of physical abuse. As such, children of MLH are a critical subgroup of vulnerable children who most need to be reached by community structures and service providers [126]. Yet, in a longitudinal study on outcomes for children in South Africa with CBO contact compared to those with no CBO contact, Skeen et al. (2016) found that while CBOs were reaching the most vulnerable children, children with HIV-positive parents in particular were only reached by CBOs once their caregiver or caregivers had died [127]. Thus, it appears that there exist barriers to participation in supportive community structures for children of MHL. Additional research has shown that this holds true for school attendance, too, and that children in HIV-affected households are more likely to miss or drop out of school [92, 128].

In a 2013 review of the literature concerning the mental health outcomes of HIV-affected children, Betancourt, Meyers-Ohki, Charrow and Hansen [101] found that few studies reported comparisons by gender. However, what work has been done is equivocal. Fang et al. [121] reported that among Chinese orphans whose parents both died from AIDS, male gender was associated with

higher self-esteem and lower perceived control over the future, while Doku [129] found that in Ghana, males reported significantly higher rates of peer problems as compared to females [101, 121, 129].

### CHILDREN OF NON-MATERNAL CAREGIVERS WITH MENTAL DISORDERS

In the context of HIV, rates of orphanhood are high, and a considerable burden of maternal deaths in high burden countries may be attributable to HIV [130], while HIV-infected mothers are significantly more likely to die during childbirth than HIV-negative mothers. As explicated in a report for the Centers for Disease Control and Prevention, Kendal and Danel [131] present evidence that suggests that HIV contributes to the burden of mortality among pregnant women. For instance, in most countries, death during pregnancy of childbirth has become less common. However, in sub-Saharan African countries with high HIV prevalence, this has not occurred, and instead, maternal mortality rates have increased over the past two decades [132]. Equally, Zaba et al. note that women with HIV are eight times more likely to die during pregnancy than HIV-negative women [133]. In their study, these authors argue that a quarter of deaths of pregnant and postpartum women in sub-Saharan Africa are attributable to HIV [133].

In this context, despite increasing numbers of non-maternal caregivers, there is little research that explicitly isolates the effects of non-maternal mental health on child outcomes. A substantial body of literature from LMIC [104-106, 121, 134-138] has linked familial HIV/AIDS with poor mental health outcomes for children and adolescents. Indeed, much of what we know about MLH and their children would be the same for children of non-maternal caregivers. It is unlikely that the impacts of caregiver mental illness on child development is somehow unique to biological caregivers. Mental disorder among grandparents, aunts or even sibling carers will likely result in the same negative impacts on child development as biological parent mental illness.

Single or double orphans are primarily cared for by female family members, even when a father is alive and involved [139]. The financial burden for care and children's basic needs are, at best, met through government grants (direct and indirectly targeted at children), although such provision is woefully inadequate or completely absent in many low-income states. This financial strain may be great, particularly if caregivers are caring for multiple children orphaned by HIV/AIDS, and may be a trigger for mental distress for the caregiver, perpetuating the cycle of exposure to caregiver mental illness/psychological distress for children. Lunga examined the challenges experienced by grandparents in raising their grandchildren in South Africa, and detailed the difficulties faced by grandparents but did not examine mental health or child outcomes [140]. Fathers of children with HIV have also been shown to experience significantly elevated levels of

parenting distress and psychological distress [141]. This study, however, also did not examine the effect of this on child outcome. In a seminal study that did examine child outcomes among youth living with caregivers who are unwell with AIDS or youth simultaneously affected by AIDS orphanhood and caregiver AIDS sickness, both AIDS orphanhood and caregiver AIDS sickness predicted increased depression, anxiety and post-traumatic stress symptoms over a four-year period [142].

An important point that must be made in conclusion regarding non-maternal caregivers of children affected by HIV is the bi-directional flow of care in such relationships. As the number of orphans in a community increases, uncles and aunts – the traditional first choice as substitute caregiver – become unavailable, grandparents are increasingly being recruited into childcare [143-145]. Grandparents are often a last resort as caregiver, and agree to take orphans because other relatives refuse [146]. Grandparents are more frequently recruited as caregivers in areas where the AIDS epidemic is more severe or where the extended family is weakened [147]. In this case, however, what may appear to be a situation in which the elderly provide childcare is actually more akin to a situation of mutual support. Aging grandparents become increasingly dependent for their own care on their grandchildren. Thus, it is possible that a child who witnessed the advanced stages of his/her mother's illness, and recently lost a mother to HIV, may then be placed in a position of having to care for another frail relative. This is likely to compound trauma- and loss-related mental health conditions for children. Future work should explore the effect of non-maternal caregiver mental health in the context of HIV (child or caregiver) on child outcomes.

#### FROM HIV TO MENTAL DISORDERS

There is substantial evidence that HIV places individuals, including mothers, at risk of negative mental health outcomes. Depressive symptoms and clinical depression are highly comorbid with HIV, and persons living with HIV are between two and four times more likely to be depressed than seronegative individuals [148, 149]. It has been suggested that persons living with HIV develop depressive symptoms in response to their diagnosis, and the adjustments that must be made in order to live with the illness [150, 151]. A meta-analysis of studies comparing depressive disorders between HIV-positive and HIV-negative samples, showed that major depressive disorder was nearly twice as common among HIV-positive persons than it was among HIV-negative persons [152].

In a review of over 30 studies, rates of depression were as high as 63.3% [153], while a Zimbabwe study found that 75% of HIV-positive people had psychological morbidity [154]. The perinatal period is a vulnerable one for MLH, with pregnancy increasing the vulnerability of HIV-positive women to depression [155]. This is particularly true for prospective and new mothers in

LMIC [156]. It has also been suggested that levels of psychological distress among HIV-positive individuals may be related to the severity of their physical symptoms [153]. MLH have been shown to score higher on measures of depression than uninfected mothers [94]. Maternal HIV status appears to fuel maternal depression and child maladjustment largely as a function of stigma. Mothers reporting high levels of HIV-related stigma scored significantly higher on measures of depression, and their children were more likely to engage in risky behaviors [157]. Child experience of stigma was correlated with high maternal anxiety and depression [4]. In addition, children's literacy was negatively correlated with mothers' total stigma score, suggesting that those children experiencing HIV-related stigma were at risk for educational problems.

Most studies examining maternal mental health in the context of HIV have focused on maternal depression. However, some have also examined MLH with substance abuse problems and anxiety. Children affected by their parents' drug use and HIV face considerable challenges, including being exposed to caregiver dysfunction and foster care placement [158]. In addition, drug use, a stigmatized behavior, may restrict social support otherwise available to HIV-affected families. Although prevalence estimates are hard to come by, substance use disorders among MLH have received some research attention. Specifically, this is because substance abuse can interfere with adherence to ARV and PMTCT regimens. Although more research attention has been directed at the pathway from substance abuse to HIV risk, it is also possible that living with HIV might lead to substance abuse – possibly as a coping mechanism. A third possible pathway is from HIV-related depression to substance abuse, thus compounding the burden of psychological morbidity on a single individual living with HIV.

Persons living with HIV are also at high risk of developing an anxiety disorder, with some prevalence estimates reaching as high as 38% [159, 160]. The symptoms may occur anytime during the course of the infection [159]. This anxiety may stem from fear of stigma, as well as illness and death [161-163]. HIV, however, often occurs in the context of existing stressors and women who become infected may already be facing multiple stressors and may be particularly susceptible to anxiety [94, 164]. In the next section, we examine the evidence concerning mental health and HIV vulnerability, suggesting that mothers in LMICs are at elevated risk of HIV infection due to mental illness.

#### FROM MENTAL HEALTH DISORDERS TO HIV

As has already been stated, poverty and mental illness interact in a bi-directional manner through social causation and social drift [18]. How might the mechanism work in the pathway from depression to HIV? Depression reduces individuals' motivation to seek health care, and can impair

adherence to medication and reduce the capacity for self-protective and self-restorative health behaviors [165]. A number of psychiatric disorders, including substance abuse, increase vulnerability to HIV infection [166]. HIV risk among people with psychological disorders is associated with a lack of condom use, multiple sexual partners, high-risk sexual behaviors and the use of intravenous drugs [167, 168]. Rates of HIV infection among patients in psychiatric institutions are as high as 23.8% [169, 170]. Part of this can be attributed to sexual or drug-related HIV risk behaviors among persons with psychological disorders [166, 171], with 42% of in-patients reporting risky sexual activity in the past year [166]. Among mothers, the social exclusion characterizing depression across the perinatal period may create vulnerability through intimate partner violence and engagement in transactional sex [153]. Substance abuse, including alcohol and drug abuse, are associated with increased HIV risk [172, 173]. In addition, intersections of mental disorder, gendered power disparities, sexual violence and socioeconomic disenfranchisement place women in LMICs at risk for HIV.

### MECHANISM OF RISK

There are a number of pathways between maternal/caregiver mental health and poor child outcomes. In this section, we outline a few of these pathways as a way of suggesting how such risk pathways can be targeted by interventions aimed at improving child outcomes (see Table 2). By addressing these mediators, the impact of negative maternal/caregiver mental health status on child outcomes can be reduced. Biggar proposed the notion that maternal depressive symptoms mediated, or moderated, the relationship between maternal HIV status and child psychological outcomes (specifically, children's depressive symptoms) [174]. In the context of maternal depression, HIV status increased child depressive symptoms, and the direction of this effect differed between MLH and HIV-negative mothers [174]. Bauman and colleagues showed that child behavior problems among children of MLH were significantly related to mothers' psychological distress [175]. Among adolescents, maternal distress at living with HIV has been found to indirectly affect adolescent psychological distress and risky behavior [176]. So, maternal HIV often affects children via maternal psychological distress. But how does maternal psychological distress impact children: via which pathways?

One possible mechanism through which maternal depression, in the context of HIV, affects children is through its impact on parenting skills [177]. Maternal stress and distress are associated with poor parenting skills, while parental monitoring may be affected by mental health difficulties related to HIV [178]. Family routines are also correlated with maternal depression and maternal self-report of HIV symptoms resulting in higher levels of problem behaviors among affected children [178]. Social support has also been found to be influential in determining how much of

maternal/caregiver stress and distress translates into negative child outcomes [179]. This is potentially due to the mitigating effect on parenting stress provided by social support. Parenting mediates the impact of caregivers' distress on children's well-being in families affected by HIV/AIDS. Problem-solving interventions, like those that improve social support, also likely work via their effect on parenting stress [179]. Such findings add weight to the argument for family-based intervention for children affected by HIV, and affirm the importance of incorporating the cognitive, emotional and behavioral components of parenting practices in any intervention.

Poverty, in addition, appears to be a powerful mediator of the relationship between maternal mental health and child outcomes. Across many studies, poverty is associated with a range of negative outcomes for children in the realms of physical health, language and cognitive development, academic achievement and educational attainment [180-182]. However, rather than cause the negative outcomes directly, poverty may operate, in part, via parenting stress/distress and maternal or caregiver mental health [182-185]. Regardless of direction, poverty may exacerbate mental health problems, placing children of MLH with mental health problems living in poverty at especial risk.

Most studies examining the mechanisms underpinning the associations between maternal mental health and child outcomes have focused on aspects of maternal functioning, such as maternal regulatory processes [186]. Child functioning has received much less attention – few studies have examined how child factors might influence susceptibility to maternal mental health problems [187]. Child executive function at age three has been shown to be mediated by mothers' depressive symptoms and children's externalizing and internalizing problems [188]. Improving children's executive functioning might protect children against some of the negative sequelae of maternal depression.

In addition to the relationship between maternal mental health and child outcomes, the relationship between maternal HIV and child outcomes is an important consideration. The children of MLH, regardless of their own HIV status, are affected by maternal HIV long before the illness affects a parent's capacity to function. The children of MLH are considered a high-risk group for significant mental health and behavioral problems [94, 95], and these children have been shown to experience a plethora of socioemotional, health and economic consequences of living with an MLH [96-98]. Pathways from maternal HIV to problems experienced by children include maternal physical withdrawal, parenting stress and poor parenting practices, and additional responsibilities that are placed on the child in the face of their mother's diminished physical capacity due to illness.

Desmond and colleagues have attempted to develop mathematical models in order to provide estimates of the magnitude of the impact of adult HIV infection on children including

depression, anxiety, dropping out of school and early sexual debut [189]. Taking a longitudinal perspective, their model shows the way in which cumulative risk affects children of MLH compared to children not affected by maternal HIV. Children living with an MLH demonstrate a build-up of multiple risks that compound the effects of other risks over the course of the child's life in a manner not seen in other children [189].

Another pathway from maternal depression, in the context of HIV, to child outcomes concerns ARV adherence (and, potentially, from low adherence to negative mental health) [57]. For instance, research has shown that women with depression are less likely to adhere to their ARV regimens. However, it is plausible, too, that women who do not adhere to their ARV medication will experience more symptoms, and this will affect their mental health (given the relationship between physical illness and negative mental health outcomes) [190-194]. Both of these pathways, however, would likely result in negative outcomes for children (declines in maternal health, resulting in declines in capacity and availability for engagement with children) [30].

Whether maternal depression in the context of HIV infection is a pathway from maternal illness to child difficulties, or a moderator of the relationship, is unclear. However, what is clear is that unique vulnerabilities are experienced by children of MLH. In their paper on the mechanisms through which maternal depression and mental health in early childhood are related, Herba, Glover, Ramchandani and Rondon note many areas of uncertainty in current knowledge regarding the mechanisms underlying these associations [195]. More generally and across contexts, disentangling the effects of maternal depression on child cognitive and emotional functioning, from those of bereavement, stigma and the physiological sequelae of being HIV positive, is no mean feat.

Particularly, the difficulty and consequent dearth of longitudinal research in LMICs has stifled progress [196, 197]. Further, in contexts where HIV rates are high, numerous other health risks often co-occur, making the separation of discrete causal effects difficult [198]. Future work, drawing on longitudinal data, is needed if the mechanisms of risk in such contexts are to be illuminated.

## CUMULATIVE IMPACT ON CHILDREN

In the child development literature, the dominant thesis has been that poor child outcome is predicted by the total number of adverse events (cumulative count), rather than the specific nature of the risk exposure [199]. Recently, there has been a call for more research into how the nature, dose and timing of negative life events impact on child outcome given how little we understand about pathways and mechanisms [200]. Although it is not within the scope of the current review to explore the issue of mechanism, timing and dose, it is clear that when MLH experience depression,

or mothers with depression contract HIV, the cumulative effect of the burden may act in a detrimental synergistic way (see Table 1), and the concept of cumulative risk retains some explanatory power. This may take the form of:

- persistence of depressive symptoms in MLH that exceed those of HIV-negative mothers;
- exacerbation of HIV symptom-related distress among depressed MLH;
- exacerbation of depression due to illness;
- lower adherence to ARVs and reduced quality of life;
- negative impact on children in the family.

In a study of mood disorder among MLH, almost two-thirds had persistent disorders [49]. In turn, persistent disorders were associated with lower income and functional limitations. Increased physical symptoms of HIV may be related to poorer quality of life and greater anxiety [153, 201]. There is also evidence that HIV symptom-related distress is exacerbated among depressed MLH [202]. Depression may increase fatigue, uncertainty and a diminished quality of life [57], while conversely, depression is exacerbated by illness. HIV imposes additional psychological and physical burdens on people with depression [203]. Depression and HIV are exacerbated by problems in interpersonal relationships and embedded in social and familial contexts characterized by substance abuse and domestic violence [204]. In a similar way to depression, HIV diminishes access of mothers' to socioemotional support, increasing stigma and isolation [109]. Concerns about their children's well-being and futures contributed to the burden of stress experienced following a diagnosis of HIV [205]. Pregnancy and motherhood increase the likelihood of depression and impacts on coping [203].

How might a dual diagnosis of maternal depression and HIV have a cumulative negative effect on children? One example of such a mechanism would be that of maternal availability. In the case of maternal depression, diminished maternal responsiveness and even remoteness in engagement are common [21]. These may be exacerbated in the case of an MLH who is reticent regarding contact with her child out of fear of infecting her child [158]. Disentangling the differential impact of mental illness or HIV on this interaction may be particularly difficult, but it is clear that children who receive diminished contact and affection from their mothers are at risk for a host of problematic outcomes. Due to gains made in public health policy and awareness-raising, many or most individuals with HIV are aware that casual physical interaction (hugging, etc.) is not a source of infection. However, it may remain the case that HIV-positive caregivers still do not engage in as much physical contact with their children for other reasons, including distraction due to illness or anxiety, the demands of treatment or feelings of ill health and lethargy.

It is also possible that, in the case of children with behavioral difficulties who are seronegative, these children may not have the same access to health care and social services than they might had they been HIV-positive [35]. Similarly, if we consider maternal substance abuse, both HIV and depression might lead women to drink in an attempt to aid in coping. Maternal alcohol consumption, in turn, has deleterious effects on child health and safety [206-210]. In the case of mothers with depression and HIV, problem drinking may lead to low adherence to drug regimens, resulting in worse health outcomes, diminished capacity to care for the child or even death.

Risks accumulate throughout the course of affected children's lives, including through increased responsibilities to care for ill and depressed parents. Child-externalizing behavior is positively correlated with parental disability [158]. Behavior problems among the children of MLH are related to the mothers' illness-related activity restrictions [175]. The likelihood that a woman will die at an early age is greater for women with HIV [211] and depression [147]. Meanwhile suicide, often the result of underlying depression, is the leading cause of preventable death among new mothers [32]. Orphans and vulnerable children are more likely to engage in sex at an earlier age, compared to non-orphans [102, 212]. In communities with high prevalence, the capacity of extended families to cope continues to be strained. When children slip through the familial safety net and end up at the fringes of kinship networks, the cycle of vulnerability to HIV and depression is perpetuated. Elevated rates of depression among HIV-positive mothers are associated with the mothers being less able to perform parental tasks and with children (often girls) then assuming increased responsibilities for household tasks [45]. This in turn increases the likelihood that children (notably girls) will drop out of school.

The evidence points to the fact that the worse a mother's HIV-related distress is, the worse her HIV symptoms are, and the greater the likelihood that a mother will become depressed. Likewise, worsening symptoms over time may lead to greater distress [213, 214]. This is exacerbated by poor access to mental health services in most LMICs. Caring for children affected by HIV/AIDS within a context of poverty places carers at risk of developing depression and other mental health problems, and accessing mental health services may be difficult. This is likely to have a profound impact on the well-being of both the carers and the children in their care [43, 215]. In the context of the cumulative burden of maternal depression and HIV, children are manifestly more vulnerable to developing psychosocial problems across their life-course.

## Responses to Global Mental Health

### SCREENING FOR DEPRESSION

The World Health Organization (WHO) recommends that attention to the psychosocial needs of people be an integral part of HIV care [216]. Integrating mental health care into HIV treatment also provides an opportunity for psychological services to be incorporated into primary health care [217]. However, as many as 44% of African countries do not even have a mental health policy, and 33% do not have a mental health plan [218], which makes the implementation of mental health services difficult. With regard to resources, little has changed in the allocation of resources for mental health care in the last 10 years, particularly in LMICs [218]. Opportunities for intervention with depressed MLH, as well as maternal HIV- and depression-affected children are numerous, and include the incorporation of mental health screening [219] and interventions designed to improve maternal well-being in the context of HIV and depression.

In resource-scarce settings, however, women are unlikely to be screened in primary health care (PHC) facilities due to inadequate resource allocation [220, 221]. This represents a major missed public health opportunity, since PND is treatable [222], and increased health care contact (e.g., during pregnancy) provides opportunities for screening, prevention and treatment. Broadly speaking, there are two main reasons for screening. First, screening serves as a means of improving detection and diagnosis and to direct patients to appropriate treatments [223]. Screening instruments can be used for either initial screening of the general population, or for case-finding, in which patients seeking health care are tested for disorders that may be unrelated to the initial purpose of their visit [224]. The assumption is that successful screening will increase the likelihood that those in need will be identified and appropriately treated. Second, screening is a means to understanding the disease burden in order to plan and monitor services. In population-based surveys (e.g., World Health Survey), it is usually the second reason that predominates. Universal screening tests the general population for the purpose of separating them into groups with high and low probabilities for a given disorder. Here, the purpose of screening is to detect depression, not assess its severity. Simplicity, acceptability and cost are therefore important in screening and epidemiological surveys [224]. Diagnoses of persons who screen positive may then be confirmed with a more time-intensive diagnostic enquiry [225].

Several screening instruments have been developed and used for the detection of CMDs in primary care settings. These include the General Health Questionnaire (GHQ) [226], the Patient Health Questionnaire (PHQ) [227], the Self-Reporting Questionnaire (SRQ) [228], the two Kessler scales (K6 and K10) [229] and the Hopkins Symptom Checklist for Depression (HSCL) [230]. Although these instruments were initially developed to measure general symptoms and psychiatric distress,

they are commonly used to screen for depressive symptoms [231]. Instruments such as the Edinburgh Postnatal Depression Scale (EPDS) [232] and the Postpartum Depression Screening Scale (PDSS) [233] were designed specifically to measure postpartum depression (PPD) symptoms.

In sub-Saharan Africa, the Shona Symptom Questionnaire (SSQ) was developed as an indigenous measure of common mental disorders (CMDs) for use among Shona speakers in Zimbabwe [234]. Although these instruments were initially developed to measure general symptoms and psychiatric distress, they are commonly used to screen for depressive symptoms [177]. Instruments such as the Edinburgh Postnatal Depression Scale (EPDS) [178] and the Postpartum Depression Screening Scale (PDSS) [179] were designed specifically to measure PPD symptoms. These instruments have been used across numerous cultural contexts [235-238].

Regarding anxiety, specifically, instruments such as the GAD-7 [239], the hospital anxiety and depression scale for anxiety (HADS-A) [240], and the Hamilton Anxiety Rating Scale [241], all serve as screening tools for use in primary care settings. The Hamilton Anxiety Rating Scale has been used to gauge effect among HIV-positive populations [55], and all measures have been used in LMIC settings [242-244]. While many of these instruments are relatively short (10 or 15 items), the use of the full tool at a universal level may not be feasible. Shorter screening tools have been adapted from full-item screening questionnaires, consisting of fewer items and with shorter completion times. Short screening tools are defined as those having five to 14 items, and that take between two and five minutes to complete. Ultra-short screening tools typically have three or fewer questions, and take less than two minutes to complete [225]. Shorter scales may be as effective as longer ones for universal screening in PHC and community settings [219].

Shorter screening tools could effectively be administered by non-physicians and community health workers (CHWs) [245] as a means to prevent further over-stretching primary care settings and limited health resources. Approaches that incorporate CHWs into the detection and management of perinatal mental disorders have shown potential, with research demonstrating the capacity of CHWs to address depressed mood among women during the perinatal period [246-248]. High-quality, randomized control trials conducted in sub-Saharan Africa suggest that the delivery of manualized psychosocial treatments by non-specialist, lay health workers is both feasible and effective [247, 249], provided that cases can be identified and referred for treatment. There is a global shortage of mental health professionals, and in many LMICs, an absent or very weak infrastructure to create and validate interventions, and train, coordinate and regulate mental health workers. It is thus important that whatever resources are available be used for complex cases, and that efforts are made to integrate mental health into primary care.

It has been argued that the strategic use of screening tools could facilitate triage and the use of stepped care models [223]. Indeed, screening without other systematic changes to improve depression management is unlikely to improve outcomes [250]. These studies underlie the potential of short screening tools for low-resource settings and the suitability of ultra-short screening tools of three- or two-detection questions to serve as routine first-level screening that aims to rule out a diagnosis of maternal depression.

Integrating screening for mental disorders into primary health care is a priority [251], particularly in light of the poor recognition by health care workers of symptoms of mental disorder [252], let alone the skills to deal with them when they are identified. In addition, short screening tools are essential as interventions in LMICs, and need to be designed with the heavy workloads of CHWs in mind. Hung et al. have shown that CHWs can be trained to successfully administer community-based screening for depression in a resource-limited setting using short or ultra-short screening instruments [245]. Bauman has argued that all children who are affected by HIV should be routinely screened for psychiatric problems, and that this should ideally involve using multiple measures and sources of information to avoid under-identification of child mental health and behavioral problems [253].

Aside from the role that CHWs could play in screening in LMICs, the potential for more formal social services – including social workers – must not be overlooked. The potential role of the social service workforce (including case managers, para-social workers and social workers) is substantial. Given that relatively only short and simple screening may be able to be integrated into caregiver assessments by CHWs as part of case management, a more specialized subset of case workers from the social services sector could administer more complex tools. In order to minimize the burden on front-line workers, it would be necessary to implement pre- or in-service training for workers who would implement these efforts, and appropriate referral pathways would need to be integrated into protocols (for more, see “Stepped Care” models below).

There is a growing evidence base of effective psychosocial and psychological treatments for maternal depression [254]. For the purposes of this review there are a number of promising low-cost, task-sharing approaches. Problem-solving therapy and cognitive behavior therapy have been found to effectively treat maternal depression [246], as well as adult depression [255, 256]. Other promising interventions include the AFFIRM trial currently underway in South Africa that will assess the effectiveness and cost-effectiveness of a task-sharing counselling intervention for maternal depression [257].

Further to interventions which aim to improve maternal and child outcomes by targeting maternal depression are those that intervene specifically with children of MLH. For instance, Murphy

et al. reported on a behavioral intervention for children ages 7–14 living with an MLH focusing on improving mother-child communication, improving HIV knowledge and reducing anxiety and lessening feelings of stigma [258]. Children who received the intervention showed significant decreases in anxiety and worry, an increase in happiness and improved knowledge about HIV. Finally, there is some evidence of how a group intervention with children affected by maternal HIV decreased child withdrawal, as well as social, attention, rule-breaking and aggressive behavioral problems [259].

A note of caution is in order regarding the treatment of maternal depression as a means of improving child outcomes. There is a growing body of evidence to suggest that even when the depression has been successfully treated, parenting quality does not necessarily improve [260], and that child outcome is not necessarily better [261]. Given the disease burden of mental disorders in LMICs and the impacts on children, the screening, treatment and referral of caregivers with mental disorders is essential. In the next section we outline possible entry points for intervention with particular emphasis on platforms of interest for PEPFAR programming. The treatment of maternal depression is of course an end in itself, but if the aim of targeting depression is to also provide benefit to the child, then additional components must be added, including parenting interventions [262], cash transfers or microfinance [263], and structural interventions [264].

#### **ENTRY POINTS FOR INTERVENTIONS AND PLATFORMS OF DELIVERY**

While there is a large and growing literature on the epidemiology of HIV and maternal depression, there is a lamentable gap in evidence on successful interventions, and crucial questions regarding community provision such as care, provision and well-being of children infected or affected by HIV and/or maternal depression remain. Delivering effective interventions to caregivers and children in adverse settings will require a mix of types of interventions and delivery platforms. Given the high levels of poverty and adversity, coupled with the complexity of the interactions between HIV, caregiver mental illness and child development, there is no single solution. Linked to this is the importance of beginning to examine the “how” rather than the “what” of interventions – the move from knowledge of what works to systems that deliver [265]. Effective implementation of programs at scale is beset with challenges. Poor quality or infrequent supervision has undermined many large-scale programs [266]. In many smaller interventions supervision is often more consistent, intense and of a better quality, and the motivation of staff is also often higher [267]. These are significant barriers, and the degrees of control and oversight that are possible in small-scale studies do not necessarily translate to the implementation of large-scale interventions. New interventions and programs (particularly at scale) tend to focus on content of interventions and on targets, without a

concomitant building of effective strategies to support the management and supervision of CBOs/NGOs on the ground. This contributes to the poor implementation of many programs and strategies.

**Table 1: Delivery Platforms**

Community	Health System	Population
<ul style="list-style-type: none"> <li>○ Neighborhood and Family</li> <li>○ Schools</li> </ul>	<ul style="list-style-type: none"> <li>○ Primary Health Care</li> <li>○ Specialized Care</li> </ul>	<ul style="list-style-type: none"> <li>○ Legislation/Policy</li> <li>○ Structural</li> </ul>

In the next section we will outline a number of possible delivery platforms and types of interventions that are promising (see Table 1, above). In some cases, we will focus on specific interventions that have evidence – but only insofar as they typify the kind of programming that we believe is possible and needed in LMICs. We highlight how interventions may be usefully conceptualized as targeting the risk factor pathways between maternal/caregiver mental health, HIV and child outcomes. We will also argue that ensuring the effectiveness of interventions will depend to a significant degree on enabling environments – typified most strongly by legal frameworks and transformative policies.

## COMMUNITY AND FAMILY PLATFORMS

### Community-based organizations (CBOs)

At the program level, there are a vast number of grass roots activities providing care and support in different ways for young children infected or affected by HIV. CBOs are able to access marginalized families that may be inaccessible to health workers, and allow for support to occur within the home (although they are not necessarily home visiting programs) and not just in clinics and hospitals [268]. CBOs are often serving the most vulnerable and difficult-to-reach children in communities – the very children missed by the health system and more formal interventions.

Combining community need with evidence-based interventions is the gold standard, but this is difficult to operationalize with community-based initiatives. There are numerous interventions for HIV prevention, but very few of these have been evaluated. A systematic review of evaluated community interventions did not find a single intervention that met the rigorous inclusion criteria [269]. This lack of studies was also highlighted by the JLICA initiative [270]. Schenk, using much less rigorous criteria for inclusion, identified 17 studies of value for community-based intervention [271] (see Appendix A). When it comes to interventions that target both HIV and depression using CBOs,

the evidence base is small. Skeen, Sherr and Tomlinson have conducted an ongoing cohort study examining the development outcomes of HIV-positive and HIV-negative children, and the mental health of children and carers attending community-based organization (CBO) programs in South Africa and Malawi [272]. In a cross-sectional study, they interviewed 952 carers of children (ages 4 to 13 years) attending 28 randomly selected CBOs funded by 11 major donors in South Africa and Malawi [273]. The group has published a number of papers outlining outcomes for both carers and children.

With regard to carer mental health, almost 30% of carers scored above the clinical cut-off for current psychological morbidity, and 12% reported suicidal ideation. Unemployment, a sick relative in the home, lack of community support and child food insecurity were all associated with both psychological morbidity and suicidal ideation in carers [273]. However, carers were not receiving any care for psychological morbidity. This was not only about access, as many of the participants were in regular contact with the CBO. Rather it suggests that caregivers simply did not identify the CBOs as sources of support for mental health problems, and that CBOs did not readily see themselves as sources of such support [273]. In the same cohort, HIV burden was associated with child behavioral problems, such as internalizing and externalizing problem outcomes that were often mediated by caregiver depression [274].

Interestingly, they also showed that although HIV-positive children were likely to have been enrolled in programs for longer than HIV-negative children, they were in fact receiving the least input from CBOs. They were more likely to be enrolled in medical care and emotional support programs, but also less likely to be accessing play groups, childhood development programs and school support programs. The findings of this review suggest (supported by the work by Skeen and colleagues) that HIV-positive children are facing particular difficulties, and that there are community-level programs that are mitigating the impact of developmental difficulties associated with HIV [275, 276]. It is essential that these become standard practice in order to ensure that vulnerable children do not continue to be marginalized. Ongoing efforts to support community-based programs in their work to improve the psychosocial well-being of children are key in this regard.

In this study, household HIV burden was positively associated with an array of negative child outcomes, but these were mediated by caregiver depression levels. Such findings suggest that HIV within the family can affect child development, emphasizing the important role of depression in the pathway to such an effect. Interventions delivered by CBOs directed at alleviating parental depression in the presence of HIV are thus necessary [274]. This is supported by findings published in a recent paper from the same study, which showed that children who attended CBOs saw behavioral and mental health benefits over time. However, those with more severe psychopathology

were not benefited by their attendance. The authors concluded that those children with greater support needs required more specialized services [277].

### Home visiting

Home visiting models are predicated on the idea that community participation in health care decisions is essential [278]. The “gold standard” of home visiting models is the nurse home visiting model of Olds and colleagues in the US, where nurses visit disenfranchised families at risk for poor child outcomes [279, 280]. Home visiting by nurses is not feasible, however, in LMICs. Another model that has been used to inform the recruitment and intervention strategy for CHWs is that of “positive peer deviants” [281, 282]. In this model, CHWs are selected on the basis of living in the same poor neighborhood and experiencing much of the same adversity, but they have children who are thriving. The underlying principle is that women from within communities are best placed for training to deliver services to others. One of the few home visiting models in Africa that has been evaluated using a gold standard RCT is Philani [283]. The Philani Maternal, Child Health and Nutrition Trust was established in 1979, and includes a focus on HIV and nutrition, targets maternal and child health, and more recently has included an Early Childhood Development component. Philani CHWs offer ongoing support over time, as well as facilitate health care-seeking behaviors. During a four- to six-week assessment and training period, CHWs are trained in skills on HIV/AIDS, maternal mental health, nutrition, basic health, early stimulation and play, knowledge about community resources and services, and information on grants and referral routes and mechanisms. CHWs conduct approximately six home visits per day, and build supportive and trusting relationships with women and families. Philani CHWs deliver approximately four antenatal visits and five to eight postnatal visits between birth and two months post-birth per participant. Intervention sessions range from 30 to 60 minutes. Implementation is monitored by supervisors who review all charts, and document visits on mobile phones and conduct random site visits once every two weeks. CHWs also attend a monthly in-service training [284].

The Philani intervention has had significant benefits for mothers and infants across the life-course. Benefits have been noted in the areas of child health, child cognitive development and maternal adherence to HIV prevention strategies [284]. The intervention also benefited subgroups: women living with HIV (WLH) adhered 5%–10% better on an absolute basis to each of the tasks to ensure prevention of mother-to-child transmission (PMTCT) compared to women in the control group. Overall, adherence to all PMTCT tasks resulted in a relative effect size of 50% better adherence to PMTCT tasks by women living with HIV. Women using alcohol (WUA) in Philani Intervention Program neighborhoods significantly reduced episodes of drinking during pregnancy. In

contrast, WUA in the control group increased their drinking by 50% during pregnancy. Alcohol use was similar across intervention and control groups at the six and 18 month follow-ups [284]. The Philani intervention also reduced malnutrition: women receiving home visits were three times more likely to breastfeed exclusively for six months and breastfed longer. At 36 months' post-birth intervention, mothers were significantly less depressed compared to women in the control group, and children of mothers receiving intervention were less likely to be stunted, had better vocabularies, and were less likely to be hospitalized than children in the control group [285].

An important finding for the current review involves the impact of home visiting on child outcome in the context of perinatal depression. While the Philani CHWs were not trained to address depression, and rates of depression were similar in the intervention and control groups over time, the children of depressed mothers receiving the intervention were more often in the normative weight and height for age over time, and they were also more likely to have a higher IQ at 18 months compared to children of depressed mothers in the control group. Having said that, while the CHWs were not trained to deliver a preventive or curative intervention for depression, the day-to-day reality of their supportive roles to women in their neighborhoods often resulted in quite specific responses to mental health difficulties. The depression and infant growth outcome of the Philani study contributes to a growing body of literature examining the impact of community-based interventions on child health in the context of perinatal depression [246].

### **Family-based interventions**

Many global health initiatives have been largely dominated by a narrow, disease-focused model [286], with less emphasis on systemic and family influences on health. Family relationships and parental support are associated with condom use and later sexual initiation [287, 288], while increases in risky sexual and health behaviors have been linked to poor family support and cohesion [289, 290]. A focus on the individual or the disease fails to address the complexities of development of individuals within families and communities. For example, a focus only on prevention of mother-to-child transmission fails to then address the increased mortality and morbidity among HIV-exposed, uninfected infants and children [291]. Another example is how successful exclusive and appropriate feeding involve a complex web of negotiations around barriers to implementation coupled with partner and family support, and not simply the provision of counselling information [292].

Adopting a family-based and group approach offers the potential to ensure that the broader system implications of HIV (such as depression) are not ignored, and that interventions are able to leverage wider resources within families and communities. Finally, a family-based approach is

“developmental” to the extent that it acknowledges how particular child developmental milestones may be challenging for families. Sensitivity to tailoring interventions to fit a particular developmental stage of the child is difficult when the focus is on a narrow conception of disease and the individual. There is evidence of the effectiveness of support groups and family-centered interventions for people living with HIV, including reductions in anxiety, depression, psychological distress, stress and anger, and improved quality of life and coping [293-295]. This is possibly related to the importance of social support in determining coping and adjustment to depression and HIV [102, 296, 297]. Starting within the family unit seems to be of especial relevance to interventions with mothers and children affected by the dual burdens of HIV and depression. Effective family-based interventions for preventing youth risk behaviors have been developed for families coping with parental HIV infection [298]. Further, interventions such as Family First [299] target specific risk behaviors related to HIV status, such as alcohol and substance abuse, and improving parenting skills of MLH. Findings include fewer family conflicts which, in turn, were associated with less adolescent sexual risk behavior. Adolescents also reported less substance abuse in their later years, suggesting that family-based interventions have high potential for facilitating more resilient mental health and developmental trajectories among HIV-affected children [300]. An added benefit of family-based approaches is that they are ideally placed to focus on sibling relationships. In the context of child-headed households, interventions that target siblings are vital. In homes where there are high levels of parental conflict, positive sibling relationships can be protective for children [301, 302].

Exemplary in this regard is the Collaborative HIV Prevention and Adolescent Mental Health Program (CHAMP), a family-based intervention for adolescents [303]. The program, originally trialled low-income communities in the US, Caribbean and South Africa, and began as a generalist mental health promotion program, which has since expanded to include elements tailored to HIV-endemic areas. Based in both developmental and ecological understandings of HIV and mental disorder risk, CHAMP not only intervenes early, but also emphasizes the social and relational nature of risk and resilience [303, 304]. A strength of the model is its high level of intensive stakeholder involvement, and the program is designed with a view for prevention efforts to be supported and sustained by communities [303, 304].

### **Parenting groups**

Given that PEPFAR already has a number of parenting programs that function via parenting groups in high-risk LMICs in sub-Saharan Africa, these may serve as a natural point of entry for mental health interventions for caregivers. There is also a natural fit between mental health programming and parenting groups, given the role of social support in alleviating maternal distress and depression. In

such contexts, it may not be necessary to name a mental health intervention as such. Instead, parenting groups could be used to foster social support for mothers at risk. Increasing the visibility of PEPFAR-funded parenting platforms in target countries could offer a non-stigmatizing intervention for MLH at risk for, or living with, mental health disorders. Many of these groups include a pragmatic, problem-solving component. These skills are universal, rather than specific, and so it would not require many additional resources to incorporate mental health learnings into group content. These skills, that, as noted, are central to many low-cost interventions to improve maternal mental health, could then be leveraged by mothers in their day-to-day lives to deal with challenges that arise in relation to their mental health, their physical health, decision-making and child care.

Problem-solving skills are a key component in the content and delivery of psychological interventions for maternal depression by non-specialist health workers in middle- LMICs. Key among these skills is behavior activation (increasing behaviors conducive to individuals' sense of self-efficacy and pleasure, which then lead to improvements in their cognition and affect). When employing behavior activation in interventions, CHWs work with parents to break down problems into manageable, actionable steps. With support and mentoring, parents acquire practical skills for addressing the day-to-day stressors that would otherwise fuel their distress.

### SCHOOL-BASED PLATFORM

Currently, PEPFAR's programming for youth is targeted predominantly at HIV prevention, and includes delaying age of sexual debut and providing information about consistent and correct condom use [305]. These programs could usefully (and relatively easily) incorporate mental health promotion, as well as mental health services, given the above associations between family HIV and child outcomes. Findings from a systematic review concluded that effective mental health promotion and problem prevention programs in schools shared certain features, including teaching skills, focusing on positive mental health and balancing universal and targeted approaches [306]. In addition, there was a focus on embedding interventions within a multimodal or whole-school approach that included features such as liaison with parents, parenting education, community involvement and coordinated work with outside agencies [306]. Although HIV prevention education is already a standard part of most high school life orientation curricula, mental health literacy and health promotion is not. School-based programs offer an important potential platform for mental health promotion. This can occur on two levels.

1. For children at risk, but not yet manifesting problematic or risky behavior, generalist mental health promotion may be sufficient (universal interventions, which are either general or targeted). One example of an evidence-based generalist program is HealthWise – a program that aims to

engage youth around decision-making and risk behavior prevention. The program, which aims to encourage positive, free-time behavior to reduce engagement in unhealthy behaviors, consists of a set of activities to help young people to use their free time in ways that will benefit themselves and their families, friends and community. However, the program also incorporates a focus on skills development for decision-making, emotional regulation exercises, conflict resolution and techniques to avoid peer pressure. It also has an educational component that focuses on the causes and effects of drug use and sexual risk behaviors. The effectiveness of HealthWise has been assessed in South Africa [307, 308], and has shown to be effective in increasing the perception of condom availability and decreasing alcohol use, among others. These results suggest that HealthWise is a promising approach to reducing multiple health risk behaviors among the population of school-going South African adolescents [309].

2. For children and adolescents already manifesting problematic behavior, or showing signs of mental health problems, more targeted intervention – and potentially referral up the tiers of care – will be necessary. The principles of collaborative stepped care for maternal mental health difficulties may be pertinent here (see next section). In terms of more targeted interventions for children and adolescents exhibiting mental health problems or behavior problems, benefits have accrued to children involved in child-training interventions (including teacher training) between the ages of seven and 14 years [310, 311], including a reduction in behavioral problems and improved social skills [311]. School-based and camp-based psychosocial group interventions have also shown to benefit child and adolescent mental health and reduce internalizing problems, behavioral difficulties and competencies.

As noted, bereavement increases children’s risk for psychological disorders. In contexts in which HIV-related death is high, bereavement becomes a pressing mental health risk. Between 2014 and 2015, Thurman, Lockett, Nice, Spyrelis and Taylor assessed the effects of an eight-session support group intervention on the psychological health of bereaved female adolescents in South Africa [312]. The intervention, called Abangane, is specifically designed for roll out in resource limited settings. The eight-session curriculum for female adolescents, called Abangane (“friends” in isiZulu), is an adaptation of a specially designed grief support intervention. Abangane support groups include activities guided by cognitive behavioral therapy (CBT) principles and indigenous games and songs, as well as discussions about cultural rituals and traditions surrounding death [312].

In Thurman et al.’s study, the intervention group had significantly lower scores for intrusive grief, complicated grief and depression relative to the wait-listed group [312]. As such, short-term,

structured, theory-based support groups with contextually relevant content could constitute a core response to children affected by HIV-related bereavement.

Schools can also serve as entry points for parenting programs, and referral to clinical tier platforms that use nurses to screen children for mental health problems and refer up to specialist care could prove to be a promising link between platforms. USAID has shown support in the past for school-based reproductive health and HIV education programs. Lessons learned from these interventions could strengthen current programming. Further, being able to take advantage of existing points of entry into key populations would make scale-up of any potential mental health interventions easier. Equally, programs aimed at reducing gender-based violence, like USAID's Safe Schools Program in Malawi and Ghana, could provide similar points of entry.

Intervention work with school-aged children could also be integrated into projects such as PEPFAR's DREAMS program for girls. Here partnerships aim to reduce HIV infections among adolescent girls and young women in 10 sub-Saharan African countries (Kenya, Lesotho, Malawi, Mozambique, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe). Given the extensive reach of the DREAMS network, it is an ideal platform from which to launch mental health promotion and disorder-prevention interventions as part of an integrated package of care.

Among adolescents and young adults, vocational training and skills development centers could also constitute a valuable platform for delivery of programming. Given that in LMICs, adolescents might be less likely to finish their formal high school education, reaching this population should entail non-school-based programming. While some work has examined the utility of delivering workshops [313, 314], training and mentoring [315] and vocational training [316] in tandem with HIV prevention interventions, there is little information concerning the use of existing youth training facilities as platforms for delivery of HIV programming. However, given the broader reach and greater appeal of training facilities to adolescents in comparison to formal health services, the utility of this avenue of delivery should be explored further.

## HEALTH CARE PLATFORM

### Linking the community to the health system through stepped care

A useful conceptualization of understanding how mental health services can be delivered in low-resource settings is the "pathways to care," or "stepped care," model [317, 318]. In this model, access to mental health care involves passing between different tiers of care in the community, and then into specialized health care settings [317]. Integral to stepped care are processes of prevention, screening and referral [317]. This model also centralizes the importance of training primary care staff [218, 317], consultation-liaisons between primary care clinicians and mental health professionals

[319], collaborative care across levels of services [320], and strengthening referral services. Notably, establishing linkages and referral systems between community-based programs and clinic-based HIV/AIDS support programs are central in these efforts [321]. The basic principles of the collaborative stepped care approach are that the first port of intervention is low cost and low intensity. Movement to a higher level of more intense treatment only happens for those presenting with specialized and complex problems.

Patel and colleagues have shown in India how a collaborative stepped care model that utilizes supervision by mental health specialists (most specialized and complex level), medication dispensing by primary care physicians (middle level), and psychosocial interventions by lay health counsellors was successful in improving recovery among patients with common mental disorders [322]. Other models include the Perinatal Mental Health Project (PMHP) that delivers mental health care to pregnant women in a collaborative, step-wise manner, making use of existing resources in primary care [219]. A strength of this model is that it lends itself to leveraging existing health care structures, including existing PEPFAR platforms.

An important caution must be made here. The future of mental health provision cannot reasonably continue to lie in the hands of lay or volunteer providers and informal infrastructure. Formal service provision and professional development of mental health workers must be prioritized if the sector is to be strengthened and sustainable gains made.

## POPULATION PLATFORM

Establishing an enabling environment – an important function of government and policy – is essential to ensuring effective implementation at scale. An enabling legal framework is key and would include policies such as social assistance and maternity leave. Recently, Richter and colleagues outlined five transformative policies (with robust global data) that have the potential to create the conditions to assist caregivers in providing nurturing care for children: paid parental leave; breastfeeding breaks at work; day care, early child care and parenting programs; paid leave for child health care; income support, such as a minimum wage; and tuition-free pre-primary education [323]. Another lever would be policies to ensure adequate financing of community visits by CHWs. Also important is intersectoral coordination. In most LMICs, the roles and functions that support caregivers on a daily basis are, in fact, artificially split across government departments.

## STRUCTURAL INTERVENTIONS

As has already been shown, poverty increases the risks of mental illness, and is a driver of HIV. Interventions targeting the structural drivers of HIV risk and mental illness are therefore essential in order to complement other preventive and curative efforts.

## Microfinance

In many LMICs, economic power and household decision-making rest largely with men. According to the Global Gender Gap Report, many African countries, particularly those in the north, are considered “gender unequal” [324]. Gender norms are a significant factor that ensure women assume primary responsibility for childcare activities, and coupled with cultural and religious assumptions about women’s capabilities, make it difficult for women to achieve economic independence [324]. It has been suggested that in order for interventions for women to be effective, they must address gendered power disparities, labor and social norms [325]. Economic insecurity puts MLH at risk for depression, stress and staying in unsatisfactory or abusive relationships. Offering women a means to generate their own income, or begin to save, not only equips them with tangible economic gains, but also has been found to improve women’s self-esteem [326] and self-concept [327].

One approach to the economic disenfranchisement of women is microfinance. Women in Africa are more likely to be constrained by social norms than by a lack of entrepreneurial spirit [328]. Opportunities for growth, such as small businesses run by women, are potential key sources of income for poor households. Village savings and loan associations (VSLAs) are a platform for groups who lack access to formal loans and the financial systems to save together and to then take loans from the savings. Loan profits and accumulated savings are then distributed back to the group, usually in a cycle of one year. Table banking groups are another version of this but with a shorter cycle – members meet monthly and pool all savings and loan repayments – and other group members are then immediately able to take a short- or long-term loan from what is on the table. Savings groups have been included in PEPFAR-funded projects such as Yekozeb Berhan in Ethiopia and Higa Ubeho in Rwanda.

## Cash transfers

The impact of social protection on HIV risk and mental illness is an under-researched area in sub-Saharan Africa. Increasing numbers of governments are implementing, or considering, conditional or unconditional cash transfers. There is evidence from Malawi of cash transfers being associated with lower prevalence of HIV [329], less age-disparate sex in South Africa and Malawi [329, 330], and less transactional sex [330]. Of particular relevance for this review is recent findings about what is known as “cash plus care.” Does adding care and support to social protection programs such as food supplementation or care provide added benefit? Early findings are promising, with Cluver and colleagues showing how cash plus care cumulatively mitigates HIV risk behavior among adolescents in South Africa [331]. Community-based organizations that are able to reach the most vulnerable

may be uniquely placed to provide care and support in conjunction with cash transfers in order to enhance the impact of single interventions.

Recent interventions have examined the impact of synergized interventions that combine traditional “care” intervention (psychosocial or health promotion interventions) with “cash” (conditional or unconditional financial aid). In the realm of HIV programming, Cluver, Olkin, Boyes and Sherr investigated whether social protection provision of “cash” or integrated “cash plus care” reduced HIV-risk behavior among adolescents [331]. These authors found that cash alone was associated with reduced HIV risk for girls (but not for boys), and that integrated cash plus care was associated with halved HIV-risk behavior incidence for both sexes. The authors concluded that increasing adolescent access to social protection may be an effective HIV prevention strategy in sub-Saharan Africa, particularly in communities that are hard-hit by the HIV epidemic [331].

### INTERVENTIONS ACCORDING TO RISK

Given the pathways between maternal mental health, maternal HIV and child outcomes, it is important to consider how targeted interventions might interrupt these pathways. MLH who are distressed about their own health and functioning will experience parenting stress, and may exhibit poorer parenting skills [177]. To improve parenting skills, interventions that focus on training parents to engage children in family routines, improve parent-child communication, and develop consistent parenting discipline can improve child outcomes [177]. Providing caregivers and families with problem-solving skills not only opens up possibilities to deal with problems differently and more effectively, but also facilitates the accessing of social support mechanisms that were not previously seen as potential sources of support [246].

Interventions that aim to address the specific impacts of poverty on children and families have had some successes. Interventions aimed at improving child development and educational outcomes for children living in poverty can usefully include psychological support for mothers, including MLH, as part of existing nutrition or educational packages [284, 285, 332-334]. Addressing poverty with cash transfers and microfinance initiatives has also been shown to have an impact on mental health outcomes among participants [335-339]. Child variables – including child behavior – can be addressed via structured home visiting that incorporates early childhood development in high-prevalence catchment areas [321]. Such interventions should usefully include screening and referral to clinical tiers for children displaying psychopathology or behavioral/ learning/ socioemotional difficulties.

**Table 2: Platforms, Interventions, Identification and Risk Pathways**

PLATFORM	INTERVENTION	IDENTIFICATION	RISK PATHWAY
<b>Community</b>			
<b>Neighborhood and Family</b>	<ul style="list-style-type: none"> <li>• Support groups and family-centered interventions for people living with HIV</li> <li>• Family-based interventions delivered via CBO-level platforms</li> <li>• Home visiting interventions for caregivers at risk</li> <li>• Community-based organization-delivered interventions</li> <li>• Problem-solving and social support interventions</li> </ul>	<ul style="list-style-type: none"> <li>• Universal access in LMICs</li> <li>• Screening of vulnerable children</li> </ul>	<ul style="list-style-type: none"> <li>• Parenting stress and parenting skills</li> <li>• Social support</li> <li>• Maternal behavior</li> <li>• Maternal mental health</li> <li>• Parenting stress, parenting skills and social support</li> </ul>
<b>Schools</b>	<ul style="list-style-type: none"> <li>• Life skills for HIV prevention and mental health promotion (universal or targeted)</li> <li>• School-based stigma and discrimination prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Referral for children- and caregivers-at-risk</li> </ul>	<ul style="list-style-type: none"> <li>• Youth risk behavior reduction</li> <li>• Stigma</li> <li>• Child variables (behavioral or emotional problems)</li> </ul>
<b>Health System</b>			
<b>Primary Health Care</b>	<ul style="list-style-type: none"> <li>• Stepped care</li> <li>• Psychosocial interventions</li> <li>• Home visiting with linkage between community-based support (CHW) and primary health care system</li> </ul>	<ul style="list-style-type: none"> <li>• Screening of caregiver mental health – universal</li> <li>• Screening of vulnerable children</li> </ul>	<ul style="list-style-type: none"> <li>• Maternal mental health</li> <li>• Child variables (behavioral or emotional problems)</li> </ul>
<b>Specialized Care</b>	<ul style="list-style-type: none"> <li>• Case management</li> </ul>	<ul style="list-style-type: none"> <li>• Screening of caregiver mental health – universal</li> <li>• Second-stage screening and diagnosis</li> </ul>	<ul style="list-style-type: none"> <li>• Maternal mental health</li> <li>• Child mental health</li> </ul>
<b>Population</b>			
<b>Legislation/Policy</b>	<ul style="list-style-type: none"> <li>• Social protection</li> <li>• Focus on creating enabling environments</li> </ul>	<ul style="list-style-type: none"> <li>• Universal</li> </ul>	<ul style="list-style-type: none"> <li>• Poverty</li> <li>• Structural disadvantage</li> <li>• Poverty</li> </ul>
<b>Structural</b>	<ul style="list-style-type: none"> <li>• Microfinance</li> <li>• Cash transfers</li> <li>• Cash plus care</li> </ul>	<ul style="list-style-type: none"> <li>• Universal</li> <li>• Means test</li> </ul>	<ul style="list-style-type: none"> <li>• Structural disadvantage</li> <li>• Unequal access</li> </ul>

## Conclusion and recommendations

This review has shown that children affected by concurrent maternal HIV and depression may be more negatively affected than they would be by either one on its own, and that the vulnerabilities they experience are multifaceted, enduring and may accumulate over time. These include vulnerability to negative outcomes in the realm of physical and emotional health, education and psychological adjustment. MLH with depression experience a host of socioemotional stressors, while poverty, the transmission of opportunistic infections, the burden of caring for adults placed on children, stigma, poor social support and exposure to diminished maternal physical and emotional capacity exacerbate the negative impact on children. We have also argued that the links between HIV and mental health are bi-directional and cumulative. Finally, we described a number of possible delivery platforms and types of intervention entry points with potential to enhance impact across PEPFAR platforms. In this review, we have outlined a number of strategies to ensure a more integrated and holistic response to HIV infection, risk and caregiver depression. We recommend that:

### RESEARCH

- There is increased research into the mutually reinforcing detrimental synergy between HIV and depression among mothers, and its effects on their children;
- More needs to be done to understand the pathways from maternal depression to HIV, and from HIV to depression.

### IMPLEMENTATION

- The CBO workforce becomes involved in screening and referral;
- Home visiting becomes an essential component of community provision, particularly in the context of inaccessible formal health infrastructure;
- Home visiting, incorporating local-tailored content addressing local health risks, strong supervision and accountability, offers a viable strategy to address HIV risk and maternal depression and is scalable globally;
- CBOs that reach the most vulnerable and marginalized children become an important platform that offer children more specialized support and not only the broad spectrum of services that they currently offer;
- Funders and countries adopt a family-based approach to ensure that the broader system implications of HIV and depression are not ignored, and that interventions are able to leverage wider resources within families;
- School are used as entry points for parenting programs and referral to clinical tier platforms that use nurses to screen children for mental health problems and refer up to specialist care;

- Care, support and parenting programs are implemented in conjunction with cash transfers in order to enhance the impact of single interventions, and that CBOs may be uniquely placed to provide this;
- Countries establish an enabling environment with transformative policies to ensure effective implementation at scale;
- There is an active effort to improve stakeholder recognition of the unique burden placed on mothers and children affected concurrently by HIV and depression;
- Funders of CBO programs should invest in developing and adapting existing capacity development programs in the area of mental health;
- Pathways to care or ‘collaborative stepped care’ models are adopted to improve linkages between communities and the health care system;
- Screening at PHC and community levels for mental health disorders is adopted;
- Screening tools become an integral part of stepped care approaches to the recognition and treatment of common mental disorders.

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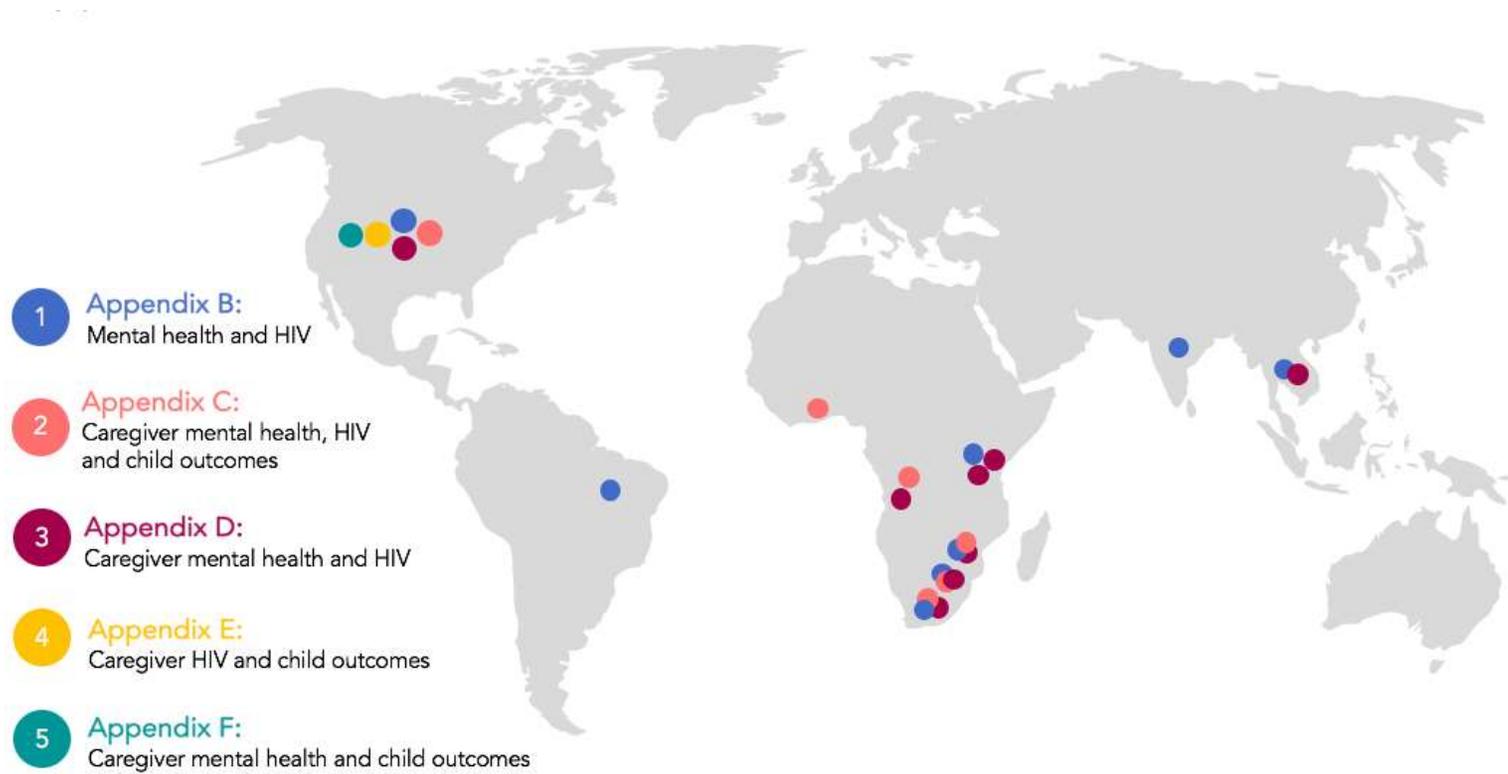
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# Appendices

## APPENDIX A: STUDIES ON HIV AND MENTAL HEALTH



## APPENDIX B: MENTAL HEALTH AND HIV

COUNTRY	SUMMARY	REFERENCE
<b>AFRICA</b> <b>(Review)</b>	<p>The author reviews published quantitative research on the mental health of HIV-infected adults in Africa. Twenty-seven articles published between 1994 and 2008 reported the results of 23 studies. Most studies found that about half of HIV-infected adults sampled had some form of psychiatric disorder, with depression the most common individual problem. People living with HIV or AIDS (PLHIV) tended to have more mental health problems than non-HIV-infected individuals, with those experiencing less problems less likely to be poor and more likely to be employed, educated and receiving antiretroviral treatment (ART). Being female, experiencing poor health, receiving poor-quality health services, and a lack of material and emotional support from family and friends were associated with greater psychiatric morbidity. The author concludes that more rigorous research is needed to put mental health services for PLHIV in Africa on the health care agenda. Priorities for future research should include replicating findings regarding common mental health problems among PLHIV, important issues among HIV-infected women, and the longer-term mental health needs of those on ART.</p>	<p>Brandt, R. (2009). The mental health of people living with HIV/AIDS in Africa: a systematic review. <i>African Journal of AIDS Research, 8(2)</i>, 123-133.</p>
	<p>This review focuses on the ways in which children and adolescents are impacted by the epidemic, giving particular attention to their mental health. Methods: A health promotion framework is adopted to guide analysis. Preventive interventions continue to manifest limited benefits in behavioral changes. More complex causal models and improved behavioral measures are needed. In the African context, the time has come to view pediatric AIDS as a chronic disease in which the mental health of caregivers and children influences important aspects of disease prevention and management. Increasingly sophisticated studies support earlier findings that social and psychological functioning, educational achievement and economic well-being of children who lose parents to AIDS are worse than that of other children.</p>	<p>Earls, F., Raviola, G. J., &amp; Carlson, M. (2008). Promoting child and adolescent mental health in the context of the HIV/AIDS pandemic with a focus on sub-Saharan Africa. <i>Journal of Child Psychology and Psychiatry, 49(3)</i>, 295-312.</p>

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**BRAZIL**

This study evaluated the effect of clinical, demographic and psychiatric factors on the health-related quality of life of 76 women living with HIV in Brazil. A total of 44.8% were asymptomatic, 28.9% symptomatic non-AIDS and 26.3% had AIDS. Most (77.6%) used two or three kinds of antiretrovirals; 36.8 and 30.3% achieved scores for anxiety and depression, respectively (HAD); and 48.7% for conspicuous psychiatric morbidity (CIS-R). The sub-group of the non-AIDS symptoms (clinical stage B) showed the worst quality of life. The variables which better explained the scoring variation on both the mental and physical components of the SF-36 were related to mental health. The more mental symptoms present, the worse the health-related quality of life.

Tostes, M. A., Chalub, M., & Botega, N. J. (2004). The quality of life of HIV-infected women is associated with psychiatric morbidity. *AIDS Care, 16*(2), 177-186.

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**GLOBAL**

This project aims to assess the prevalence and natural history of HIV-1-associated psychiatric, neuropsychological, and neurological abnormalities in representative subject samples enrolled in the five geographic areas predominantly affected by the HIV-I epidemic. The cross-sectional study was completed in five centers. This paper reports on the results of psychiatric assessment, which revealed a significantly higher prevalence of current mental disorders in symptomatic seropositive persons compared with seronegative controls among intravenous drug users in Bangkok and homosexuals/bisexuals in São Paulo. The mean global score on the Montgomery-Asberg Depression Rating Scale was significantly higher in symptomatic seropositive individuals than in matched seronegative controls in all centers.

Maj, M., Janssen, R., Starace, F., Zaudig, M., Satz, P., Sughondhabirrom, B., ... & Calil, H. M. (1994). WHO neuropsychiatric AIDS study, cross-sectional phase I: study design and psychiatric findings. *Archives of General Psychiatry, 51*(1), 39-49.

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This review set out to evaluate the efficacy of cognitive-behavioral interventions (CBIs) for improving the mental health and immune functioning of people living with HIV (PLWH). Data from 15 controlled trials were analyzed. Significant intervention effects were observed for improving symptoms of depression ( $d = 0.33$ ), anxiety ( $d = 0.30$ ), anger ( $d = 1.00$ ), and stress ( $d = 0.43$ ). There is limited evidence suggesting intervention effects on CD4 cell counts ( $d = 0.08$ ). The aggregated effect size estimates for depression and anxiety were statistically significant in trials that provided stress management skills training and had more than 10 intervention sessions.

Crepaz, N., Passin, W. F., Herbst, J. H., Rama, S. M., Malow, R. M., Purcell, D. W., & Wolitski, R. J. (2008). Meta-analysis of cognitive-behavioral interventions on HIV-positive persons' mental health and immune functioning. *Health Psychology, 27*, 4-14.

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**GLOBAL  
(Review)**

The authors performed a systematic review and meta-analysis of double-blinded, randomized controlled trials to examine efficacy of group psychotherapy treatment among HIV infected with depressive symptoms. The principal measure of effect size was the standard difference between means on validated depression inventories. The pooled effect size from the random effects model was 0.38 (95% confidence interval [CI]: 0.23–0.53) representing a moderate effect. Heterogeneity of effect was not found to be significant ( $p = 0.69$ ;  $I^2 = 0\%$ ). Studies reporting use of group CBT had a pooled effect size from the random effects model of 0.37 (95% CI: 0.18–0.56) and was significant. Studies reporting the use of group supportive psychotherapy had a pooled effect size from the random effects model 0.58 (95% CI:  $-0.05$ – $1.22$ ) and was nonsignificant. The results of this study suggest that group psychotherapy is efficacious in reducing depressive symptoms among HIV-infected individuals.

Himelhoch, S., Medoff, D. R., & Oyeniya, G. (2007). Efficacy of group psychotherapy to reduce depressive symptoms among HIV-infected individuals: a systematic review and meta-analysis. *AIDS Patient Care and STDs*, *21*(10), 732-739.

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This meta-analytic review integrated the results of 35 randomized controlled trials examining the efficacy of 46 separate stress-management interventions for HIV+ adults ( $N = 3,077$ ). Compared to controls, stress-management interventions reduce anxiety, depression, distress, and fatigue and improve quality of life ( $d+s = 0.16$  to  $0.38$ ). Stress-management interventions do not appear to improve CD4+ counts, viral load, or hormonal outcomes compared with controls.

Scott-Sheldon, L. A., Kalichman, S. C., Carey, M. P., & Fielder, R. L. (2008). Stress management interventions for HIV+ adults: a meta-analysis of randomized controlled trials, 1989 to 2006. *Health Psychology*, *27*(1), 129-139.

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**INDIA**

This study examined the relationship between HIV-related disclosure and quality of life, anxiety and depression among PLWH in South India. Certain disclosure-related variables appear to relate significantly with quality of life among HIV-infected persons. A positive outcome related to disclosure and extent to which a subject felt the need to disclose were significantly associated with higher scores on the total quality of life measure. No relationship was found between disclosure-related variables and psychological morbidity or other domains of quality of life. The type of disclosure (voluntary/without consent) did not appear to influence quality of life in this sample.

Chandra, P. S., Deepthivarma, S., Jairam, K. R., & Thomas, T. (2003). Relationship of psychological morbidity and quality of life to illness-related disclosure among HIV-infected persons. *Journal of Psychosomatic Research*, *54*(3), 199-203.

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Anxiety, depression, and suicidal ideation were assessed among 51 HIV-seropositive heterosexual men and women with various stages of HIV infection. All assessments were done between 4 and 6 weeks after revelation of positive serostatus. Psychosocial variables such as quality of family relationships and substance use and sociodemographic details such as gender, income, education, and residence were studied for their association with psychiatric morbidity. Depression was present in 40% and anxiety in 36% of the sample. Serious suicidal intent was seen in 14%. Multiple regression analysis indicated that presence of pain, concurrent alcohol abuse, poor family relations, and presence of AIDS in the spouse were significant factors associated with depression, anxiety, and suicidal ideation.

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Chandra, P. S., Ravi, V., Desai, A., & Subbakrishna, D. K. (1998). Anxiety and depression among HIV-infected heterosexuals—a report from India. *Journal of Psychosomatic Research, 45*(5), 401-409.

Seropositive HIV patients admitted in a medical ward were assessed for demographic profile, presenting physical illness, mode of contacting the infection, psychiatric morbidity and associated psychosocial factors. The results revealed male preponderance and heterosexual unprotected exposure as the common mode of contacting the illness. It was observed that majority of the patients presented with tuberculosis. Psychiatric assessment revealed a high rate of depressive and anxiety syndromes.

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Ahuja, A. S., Parkar, S. R., & Yeolekar, M. E. (1998). Psychosocial aspects of seropositive HIV patients. *The Journal of the Association of Physicians of India, 46*(3), 277-280.

Forty-six subjects infected with the human immunodeficiency virus (HIV) were followed up, for recording psychiatric morbidity if any, before and after the information regarding their HIV status was revealed to them. Among these, four patients had the AIDS syndrome, while 42 individuals were HIV carriers. The pre-information morbidity in the AIDS group included two individuals who presented with delirium and one with an adjustment disorder. The psychiatric diagnosis among the HIV carriers revealed one patient with major depression, four with adjustment disorders and four with alcohol dependence syndrome. The additional morbidity after the diagnoses was revealed included major depression and adjustment disorders which could be managed by psychological intervention and counselling in most cases.

Jacob, K. S., Eapen, V., John, J. K., & John, T. J. (1991). Psychiatric morbidity in HIV infected individuals. *The Indian Journal of Medical Research, 93*, 62-66.

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**LMIC  
(Review)**

The authors present a systematic review of the literature on HIV and mental illness in developing countries, examine the mental health risk factors for HIV, mental health consequences of HIV, psychosocial interventions of relevance for HIV-infected and affected populations, and highlight the relevance of these data for HIV care and treatment programs. The authors review seven studies that measured the prevalence of HIV infection among clinic and hospital-based populations of people with mental illness or assessed sexual risk behavior in these populations; 30 studies that described the mental health consequences of HIV infection; and two reports of psychosocial interventions. The review demonstrates the need for methodologically sound studies of mental health throughout the course of HIV, including factors that support good mental health, and interventions that employ identified variables (e.g., coping, family support) for efficacy in reducing symptoms of mental illness.

Collins, P. Y., Holman, A. R., Freeman, M. C., & Patel, V. (2006). What is the relevance of mental health to HIV/AIDS care and treatment programs in developing countries? A systematic review. *AIDS (London, England)*, *20*(12), 1571.

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**SOUTH AFRICA**

This study compared psychiatric morbidity, coping responses, and disability in male and female outpatients recently diagnosed with HIV / AIDS. One hundred and forty-nine patients (44 male, 105 female) with HIV / AIDS attending an infectious diseases clinic at Tygerberg Hospital, Cape Town, were evaluated. Subjects were assessed using the MINI International Neuropsychiatric Interview (MINI), the Carver Brief COPE, and the Sheehan Disability Scale. Fifty-six per cent of patients were diagnosed with a psychiatric disorder, most commonly major depression (34.9%), dysthymic disorder (21.5%), post-traumatic stress disorder (14.8%), and alcohol dependence (10.1%). There were no significant gender differences in the prevalence of mood disorders in the sample. Men, however, were more likely than women to meet diagnostic criteria for alcohol abuse or dependence, and to engage in certain risky sexual behaviors. Women were more likely to suffer from post-traumatic stress disorder, and to use coping strategies of planning and religion to deal with the illness. There were no significant gender differences in disability.

Olley, B. O., Gxamza, F., Seedat, S., Theron, H., Stein, D. J., Taljaard, J., ... & Reuter, H. (2004). Psychopathology and coping in recently diagnosed HIV/AIDS patients - the role of gender. *South African Journal of Psychiatry*, *10*(1), 21-24.

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Background. To the best of our knowledge no previous studies have been published on the rates of psychopathology in HIV infected patients from a predominantly black, heterosexual Third-World population. To evaluate the levels of-anxiety experienced by patients infected with HIV, the presence of specific anxiety and other psychiatric disorders, as well as to determine whether this is associated with disease stage and time after diagnosis. One hundred HIV-infected patients attending the immunology clinics at the Universitas and Pelonomi hospitals in Bloemfontein, South Africa, were screened for the presence of psychiatric disorders using the Mini International Neuropsychiatric Interview (MINI). More specifically, anxiety was evaluated using the Zung self-rating and Hamilton anxiety (HAM-A) scales. Disease stage of the patient was determined by clinical examination and CD4+ T-cell count values. According to the MINI, 35% of the patients had a major depressive disorder. A further 3% had dysthymic disorder, while bipolar disorder was diagnosed in 6%. As regards anxiety disorders, the following was found: panic disorder 37%, agoraphobia 9%, social phobia 15%, specific phobias 10%, obsessive-compulsive disorder 3% and generalised anxiety disorder 21%. Post-traumatic stress disorder was diagnosed in 6%. Thirty-one of the patients scored above the cut-off on both the HAM-A and Zung scales. The results indicate that psychiatric comorbidity is common in HIV-infected patients. Anxiety and depressive disorders were found in a large number of patients, significantly more than the proportion expected in the general population. The identification and treatment of these co-morbid psychiatric syndromes in HIV-infected patients should be actively pursued, as treatment could lead to an improvement in quality of life

Els, C., Boshoff, W., Scott, C., Strydom, W., Joubert, G., & Van der Ryst, E. (1999). Psychiatric comorbidity in South African HIV/AIDS patients. *South African Medical Journal*, 89(9).

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This study investigated predictors of depression among outpatients with recently diagnosed HIV/AIDS patients in South Africa. One hundred and forty-nine recently diagnosed HIV/AIDS patients were evaluated. Three variables: gender (odd ratio [OR] = 1.23; 95% confidence interval [CI] 1.56, 1.93), impact of negative life events (OR = 1.13; CI, 1.03, 1.23), and disability (OR = 1.51, CI, 1.28, 1.80) predicted current major depression.

Olley, B. O., Seedat, S., Nei, D. G., & Stein, D. J. (2004). Predictors of major depression in recently diagnosed patients with HIV/AIDS in South Africa. *AIDS Patient Care and STDs*, 18(8), 481-487.

<b>THAILAND</b>	<p>As part of a perinatal HIV transmission and family impact study in Bangkok, predictors of psychological scales were evaluated from interview data (N=129) collected 18–24 months postpartum. Standardized questionnaires were used to assess depressive symptoms and HIV-related worry. Depressive symptomatology and HIV-related worry were common among these women. High depression scores were associated with women who were no longer in a relationship with their partner (odds ratio (OR) 5.72, confidence interval (CI) 2.18–14.97) and who used venting coping strategies (OR 2.15, CI 1.44–3.21). Higher levels of HIV-related worry were associated with women whose babies were HIV-infected (OR 3.51, CI 1.28–10.69), who had not disclosed their HIV status to others (OR 3.05, CI 1.29–7.24) and who reported that their HIV-infection was something about which their family would be ashamed (OR 3.44, CI 1.34–9.77).</p>	<p>Bennetts, A., Shaffer, N., Manopaiboon, C., Chaiyakul, P., Siriwasin, W., Mock, P., ... &amp; Clark, L. (1999). Determinants of depression and HIV-related worry among HIV-positive women who have recently given birth, Bangkok, Thailand. <i>Social Science &amp; Medicine</i>, 49(6), 737-749.</p>
<b>UGANDA</b>	<p>To examine self-reported quality of life and health status of HIV-infected women and a comparison sample of HIV-uninfected women in rural Uganda, the authors adapted a Lugandan version of the Medical Outcomes Survey-HIV (MOS-HIV). It was administered on a cross-sectional survey among 803 women (239 HIV-positive and 564 HIV-negative) enrolled in a community study to evaluate maternal and child health in Rakai District, Uganda. Compared to HIV-negative women, HIV-positive women reported lower scores than HIV-negative women for general health perceptions, physical functioning, pain, energy, role functioning, social functioning, mental health and overall quality of life (p all &lt;0.01). Substantial impairment was noted among women reporting ≥4 symptoms.</p>	<p>C. Mast, T., Kigozi, G., Wabwire-Mangen, F., Black, R., Sewankambo, N., Serwadda, D., ... &amp; W. Wu, A. (2004). Measuring quality of life among HIV-infected women using a culturally adapted questionnaire in Rakai district, Uganda. <i>AIDS Care</i>, 16(1), 81-94.</p>
<b>UNITED STATES</b>	<p>This manuscript explores adjustment and mental health as related to African American women with HIV/AIDS. Careful consideration is given to the stages of adjustment and related mental health challenges that women might experience. The paper also explores the reciprocal impact of children, other family members and significant others on the mental health status of African American women living with HIV/AIDS.</p>	<p>Feist-Price, S., &amp; Wright, L. B. (2003). African American women living with HIV/AIDS: Mental health issues. <i>Women &amp; Therapy</i>, 26(1-2), 27-44.</p>

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This study identified the psychosocial stressors of low-income families who were affected by HIV/AIDS in Alabama, using personal interviews with 12 social workers at public agencies and a review of social work charts for 80 clients at an HIV clinic for mothers and children. The results indicated that families were likely to experience housing instability, family breakdown, mental illness, behavioral problems, and stigma. Younger children typically lived with their mothers, while older biological children often resided with relatives or in foster care. Social workers perceived mental health conditions such as depression and anxiety to be common among women caregivers. Behavioral problems and learning difficulties were frequently reported among children, but children who were not living with HIV did not have the same access to health care and social services as their siblings who were living with HIV.

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Lichtenstein, B., Sturdevant, M. S., & Mujumdar, A. A. (2010). Psychosocial stressors of families affected by HIV/AIDS: Implications for social work practice. *Journal of HIV/AIDS & Social Services, 9*(2), 130-152.

This study examined whether there were differences in the rate of depressive and anxiety disorders between HIV-infected women (N=93) and a comparison group of uninfected women (N=62). Secondary objectives were to examine correlates of depression in HIV-infected women-including HIV disease stage and protease inhibitor use-and the associations between symptoms of depression or anxiety and other potential predictor variables. Subjects underwent extensive semi-annual clinical, psychiatric, neuropsychological, and immunological evaluations. Depressive and anxiety disorder diagnoses were assessed by using the Structured Clinical Interview for DSM-IV. Symptoms of depression and anxiety were evaluated with the Hamilton Depression Rating Scale (the 17-item version and a modified 11-item version) and the Hamilton Anxiety Rating Scale, respectively. The rate of current major depressive disorder was four times higher in HIV-seropositive women (19.4%) than in HIV-seronegative women (4.8%). Mean depressive symptom scores on the 17-item Hamilton depression scale also were significantly higher, overall, in the HIV-infected women (mean=8.7, SD=8.0) relative to comparison subjects (mean=3.3, SD=5.8). There was no significant between-group difference in the rate of anxiety disorders. However, HIV-seropositive women had significantly higher anxiety symptom scores (mean=8.8, SD=8.9) than did HIV-seronegative women (mean=3.6, SD=5.5). Both groups had similar substance abuse/dependence histories, but adjusting for this factor had little impact on the relationship of HIV status to current major depressive disorder. HIV-seropositive women without current substance abuse exhibited a significantly higher rate of major depressive disorder and more symptoms of depression and anxiety than did a group of HIV-

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Morrison, M. F., Petitto, J. M., Have, T. T., Gettes, D. R., Chiappini, M. S., Weber, A. L., ... & Evans, D. L. (2002). Depressive and anxiety disorders in women with HIV infection. *American Journal of Psychiatry, 159*(5), 789-796.

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seronegative women with similar demographic characteristics. These controlled, clinical findings extend recent epidemiologic findings and underscore the importance of adequate assessment and treatment of depression and anxiety in HIV-infected women.

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The impact of depression on morbidity and mortality among women with human immunodeficiency virus (HIV) has not been examined despite the fact that women with HIV have substantially higher rates of depression than their male counterparts. To determine the association of depressive symptoms with HIV-related mortality and decline in CD4 lymphocyte counts among women with HIV. The HIV Epidemiologic Research Study, a prospective, longitudinal cohort study conducted from April 1993 through January 1995, with follow-up through March 2000. Four academic medical centers in Baltimore, MD; Bronx, NY; Providence, RI; and Detroit, Mich. A total of 765 HIV-seropositive women aged 16 to 55 years. HIV-related mortality and CD4 cell count slope decline over a maximum of 7 years, compared among women with limited or no depressive symptoms, intermittent depressive symptoms, or chronic depressive symptoms, as measured using the self-report Center for Epidemiologic Studies Depression Scale. In multivariate analyses controlling for clinical, treatment, and other factors, women with chronic depressive symptoms were 2 times more likely to die than women with limited or no depressive symptoms (relative risk [RR], 2.0; 95% confidence interval [CI], 1.0-3.8). Among women with CD4 cell counts of less than  $200 \times 10^6/L$ , HIV-related mortality rates were 54% for those with chronic depressive symptoms (RR, 4.3; 95% CI, 1.6-11.6) and 48% for those with intermittent depressive symptoms (RR, 3.5; 95% CI, 1.1-10.5) compared with 21% for those with limited or no depressive symptoms. Chronic depressive symptoms were also associated with significantly greater decline in CD4 cell counts after controlling for other variables in the model, especially among women with baseline CD4 cell counts of less than  $500 \times 10^6/L$  and baseline viral load greater than 10 000 copies/microl. Our results indicate that depressive symptoms among women with HIV are associated with HIV disease progression, controlling for clinical, substance use, and sociodemographic characteristics. These results highlight the importance of adequate diagnosis and treatment of depression among women with HIV. Further research is needed to determine if treatment of depression can not only enhance the mental health of women with HIV but also impede disease progression and mortality.

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Ickovics, J. R., Hamburger, M. E., Vlahov, D., Schoenbaum, E. E., Schuman, P., Boland, R. J., ... & HIV Epidemiology Research Study Group. (2001). Mortality, CD4 cell count decline, and depressive symptoms among HIV-seropositive women: longitudinal analysis from the HIV Epidemiology Research Study. *Jama*, 285(11), 1466-1474.

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Although past work has documented relations between HIV/AIDS and negative affective symptoms and disorders, empirical work has only just begun to address explanatory processes that may underlie these associations. The current investigation sought to test the main and interactive effects of HIV symptom distress and anxiety sensitivity in relation to symptoms of panic disorder (PD), social anxiety disorder (SA), and depression among people with HIV/AIDS. Participants were 164 adults with HIV/AIDS (17.1% women; mean age, 48.40) recruited from AIDS service organizations (ASOs) in Vermont/New Hampshire and New York City. The sample identified as 40.9% white/Caucasian, 31.1% black, 22.0% Hispanic, and 6.1% mixed/other; with more than half (56.7%) reporting an annual income less than or equal to \$10,000. Both men and women reported unprotected sex with men as the primary route of HIV transmission (64.4% and 50%, respectively). HIV symptom distress and anxiety sensitivity (AS) were significantly positively related to PD, SA, and depression symptoms. As predicted, there was a significant interaction between HIV symptom distress and anxiety sensitivity in terms of PD and SA symptoms, but not depressive symptoms. Results suggest that anxiety sensitivity and HIV symptom distress are clinically relevant factors to consider in terms of anxiety and depression among people living with HIV/AIDS. It may be important to evaluate these factors among patients with HIV/AIDS to identify individuals who may be at a particularly high risk for anxiety and depression problems. Limitations included recruitment from ASOs, cross-sectional self-report data, and lack of a clinical diagnostic assessment.

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Gonzalez, A., Zvolensky, M. J., Parent, J., Grover, K. W., & Hickey, M. (2012). HIV symptom distress and anxiety sensitivity in relation to panic, social anxiety, and depression symptoms among HIV-positive adults. *AIDS Patient Care and STDs*, 26(3), 156-164.

**UNITED STATES (cont.)**

Investigated the relationship between depression and HIV risk behaviors or sexually transmitted disease (STD) diagnosis at an urban STD clinic. Depressed patients were more likely to have sex for money or drugs, to have had sex with an intravenous drug user, to have sex when 'high' on alcohol or drugs, to have a greater number of lifetime sex partners, and to abuse alcohol or drugs than were non-depressed patients. Associations of HIV risk behaviors with depression persisted after adjustment for substance abuse.

Hutton, H. E., Lyketsos, C. G., Zenilman, J. M., Thompson, R. E., & Erbeding, E. J. (2004). Depression and HIV risk behaviors among patients in a sexually transmitted disease clinic. *American Journal of Psychiatry*, 161(5), 912-914.

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Examined the intersection of drug use, violence, and depression with HIV-risk among African American women in the US. Authors analyzed whether particular sexual risk behaviors are associated with exposure to violence, depression or both among 420 African American out-of-treatment female drug users. Women with a history of sexually transmitted diseases were more likely to experience violence and depression both alone and jointly. Women who had two or more sexual partners in the last 30 days (OR /2.26) and women who had an early onset of alcohol use (OR /2.50) were at an increased risk for having the full tripartite of drug use, violence and depression. Never being married was a protective factor for the full tripartite. As expected, more risk factors were found among women who had the full tripartite than among women with one or two of the factors.

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Johnson, S. D., Cunningham-Williams, R. M., & Cottler, L. B. (2003). A tripartite of HIV-risk for African American women: the intersection of drug use, violence, and depression. *Drug and Alcohol Dependence, 70*(2), 169-175.

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This study examined the association of depression severity and drug injection HIV risk behavior. Depression severity was associated with injection risk (odds ratio= 1.5; 95% confidence interval=1.1–2.3).

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Stein, M. D., Solomon, D. A., Herman, D. S., Anderson, B. J., & Miller, I. (2003). Depression severity and drug injection HIV risk behaviors. *American Journal of Psychiatry, 160*(9), 1659-1662.

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The authors examined the relationship between depression and HIV-related risk behavior practices in a sample of 250 'at risk', predominantly African American women living in the Atlanta, Georgia metropolitan area using interviews. Depression was a key-mediating variable, having its primary influence on women's risky practices through its impact upon their attitudes toward using condoms. Factors associated with depression included religiosity, closeness of family relationships, financial problems, childhood maltreatment experiences, and drug-related problems.

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Klein, H., Elifson, K. W., & Sterk, C. E. (2008). Depression and HIV risk behavior practices among "at risk" women. *Women & Health, 48*(2), 167-188.

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**ZIMBABWE**

The authors examined the prevalence of HIV infection, neuropsychiatric disorders, psychiatric symptoms/signs, alcohol use/misuse, CD4 cell counts and risk factors in adult patients in the southeastern part of Harare, Zimbabwe. The overall point prevalence of the HIV infection was 59.3% (115/194). Comparative analyses between seropositive and seronegative HIV/AIDS subjects showed: over two thirds (71.3%) of the HIV positive subjects suffered from psychiatric disorders, more than those with HIV negative (n= 44.3%, OR= 3.12, 95% CI= 1.64-5.95, P=0.0002), and subjects aged 35 years and less were mostly HIV seronegative (n= 77.2%, OR= 2.34, 95% CI= 1.18-4.75, P=0.014). The overall prevalence of alcohol use/misuse was 41 (21.1%), with a higher prevalence rate among HIV positive subjects, 28 (24.3%) than those who were HIV negative, 13 (16.5%). The commonest psychiatric symptoms/signs were emotional withdrawal, depressed mood, suspiciousness, apparent sadness, reduced sleep and suicidal thoughts (especially among women).

Sebit, M. B., Tombe, M., Siziya, S., Balus, S., Nkomo, S. D. A., & Maramba, P. (2003). Prevalence of HIV/AIDS and psychiatric disorders and their related risk factors among adults in Epworth, Zimbabwe. *East African Medical Journal*, 80(10), 503-512.

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APPENDIX C: CAREGIVER MENTAL HEALTH, HIV AND CHILD OUTCOMES

COUNTRY	SUMMARY	REFERENCE
<b>GLOBAL (Review)</b>	<p>.....</p> <p>These authors summarize the evidence of negative consequences, including those affecting health, cognitive development, education, child mental health, exposure to abuse and adolescent risk behavior, including sexual risk behavior, which has obvious implications for HIV-prevention efforts. We also highlight the evidence of positive outcomes, despite adversity, considering the importance of recognizing and supporting the development of resilience.</p>	<p>Sherr, L., Cluver, L. D., Betancourt, T. S., Kellerman, S. E., Richter, L. M., &amp; Desmond, C. (2014). Evidence of impact: Health, psychological and social effects of adult HIV on children. <i>Aids, 28</i>, S251-S259.</p>
	<p>.....</p> <p>These authors reviewed evidence and use the biopsychosocial model to illustrate risk factors, mediators and moderators underlying associations between maternal depression and child outcomes in low-income and middle-income countries.</p>	<p>Herba, C. M., Glover, V., Ramchandani, P. G., &amp; Rondon, M. B. (2016). Maternal depression and mental health in early childhood: An examination of underlying mechanisms in low-income and middle-income countries. <i>The Lancet Psychiatry, 3</i>(10), 983-992.</p>
<b>UNITED STATES</b>	<p>.....</p> <p>This exploratory study seeks to recognize the voices of infected mothers and their uninfected children regarding their experiences and consequences of stigma and discrimination. Children’s total stigma score was significantly correlated with levels of maternal anxiety and depression. Additionally, child reading levels were negatively correlated with their mothers’ total stigma score. Qualitative analyses revealed that many acts of stigma and discrimination experienced by the mothers were related to a fear of contagion.</p>	<p>Fair, C., &amp; Brackett, B. (2008). “I Don't Want to Sit by You”: A Preliminary Study of Experiences and Consequences of Stigma and Discrimination from HIV-positive Mothers and Their Children. <i>Journal of HIV/AIDS Prevention in Children &amp; Youth, 9</i>(2), 219-242.</p>
	<p>.....</p> <p>The authors examined the psychological condition of mothers living with HIV, their home life, and how these women function as caretakers with a chronic illness. Interviews were conducted with 135 HIV symptomatic or AIDS diagnosed mothers of young, well children aged</p>	<p>Murphy, D. A., Marelich, W. D., Stritto, M. D., Swendeman, D., &amp; Witkin, A. (2002). Mothers living with</p>

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6–11. White mothers were less likely to be severely ill (CD4 counts of < 500) than all other race/ethnic groups. The mean level of depression was elevated among this sample, and was associated with poorer cohesion in the family, and with poorer family sociability. Depression was also associated with the mothers being less able to perform tasks that they typically do; children of more depressed mothers had increased responsibilities for household tasks.

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HIV/AIDS: Mental, physical, and family functioning. *AIDS Care*, 14(5), 633-644.

**UNITED STATES (cont.)**

A longitudinal study was conducted on the psychological well-being of 81 young children (mean age = 8.8 years) living with mothers with AIDS, or HIV-infected mothers with symptomatic disease. The relationship between mothers' physical health and children's psychological well-being was investigated. Results showed significant linear declines in children's depression, anxiety, and aggressiveness over time. Lower levels of physical functioning and more physical symptoms among mothers were associated with higher levels of children's depression, anxiety, and aggressiveness at baseline. Lower levels of physical functioning and more physical symptoms among mothers were associated with initially high but more rapidly decreasing levels of depression among children. However, mothers who began the study in better health appear to have changed in health more quickly than mothers who began the study in poorer health.

Murphy, D. A., Greenwell, L., Mouttapa, M., Brecht, L., & Schuster, M. A. (2006). Physical health of mothers with HIV/AIDS and the mental health of their children. *Journal of Developmental and Behavioral Pediatrics*, 27(5), 386.

This study examined the degree and impact of HIV-related stigma among MLH and their uninfected children. Mothers reporting high levels of HIV-related stigma scored significantly lower on measures of physical, psychological, and social functioning. Mothers' levels of depression were also significantly higher when their levels of stigma were higher. No significant differences were found in children's depression by perceived level of stigma; however, adolescents who perceived high levels of stigma because of their mothers' HIV status were more likely to participate in delinquent behavior, compared with those reporting low HIV-related stigma. The experience of stigma had consequences for many aspects of well-being among the HIV-infected mothers. While their children were aware of and perceived stigma, they appeared to be affected primarily in the realm of delinquent behavior.

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Murphy, D. A., Austin, E. L., & Greenwell, L. (2007). Correlates of HIV-related stigma among HIV-positive mothers and their uninfected adolescent children. *Women & Health*, 44(3), 19-42.

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This study focuses on the relations between maternal stress, parenting, and child functioning among families where the mother is living with HIV. Sixty-nine mothers with at least one child between six and 12 years old completed questionnaires at the baseline assessment of an intervention designed to facilitate maternal disclosure of HIV status. Results demonstrated that maternal stress was negatively associated with a broad range of parenting skills, and that parenting skills were negatively associated with child problem behaviors. Mothers living with HIV who are anxious about their own health and functioning, and who were more stressed in their parental role, were more likely to exhibit poorer parenting skills, specifically to engage children less frequently in family routines (e.g., eating meals together, having a bedtime routine), poorer parent-child communication, and poorer and less consistent parenting discipline. Not uncommonly, mothers living with HIV experience a range of stressors above and beyond those related to their illness (e.g., poverty, residence in high risk and low resource communities, discrimination).

Murphy, D. A., Marelich, W. D., Armistead, L., Herbeck, D. M., & Payne, D. L. (2010). Anxiety/stress among mothers living with HIV: Effects on parenting skills and child outcomes. *AIDS Care, 22(12)*, 1449-1458.

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**UNITED STATES (cont.)**

This study examined the functions of socioemotional support among 205 African American mothers and children who reside in a low-income inner-city environment. Approximately one-third of participating mothers were HIV-infected. Women living with HIV and their children endorsed receiving lower levels of socioemotional support than noninfected women and their children. More social and emotional support from neighbors and friends was associated with less psychological distress of both HIV-infected and noninfected women. More socioemotional support from the mother was associated with less depressive mood and disruptive behavior among all children. Higher levels of emotional support received by mothers from children were associated with greater psychological distress in mothers. With few exceptions, the HIV status of the mother did not qualify the relationship between socioemotional support and psychosocial adjustment. Thus, socioemotional support appeared to serve as a resource factor, rather than a protective factor, among these families.

Klein, K., Armistead, L., Devine, D., Kotchick, B., Forehand, R., Morse, E., ... & Clark, L. (2001). Socioemotional support in African American families coping with maternal HIV: An examination of mothers' and children's psychosocial adjustment. *Behavior Therapy, 31(1)*, 1-26.

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The emotional distress, self-esteem and problem behaviors of adolescent daughters aged 11–18 years (n = 121) and their mothers with HIV were examined and related to reports of parental disclosure of HIV serostatus and adolescents' perceived bonds with their parents. Most mothers with HIV reported emotional distress in the clinical range (70%). The levels of emotional distress, self-esteem and drug use were significantly correlated between mothers and daughters. Adolescent's emotional distress was significantly related to maternal disclosure of HIV status. Daughters who perceived their mothers as highly caring also perceived them as low in overprotection. Daughters who perceived their mothers as low in caring were more emotionally distressed and reported more conduct problems and lower self-esteem.

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Lee, M. B., Lester, P., & Rotheram-Borus, M. J. (2002). The relationship between adjustment of mothers with HIV and their adolescent daughters. *Clinical Child Psychology and Psychiatry, 7*(1), 71-84.

This study investigated how maternal HIV and mediating family processes are associated with adolescent distress, substance use, and risky sexual behavior. Mother-adolescent (ages 12–21) dyads (N=264) were recruited from neighborhoods where the HIV-affected families resided (161 had mothers with HIV). Mediating family processes were youth aggressive conflict style, maternal bonding, maternal role reversal expectations, and overall family functioning. Results of structural equation modelling indicated that youth aggressive conflict resolution style was strongly associated with adolescent distress, substance use, and risky sexual behavior. In HIV-affected families, youth less frequently reported using an aggressive conflict resolution style and more frequently reported positive maternal bonds; their mothers reported less positive family functioning than control families. Finally, maternal distress indirectly affected adolescent distress and risk behavior via youth aggressive conflict resolution style.

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Lester, P., Stein, J. A., Bursch, B., Rice, E., Green, S., Penniman, T., & Rotheram-Borus, M. J. (2010). Family-based processes associated with adolescent distress, substance use and risky sexual behavior in families affected by maternal HIV. *Journal of Clinical Child & Adolescent Psychology, 39*(3), 328-340.

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**SOUTH AFRICA**

Families affected by HIV/AIDS in the developing world experience higher risks of psychosocial problems than nonaffected families. Positive parenting behavior may buffer against the negative impact of child AIDS-orphanhood and caregiver AIDS-sickness on child well-being. Although there is substantial literature regarding the predictors of parenting behavior in Western populations, there is insufficient evidence on HIV/AIDS as a risk factor for poor parenting in low- and middle-income countries. This paper examines the relationship between HIV/AIDS and positive parenting by comparing HIV/AIDS-affected and nonaffected caregiver-child dyads (n = 2477) from a cross-sectional survey in KwaZulu-Natal, South Africa (27.7% AIDS-ill caregivers; 7.4% child AIDS-orphanhood). Multiple mediation analyses tested an ecological model with poverty, caregiver depression, perceived social support, and child behavior problems as potential mediators of the association of HIV/AIDS with positive parenting. Results indicate that familial HIV/AIDS's association to reduced positive parenting was consistent with mediation by poverty, caregiver depression, and child behavior problems. Parenting interventions that situate positive parenting within a wider ecological framework by improving child behavior problems and caregiver depression may buffer against risks for poor child mental and physical health outcomes in families affected by HIV/AIDS and poverty.

Lachman, J. M., Cluver, L. D., Boyes, M. E., Kuo, C., & Casale, M. (2014). Positive parenting for positive parents: HIV/AIDS, poverty, caregiver depression, child behavior, and parenting in South Africa. *AIDS care*, 26(3), 304-313.

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**APPENDIX D: CAREGIVER MENTAL HEALTH AND HIV**

COUNTRY	SUMMARY	REFERENCE
<b>ANGOLA</b>	The authors assessed the mental health status of pregnant women who are HIV-positive, compared with other groups of pregnant women in Angola. Scores on the GHQ-12 for the HIV-positive group was more than twice the mean score of the controls, indicating poorer mental health in the HIV-positive group. Two-thirds of HIV-positive women had significant emotional distress, more than twice that in the control group. As well as HIV status, marital status was a strong independent predictor of mental health status, with married women experiencing less emotional distress. Pregnant women who were HIV-positive had a much poorer mental health status than the controls.	Bernatsky, S., Souza, R., & De Jong, K. (2007). Mental health in HIV-positive pregnant women: Results from Angola. <i>AIDS Care</i> , 19(5), 674-676.

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**GLOBAL  
(Review)**

These authors reviewed the literature on mental health and resilience in children and adolescents affected by HIV/AIDS. All studies subject to full review were evaluated for quality using a modified Systematic Assessment of Quality in Observational Research (SAQOR) rating system. Online searches of the literature and bibliography mining returned 171 unique studies. Of these, 29 were evaluated as pertaining directly to mental health and resilience in families and children living with HIV/AIDS. The authors state that there is a clear need for rigorous research on mental health and resilience in HIV-affected children and adolescents, with an emphasis on ecological factors.

Betancourt, T. S., Meyers-Ohki, S. E., Charrow, A., & Hansen, N. (2013). Annual Research Review: Mental health and resilience in HIV/AIDS-affected children—a review of the literature and recommendations for future research. *Journal of Child Psychology and Psychiatry, 54(4)*, 423-444.

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People with human immunodeficiency virus (HIV) show elevated anxiety levels compared to the general population. Anxiety can predate HIV infection or be triggered by HIV diagnosis and the many stresses that emerge during the course of HIV disease. Many psychological and pharmacological therapies have been shown to treat anxiety in the general population but a systematic understanding of which interventions have been tested in and are effective with HIV-seropositive individuals is needed. This review examines all published intervention studies on anxiety and HIV from 1980 to 2009 covered by the databases MedLine (1980-2009) and PsycINFO (1980-2009) for a definitive account of effectiveness of interventions and an indication of prevalence of HIV-related anxiety and measurement within studies. Standard systematic research methods were used to gather quality published papers on HIV and anxiety, searching published data bases according to quality inclusion criteria. From the search, 492 papers were generated and hand searched resulting in 39 studies meeting adequacy inclusion criteria for analysis. Of these, 30 (76.9%) were implemented in North America (the USA and Canada), with little representation from developing countries. Thirty-three (84.6%) studies recruited only men or mostly men. A total of 50 interventions were investigated by the 39 studies; 13 targeted HIV, symptoms or associated outcomes/conditions, 20 directly targeted anxiety and another 17 indirectly targeted anxiety. Twenty-four (48%) interventions were effective in reducing anxiety (including 11 indirect interventions), 16 (32%) were ineffective and 10 (20%) had an unknown effect on anxiety. Sixty-five percent of interventions directly targeting anxiety were effective. Psychological interventions (especially cognitive behavioral stress management interventions and

Clucas C, Sibley E, Harding R, Liu L, Catalan J, Sherr L. A systematic review of interventions for anxiety in people with HIV. *Psychol Health Med.* 2011 Oct;16(5):528-47

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cognitive behavioral therapy) were generally more effective than pharmacological interventions. Only three studies provided prevalence rates - these ranged from 13% to 80%. Anxiety was measured using 16 different instruments. Our detailed data suggest that interventions are both effective and available, although further research into enhancing efficacy would be valuable. Also, the vast majority of studies were Western-based, no studies looked at children or adolescents and few looked specifically at women. An international effort to harmonise measurement of anxiety is also missing. There is a need to routinely log anxiety in those with HIV infection during the course of their disease, to provide specific data on women, young people and those in diverse geographic areas and incorporate management into care protocols.

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**KENYA**

The study objective was to determine the prevalence and severity of postpartum depression (PPD) among women living with HIV and to further understand the impact of stigma and other psychosocial factors in 123 women living with HIV attending a prevention of mother-to-child transmission (PMTCT) clinic at Kenyatta National Hospital located in Nairobi, Kenya. Forty-eight percent (N = 59) of women screened positive for elevated depressive symptoms. Eleven (9%) of the participants reported high levels of stigma. Multivariate analyses showed that lower education (OR = 0.14, 95% CI [0.04–0.46], p = .001) and lack of family support (OR = 2.49, 95% CI [1.14–5.42], p = .02) were associated with the presence of elevated depressive symptoms. The presence of stigma implied more than nine-fold risk of development of PPD (OR = 9.44, 95% CI [1.132–78.79], p = .04). Stigma was positively correlated with an increase in PPD.

Yator, O., Mathai, M., Vander Stoep, A., Rao, D., & Kumar, M. (2016). Risk factors for postpartum depression in women living with HIV attending prevention of mother-to-child transmission clinic at Kenyatta National Hospital, Nairobi. *AIDS Care*, 28(7), 884-889.

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**MALAWI,  
SOUTH  
AFRICA**

Study aimed to assess the mental health of carers of children affected by HIV as a part of the Child Community Care study. A sample of 952 carers of children (aged 4–13 years) attending 28 randomly selected CBOs were interviewed. Of carers interviewed, 28% scored above the clinical cut-off for current psychological morbidity and 12.2% reported suicidal ideation. Household unemployment, living with a sick family member and perceived lack of support from the community were associated with both psychological morbidity and suicidal ideation in carers. Reported child food insecurity was also associated with psychological morbidity. Carers living in South Africa were more likely to present

Skeen, S., Tomlinson, M., Macedo, A., Croome, N., & Sherr, L. (2014). Mental health of carers of children affected by HIV attending community-based programmes in South Africa and Malawi. *AIDS Care*, 26(sup1), S11-S20.

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with psychological morbidity and suicidal ideation than carers in Malawi. Rates of help-seeking for mental health problems were low.

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#### **RWANDA**

This study compares mental health problems and risk and protective factors in HIV-positive, HIV-affected (due to caregiver HIV), and HIV-unaffected children in Rwanda using a case-control design. HIV-affected and HIV-positive children demonstrated higher levels of depression, anxiety, conduct problems, and functional impairment compared with HIV-unaffected children. HIV-affected children had significantly higher odds of depression (1.68: 95% confidence interval [CI] 1.15–2.44), anxiety (1.77: 95% CI 1.14–2.75), and conduct problems (1.59: 95% CI 1.04–2.45) compared with HIV-unaffected children, and rates of these mental health conditions were similar to HIV-positive children. These results remained significant after controlling for contextual variables.

Betancourt, T., Scorza, P., Kanyanganzi, F., Fawzi, M. C. S., Sezibera, V., Cyamatare, F., ... & Kayiteshonga, Y. (2014). HIV and child mental health: a case-control study in Rwanda. *Pediatrics, 134*(2), e464-472

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#### **THAILAND**

The objective of this study was to assess changes in the family situation of HIV-infected women who have recently given birth. As part of a prospective perinatal HIV transmission study, interviews were conducted with a subset of HIV-infected women at 18 to 24 months postpartum, and answers were compared with baseline information obtained during pregnancy. Standardized scales were used to assess levels of psychosocial functioning. A convenience sample of 129 HIV-infected women enrolled during pregnancy was interviewed at 18 to 24 months postpartum. At delivery, the women were young (median age, 22 years), primiparous (57%), and asymptomatic (93%). When baseline and follow-up data were compared, more women were living alone (1% versus 6%;  $p = 0.03$ ), fewer women were living with their partners (98% versus 73%;  $p < 0.001$ ), and 30% of families had reduced incomes. At follow-up, 10% of partners had died, and more partners than wives had become ill or died (21% versus 4%;  $p = 0.02$ ). Most children (78%) were living with their mothers, but only 57% of the HIV-infected women were the primary caretakers. Fewer women had disclosed their HIV status to others (e.g., family, friends) than to their partners (34% versus 84%;  $p < 0.001$ ), largely because of fear of disclosure. The women appeared to have high levels of depression and worry. The women's greatest worries were about their children's health and the family's future. Within 2 years after childbirth, substantial change within the families of HIV-infected women was evident. These were

Manopaiboon, C., Shaffer, N., Clark, L., Bhadrakom, C., Siriwasin, W., Chearskul, S., ... & Mastro, T. D. (1998). Impact of HIV on families of HIV-infected women who have recently given birth, Bangkok, Thailand. *Journal of Acquired Immune Deficiency Syndromes, 18*(1), 54-63.

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manifest by partner illness or death, family separation, reduced family income, shifting responsibilities  
for child care, and signs of depression and isolation.

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**UNITED  
STATES**

These authors analyzed data from the medical records of all HIV-infected women who had received perinatal care in the Maternal-Child and Adolescent Center for Infectious Diseases and Virology at LAC=USC Medical Center from 1997 through 2006. The overall prevalence of PND was 30.8%. Multivariate analysis showed that PND was significantly associated with substance abuse during pregnancy (odds ratio [OR] 2.81, 95% confidence interval [CI]: 1.35–5.82) and past history of psychiatric illness (OR 3.72, 95% CI: 2.06–6.71). Compared to mothers with CD4 nadir greater than 500 cells/mm<sup>3</sup>, mothers with a CD4 nadir during pregnancy <200 cells/mm<sup>3</sup> were 3.1 times more likely to experience PND (OR 3.01, 95% CI: 1.32–6.88). Women who had antiretroviral (ARV) medications adherence problems during pregnancy were more likely to experience PND than women who were adherent (OR 2.14, 95% CI: 1.08–4.23).

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Kapetanovic, S., Christensen, S., Karim, R., Lin, F., Mack, W. J., Operskalski, E., ... & Kovacs, A. (2009). Correlates of perinatal depression in HIV-infected women. *AIDS Patient Care and STDs*, 23(2), 101-108.

These authors compared background characteristics, co-occurring drug use, and physical and mental health functioning of urban HIV-infected and uninfected mothers with problem drinking who were raising adolescents. Mothers in both groups reported similarly high levels of lifetime and current alcohol and drug use and poor physical and mental health. Health outcomes for mothers with problem drinking do not appear to be exacerbated by HIV status.

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Leonard, N. R., Gwadz, M. V., Cleland, C. M., Rotko, L., & Gostnell, K. (2007). Physical and mental health functioning of urban HIV-infected and uninfected mothers with problem drinking. *The American Journal of Drug and Alcohol Abuse*, 33(3), 419-427.

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The authors set out to evaluate the prevalence, incidence, remission, and persistence of psychiatric and substance use disorders among MLH and identify biopsychosocial correlates. Thirty-five percent of mothers screened positive for any psychiatric or substance use disorder at initial evaluation, with no difference by maternal HIV status ( $P = 1.00$ ). Among HIV-infected mothers, presence of any disorder was associated with younger age [adjusted odds ratio (aOR): 1.39; 95% CI: 1.09 to 1.75], single parenthood (aOR: 1.35; 95% CI: 1.08 to 1.68), and functional limitations (aOR: 2.29; 95% CI: 1.81 to 2.90). Incident disorders were associated with functional limitations (aOR: 1.92; 95% CI: 1.10 to 3.30). Among HIV-infected mothers with a disorder at initial evaluation ( $n = 238$ ), 61% had persistent disorders. Persistent disorders were associated with lower income (aOR: 2.44; 95% CI: 1.33 to 4.76) and functional limitations (aOR: 3.19; 95% CI: 1.87 to 5.48). Receipt of treatment for any disorder was limited: 4.5% at study entry, 7% at follow-up, 5.5% at both entry and follow-up.

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Malee, K., Mellins, C. A., Huo, Y., Tassiopoulos, K., Smith, R., Sirois, P. A., ... & Grant, M. (2014). Prevalence, incidence and persistence of psychiatric and substance use disorders among mothers living with HIV. *Journal of Acquired Immune Deficiency Syndromes*, 65(5), 526-534.

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This study examined the association between mental health, substance abuse and family factors and medical treatment adherence in 128 HIV-infected ethnic minority mothers. Nearly 50% of the women in the sample met screening criteria for a current psychiatric disorder, and 25% for a substance abuse disorder. Two-thirds of the women were currently on antiretroviral medication; 20% of them reported missing pills in the past two days. Presence of a psychiatric or substance abuse disorder and parenting stress were the strongest correlates of non-adherence to antiretroviral medication. Less HIV disclosure to children and single parent status were associated with missing medical appointments.

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Mellins, C. A., Havens, J. F., McCaskill, E. O., Leu, C. S., Brudney, K., & Chesney, M. A. (2002). Mental health, substance use and disclosure are significantly associated with the medical treatment adherence of HIV-infected mothers. *Psychology, Health & Medicine*, 7(4), 451-460.

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**UNITED STATES (cont.)**

This longitudinal study examined mental health, substance abuse, and psychosocial predictors of long-term adherence to antiretroviral medications and medical appointments among HIV-seropositive mothers recruited from an infectious disease clinic of a large urban medical center. The authors examined psychiatric and psychosocial predictors of adherence to antiretroviral medications and medical appointments over time. Presence of a psychiatric disorder, negative stressful life events, more household members, and parenting stress were significantly associated with both missed pills and missed medical appointments at follow-up. Baseline substance abuse was associated with missed

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Mellins, C. A., Kang, E., Leu, C. S., Havens, J. F., & Chesney, M. A. (2003). Longitudinal study of mental health and psychosocial predictors of medical treatment adherence in mothers living with

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pills at follow-up and lack of disclosure to family members at baseline was associated with missed medical appointments at follow-up.

HIV disease. *AIDS Patient Care and STDs*, 17(8), 407-416.

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Using a modified theory of health behavior, this study examined the effects of maternal HIV infection and psychosocial variables on the onset of sexual and drug risk behavior in 144 HIV-negative adolescents with and without HIV-positive mothers. By follow-up, 42% of youths reported the onset of vaginal sex (vs 5% at baseline). Marijuana and alcohol use increased from 6% and 38%, respectively, at baseline to 25% and 60% at follow up. Among those reporting risk behaviors, 40–50% reported onset prior to 14 years. Youth and family psychosocial variables, but not maternal HIV status, were associated with risk behavior outcomes.

Mellins, C. A., Dolezal, C., Brackis-Cott, E., Nicholson, O., Warne, P., & Meyer-Bahlburg, H. F. (2007). Predicting the onset of sexual and drug risk behaviors in HIV-negative youths with HIV-positive mothers: The role of contextual, self-regulation, and social-interaction factors. *Journal of Youth and Adolescence*, 36(3), 265-278.

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This paper reports findings from a study evaluating preconception, pregnancy, and postpartum depressive symptoms in HIV-infected vs. at-risk, HIV-uninfected women. The prevalence of elevated perinatal depressive symptoms did not differ by HIV serostatus (HIV-infected 44%, HIV-uninfected 50%,  $p = 0.44$ ). Among HIV-infected women, the strongest predictor of elevated symptoms was preconception depression (odds ratio [OR] 5.71, 95% confidence interval [CI] 2.67-12.19,  $p < 0.001$ ); crack, cocaine, and/or heroin use during preconception was marginally significant (OR 3.10, 95% CI 0.96-10.01,  $p = 0.06$ ). In the overall sample, additional significant predictors of perinatal depression included having multiple sex partners preconception (OR 2.20, 95% CI 1.12-4.32,  $p = 0.02$ ), use of preconception mental health services (OR 2.51, 95% CI 1.03-6.13,  $p = 0.04$ ), and not graduating from high school (OR 1.92, 95% CI 1.06-3.46,  $p = 0.03$ ).

Rubin, L. H., Cook, J. A., Grey, D. D., Weber, K., Wells, C., Golub, E. T., ... & Wilson, M. L. (2011). Perinatal depressive symptoms in HIV-infected versus HIV-uninfected women: a prospective study from preconception to postpartum. *Journal of Women's Health*, 20(9), 1287-1295.

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This study examined whether maternal depressive symptoms serve as a mediator, moderator or both, between maternal HIV status and child depressive symptoms. MLH and their children reported more

Biggar, H., Forehand, R., & Family Health Project Research Group.

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depressive symptoms than noninfected mothers and their children. Maternal depressive symptoms play a moderating but not a mediating role, as the direction of the relationship between maternal depressive symptoms and child depressive symptoms differed between HIV-infected and noninfected groups.

(1998). The relationship between maternal HIV status and child depressive symptoms: Do maternal depressive symptoms play a role? *Behavior Therapy*, 29(3), 409-422.

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**ZIMBABWE**

The authors determined the prevalence and risk factors of PND among women attending urban primary care clinics in Zimbabwe. Of the 210 mothers (31 HIV positive, 148 HIV negative, 31 unknown status) enrolled during the postpartum period, 64 (33%) met DSM-IV criteria for depression. The HIV prevalence was 14.8%. Of the 31 HIV-infected mothers, 17(54%) met DSM-IV criteria for depression. Univariate analysis showed that multiparity (prevalent odds ratio [OR] 2.22, 95% confidence intervals [CI] 1.15-4.31), both parents deceased (OR 2.35, 95% CI 1.01-5.45), and having experienced a recent adverse life event (OR 8.34, CI 3.77-19.07) were significantly associated with PND. Multivariate analysis showed that PND was significantly associated with adverse life event (OR 7.04, 95% CI 3.15-15.76), being unemployed (OR 3.12, 95% CI 1.23-7.88), and multiparity (OR 2.50, 95% CI 1.00-6.24).

Chibanda, D., Mangezi, W., Tshimanga, M., Woelk, G., Rusakaniko, S., Stranix-Chibanda, L., ... & Shetty, A. K. (2010). Postnatal depression by HIV status among women in Zimbabwe. *Journal of Women's Health*, 19(11), 2071-2077.

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## APPENDIX E: CAREGIVER HIV AND CHILD OUTCOMES

COUNTRY	SUMMARY	REFERENCE
<b>AFRICA</b>	<p>This review summarizes the state of knowledge based on a systematic search of PubMed and Web of Science that identified 47 empirical research articles that examined either the population prevalence of children living with HIV-infected or AIDS-sick adults, or the consequences of adult HIV infection or AIDS illness for child well-being. The authors found that this population of children is substantial in size, and that the vulnerabilities they experience are multi-faceted, spanning physical and emotional health and schooling. Mechanisms were examined empirically in only a small number of studies, but encompass poverty, transmission of opportunistic infections, care for unwell adults, adult distress, AIDS stigma, lack of social support, maternal breastfeeding issues, and vertical HIV transmission. Some evidence is provided that infants, adolescents, children with infected or ill mothers, and children living with severely ill adults are particularly vulnerable.</p>	<p>Goldberg, R. E., &amp; Short, S. E. (2016). What do we know about children living with HIV-infected or AIDS-ill adults in Sub-Saharan Africa? A systematic review of the literature. <i>AIDS Care, 28(sup2)</i>, 130-141.</p>
	<p>Little is known about impacts of familial AIDS on abuse and sexual health outcomes among adolescents. Objectives were to determine whether familial AIDS is: (1) associated with severe physical, emotional, and sexual abuse; (2) associated with transactional sexual exploitation; and (3) explore whether relationships between familial AIDS and transactional sex are mediated by extreme poverty and abuse. Adolescent self-report study in deprived South African communities. A 2009 follow-up of a 2005 study achieved 71% retention (n = 723). The 2009 sample included AIDS-orphaned (n = 236), other-orphaned (n = 231), and non-orphaned (n = 220) adolescents, whose primary caregivers were AIDS sick (n = 109), other sick (n = 147), and healthy (n = 220). Abuse and transactional sex were measured using widely used and validated self-report measures. AIDS orphanhood and parental AIDS sickness predicted emotional and physical abuse and transactional sexual exploitation. Orphanhood or parental sickness by non-AIDS causes, and having healthy caregivers, did not predict any abuse outcomes. Adolescents "dually" affected by AIDS orphanhood and sickness showed a 3-fold likelihood of severe emotional and physical abuse and, among girls, a 6-fold likelihood of transactional sexual exploitation, compared with those in healthy families. Heightened risk of transactional sex among adolescents in AIDS-affected families was mediated by</p>	<p>Cluver, L., Orkin, M., Boyes, M., Gardner, F., &amp; Meinck, F. (2011). Transactional sex amongst AIDS-orphaned and AIDS-Affected adolescents predicted by abuse and extreme poverty. <i>Journal of Acquired Immune Deficiency Syndromes, 1</i>, 336–343. doi:10.1097/QAI.0b013e31822f0d82</p>

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extreme poverty and abuse exposure. In combination, the effects of familial AIDS, food insecurity, and exposure to abuse raised prevalence of transactional sex among girls from 1% to 57%. Adolescents from AIDS-affected families are highly vulnerable to severe physical and emotional abuse and transactional sex. This has implications for policy and programming in child protection and HIV prevention services.

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**CONGO** The purpose of this study was to compare the neurodevelopment of preschool-aged HIV-infected, HIV-affected (HIV-uninfected AIDS orphans and HIV-uninfected children whose mother had symptomatic AIDS), and healthy control children in Kinshasa, Democratic Republic of Congo. Overall, 60% of HIV-infected children had severe delay in cognitive function, 29% had severe delay in motor skills, 85% had delays in language expression, and 77% had delays in language comprehension, all significantly higher rates as compared with control children. Young HIV-infected children (aged 18–29 months) performed worse, with 91% and 82% demonstrating severe mental and motor delay, respectively, compared with 46% and 4% in older HIV-infected children (aged 30–72 months). HIV-affected children had significantly more motor and language expression delay than control children.

Van Rie, A., Mupuala, A., & Dow, A. (2008). Impact of the HIV/AIDS epidemic on the neurodevelopment of preschool-aged children in Kinshasa, Democratic Republic of the Congo. *Pediatrics*, *122*(1), e123-e128.

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**GHANA** This study examined the impact of parental HIV/AIDS status and death on the mental health of children in Ghana. Children whose parents died of AIDS showed very high levels of peer problems [ $F(3,196) = 7.34, p < .001$ ] while both orphaned groups scored similarly high on conduct problems [ $F(3, 196) = 14.85, p < .001$ ]. Hyperactivity showed no difference and was very low in the entire sample. Emotional problems were very high in all the groups except among the non-orphaned children [ $F(3, 196) = 5.10, p < .001$ ].

Doku, P. N. (2009). Parental HIV/AIDS status and death, and children's psychological wellbeing. *International Journal of Mental Health Systems*, *3*(1), 26.

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The study was conducted to assess the psychosocial adjustment of children affected by HIV/AIDS in the eastern part of Ghana. Four groups of children (children who lost their parents to AIDS, children who lost their parents through other causes, children living with HIV infected, alive parents and the comparison children who were from the same community but did not have HIV/AIDS-related illness or death in their families) were interviewed on depressive symptoms, prosocial behaviors, hyperactivity,

Doku PN. Psychosocial adjustment of children affected by HIV/AIDS in Ghana. *Journal of Child and Adolescent Mental Health*. 2010; *22*(1):25–34.

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conduct and peer problems using the Strengths and Difficulties Questionnaire (SDQ). Orphans in general and children living with HIV-infected parents consistently demonstrated poorer psychosocial adjustment than comparison children in the same community. The findings underscore the urgency and importance of culturally and developmentally appropriate intervention efforts targeting psychosocial problems among children affected by AIDS and call for more exploration of risk and resilience factors, both individual and contextual, affecting the wellbeing of these children.

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**GLOBAL  
(Review)**

This paper reviews epidemiological characteristics of children affected by HIV/AIDS, coping mechanisms and current knowledge of the impact of HIV on children. Areas where important gaps in knowledge exist are highlighted.

Foster, G., & Williamson, J. (2000). A review of current literature on the impact of HIV/AIDS on children in sub-Saharan Africa. *AIDS, 14*, S275-S284.

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Numerous articles stress the unique problems of mourning an acquired immunodeficiency syndrome (AIDS)-related death and suggest psychotherapeutic interventions. However, no studies have been conducted that identify what differs in the grief process when the death was AIDS-associated and whether the extensive clinical and research literature on bereavement can be generalized to AIDS. This paper focuses on a bereaved population that has suffered AIDS-related loss-the uninfected children of mothers who die of AIDS, a group that has been referred to as "AIDS orphans." We begin with a brief discussion of factors that complicate the grief process among those who lose a significant other to AIDS. Next, we discuss the factors that the extant clinical and research literatures suggest may influence adjustment to parental death in childhood. Then we apply this literature to parental loss in childhood from an AIDS-associated death. Finally, we recommend directions for future research.

Siegel K, Gorey E. Childhood bereavement due to parental death from acquired immunodeficiency syndrome. *J Dev Behav Ped* 1994;15:S66-77.

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**UNITED STATES, CARIBBEAN, SOUTH AFRICA**

Family-based interventions with children who are affected by HIV and AIDS are not well established. The Collaborative HIV Prevention and Adolescent Mental Health Program (CHAMP) represents one of the few evidence-based interventions tested in low-income contexts in the US, Caribbean and South Africa. This paper provides a description of the theoretical and empirical bases of the development and implementation of CHAMP in two of these countries, the US and South Africa. In addition, with the advent of increasing numbers of children infected with HIV surviving into adolescence and young adulthood, a CHAMP+ family-based intervention, using the founding principles of CHAMP, has been developed to mitigate the risk influences associated with being HIV positive.

Bhana, A., McKay, M. M., Mellins, C., Petersen, I., & Bell, C. (2010). Family-based HIV prevention and intervention services for youth living in poverty-affected contexts: the CHAMP model of collaborative, evidence-informed programme development. *Journal of the International AIDS Society*, 13(2), S8.

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This article describes a program of prevention and intervention research conducted by the CHAMP (Collaborative HIV prevention and Adolescent Mental health Project) investigative team. CHAMP refers to a set of theory-driven, evidence-informed, collaboratively designed, family-based approaches meant to address the prevention, health, and mental health needs of poverty-impacted African American and Latino urban youth who are either at risk for HIV exposure or perinatally infected and at high risk for reinfection and possible transmission. CHAMP approaches are informed by theoretical frameworks that incorporate an understanding of the critical influences of multilevel contextual factors on youth risk taking and engagement in protective health behaviors. Highly influential theories include the triadic theory of influence, social action theory, and ecological developmental perspectives. CHAMP program delivery strategies were developed via a highly collaborative process drawing upon community-based participatory research methods in order to enhance cultural and contextual sensitivity of program content and format. The development and preliminary outcomes associated with a family-based intervention for a new population, perinatally HIV-infected youth and their adult caregivers, referred to as CHAMP+, is described to illustrate the integration of theory, existing evidence, and intensive input from consumers and healthcare providers.

McKay, M. M., Alicea, S., Elwyn, L., McClain, Z. R., Parker, G., Small, L. A., & Mellins, C. A. (2014). The development and implementation of theory-driven programs capable of addressing poverty-impacted children's health, mental health, and prevention needs: CHAMP and CHAMP+, evidence-informed, family-based interventions to address HIV risk and care. *Journal of Clinical Child & Adolescent Psychology*, 43(3), 428-441.

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**CHINA**

To assess the relationship between parental HIV/AIDS and psychosocial adjustment of children in rural central China. Participants included 296 double AIDS orphans (children who had lost both their

Fang X, Li X, Stanton B, Hong Y, Zhang L, Zhao G, Lin D. Parental

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parents to AIDS), 459 single orphans (children who had lost one parent to AIDS), 466 vulnerable children who lived with HIV-infected parents, and 404 comparison children who did not experience HIV/AIDS-related illness and death in their families. The measures included depressive symptoms, loneliness, self-esteem, future expectations, hopefulness about the future, and perceived control over the future. AIDS orphans and vulnerable children consistently demonstrated poorer psychosocial adjustment than comparison children in the same community. The level of psychosocial adjustment was similar between single orphans and double orphans, but differed by care arrangement among double orphans. The findings underscore the urgency and importance of culturally and developmentally appropriate intervention efforts targeting psychosocial problems among children affected by AIDS and call for more exploration of risk and resilience factors, both individual and contextual, affecting the psychosocial wellbeing of these children.

HIV/AIDS and psychosocial adjustment among rural Chinese children. *J Pediatr Psychol.* 2009; 34(10):1053–1062. jsp006. DOI: 10.1093/jpepsy/jsp006

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**SOUTH AFRICA, MALAWI**

The authors examined the effects of caregiver and household HIV on child development from 989 children and their caregivers in South Africa and Malawi between 2011–2014. The HIV burden was positively associated with an array of negative child outcomes, often mediated by caregiver depression levels. Family HIV burden at baseline affected child behavioral problems at follow-up indirectly through carer depression. Internalizing and externalizing problems at follow-up were also indirectly affected by family HIV burden through caregiver depression.

Sherr, L., Skeen, S., Hensels, I. S., Tomlinson, M., & Macedo, A. (2016). The effects of caregiver and household HIV on child development: A community-based longitudinal study of young children. *Child: Care, Health and Development, 42(6)*, 890-899.

Community-based responses have a lengthy history. The ravages of HIV on family functioning has included a widespread community response. Although much funding has been invested in front line community-based organisations (CBO), there was no equal investment in evaluations. This study was set up to compare children aged 9–13 years old, randomly sampled from two South African provinces, who had not received CBO support over time (YC) with a group of similarly aged children who were CBO attenders (CCC). YC baseline refusal rate was 2.5% and retention rate was 97%. CCC baseline refusal rate was 0.7% and retention rate was 86.5%. 1848 children were included—446 CBO attenders compared to 1402 9–13 year olds drawn from a random sample of high-HIV prevalence areas. Data

Sherr, L., Yakubovich, A. R., Skeen, S., Cluver, L. D., Hensels, I. S., Macedo, A., & Tomlinson, M. (2016). How effective is help on the doorstep? A longitudinal evaluation of community-based organisation support. *PLoS one, 11(3)*, e0151305.

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were gathered at baseline and 12–15 months follow-up. Standardised measures recorded demographics, violence and abuse, mental health, social and educational factors. Multivariate regression analyses revealed that children attending CBOs had lower odds of experiencing weekly domestic conflict between adults in their home (OR 0.17; 95% CI 0.09, 0.32), domestic violence (OR 0.22; 95% CI 0.08, 0.62), or abuse (OR 0.11; 95% CI 0.05, 0.25) at follow-up compared to participants without CBO contact. CBO attenders had lower odds of suicidal ideation (OR 0.41; 95% CI 0.18, 0.91), fewer depressive symptoms (B = -0.40; 95% CI -0.62, -0.17), less perceived stigma (B = -0.37; 95% CI -0.57, -0.18), fewer peer problems (B = -1.08; 95% CI -1.29, -0.86) and fewer conduct problems (B = -0.77; 95% CI -0.95, -0.60) at follow-up. In addition, CBO contact was associated with more prosocial behaviors at follow-up (B = 1.40; 95% CI 1.13, 1.67). No associations were observed between CBO contact and parental praise or post-traumatic symptoms. These results suggest that CBO exposure is associated with behavioral and mental health benefits for children over time. More severe psychopathology was not affected by attendance and may need more specialised input.

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**UNITED STATES**

This study examined predictors of adjustment of adolescents of parents with HIV at three and six years after the delivery of either a coping skills intervention or a standard care condition. Youth in the intervention condition reported significantly less substance use three and six years later. In addition, positive parental bonds reported at baseline reduced emotional distress at three years and increased positive future expectations at six years. Substance use at three years predicted heightened sexual risk behaviors, continued substance use, and lower future expectations at six years. Early emotional distress and being Latino predicted increased emotional distress at three years. Parental death by three years predicted more sexual risk behavior and lowered future expectations at six years.

Rotheram-Borus, M. J., Stein, J. A., & Lester, P. (2006). Adolescent adjustment over six years in HIV-affected families. *Journal of Adolescent Health, 39*(2), 174-182.

To determine factors related to the timing and probability of nondisclosure of HIV status to perinatally HIV-infected children, and to explore factors associated with emotional distress in HIV-infected children. This is a cross-sectional study of 51 HIV-infected children based on medical records, parent interviews, and child assessments. 1) Probability of earlier age of disclosure is associated with higher child IQ (p = .04) and more family expressiveness (p = .01); 2) controlling for child age, disclosure status at time of study is associated with major life events, but not with medical status; and 3) factors

Lester, P., Chesney, M., Cooke, M., Weiss, R., Whalley, P., Perez, B., ... & Wara, D. (2002). When the time comes to talk about HIV: factors associated with diagnostic disclosure and emotional distress in

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associated with increased parent-rated anxiety in HIV-infected children in univariate analyses are: HIV disclosure ( $p = .04$ ), other major life events ( $p = .001$ ), higher medication dose frequency ( $p = .01$ ), and child age ( $p = .01$ ). Increased depression is associated only with more medication doses ( $p = .02$ ). These data indicate that higher child IQ and greater family expressiveness increase the probability of earlier diagnostic disclosure to HIV-infected children. Factors associated with emotional distress highlight important areas of clinical attention. These data suggest that diagnostic disclosure may not necessarily minimize emotional distress, indicating the need for further evaluation of the appropriate timing and type of disclosure for pediatric HIV.

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HIV-infected children. *JAIDS-HAGERSTOWN MD-*, 31(3), 309-317.

This study examined the relationships between selected risk and resistance factors and maternal reports of child behavior problems on the Child Behavior Checklist (CBCL) in families affected by maternal HIV/AIDS. Child behavior problems were related significantly to the mother's psychological distress and marginally to her having illness-related activity restrictions, but not to other measures of maternal physical health, stigma or disclosure of her HIV to the child. Two child dispositional factors, productivity and independence, and two family factors, adaptability and a good parent-child relationship, were related to better child functioning, but family cohesion was a risk factor for poorer adjustment in this sample.

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Bauman, L. J., Camacho, S., Silver, E. J., Hudis, J., & Draimin, B. (2002). Behavioral problems in school-aged children of mothers with HIV/AIDS. *Clinical Child Psychology and Psychiatry*, 7(1), 39-54.

This study used multiple measures and sources to assess mental health over time in uninfected 8- to 12-year-old children of MLH. During two years, every child had a score in the clinical range (12% once, 25% twice, 26% 3 times, 27% 4 times, and 9% all 5 times). Clinically significant symptoms were most likely at baseline when mothers were sickest. Few had clinically significant symptoms based on maternal report only (5%) or child report only (8%). Chronicity of clinically significant symptoms was not related to child age or gender, maternal health or depression, parent-child relationship, or being assigned to Project Care.

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Bauman, L. J., Silver, E. J., Draimin, B. H., & Hudis, J. (2007). Children of mothers with HIV/AIDS: Unmet needs for mental health services. *Pediatrics*, 120(5), e1141-e1147.

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**UNITED STATES (cont.)**

The authors compare, across four years, the psychosocial adjustment of noninfected children (ages 6 to 11 at first assessment) whose mothers are and are not HIV-infected, examine differential changes of the two groups of children across the four years, and examine the role of parenting on the child's adjustment. Children of HIV-infected mothers reported more depressive symptoms across the four assessments than children whose mothers were not infected. Evidence for differential change of child psychosocial adjustment across assessments for the two groups did not emerge. Parenting variables, particularly the mother-child relationship, were related to child adjustment in both groups.

Forehand, R., Jones, D. J., Kotchick, B. A., Armistead, L., Morse, E., Morse, P. S., & Stock, M. (2002). Noninfected children of HIV-infected mothers: A 4-year longitudinal study of child psychosocial adjustment and parenting. *Behavior Therapy, 33*(4), 579-600.

The authors examined a model of the relationships between parenting deficits and skills, along with child outcomes, in a sample of mothers living with HIV (MLH) and their 6- to 14-year-old children. Fewer parenting deficits were associated with better parenting skills, which, in turn, were associated with better child outcomes. This study delineated further the parenting issues with which MLH struggle, providing information on the interventions needed for this population. MLH who have little confidence in their ability to enact parenting skills and limited knowledge of basic parenting practices appear to be less likely to provide family routines consistently, monitor their children, or to engender family cohesion or a close parent-child relationship. Such parenting skills were found to be associated with child functioning.

Murphy, D. A., Armistead, L., Marelich, W. D., & Herbeck, D. M. (2015). Parenting deficits of mothers living with HIV/AIDS who have young children. *Vulnerable Children and Youth Studies, 10*(1), 41-54.

The authors investigated the influence of parenting skills on adolescent outcomes among children affected by maternal HIV / AIDS (N = 118, M age = 13). Among families with more frequent family routines, over time adolescents showed lower rates of aggression, anxiety, worry, depression, conduct disorder, binge drinking, and increased self-concept. Among families with higher levels of parental monitoring, adolescents showed significant declines in anxiety and depression, conduct disorder, and binge drinking, along with increased self-concept. Mothers' level of illness was associated with parenting. Greater variability in parental monitoring resulted in higher levels of problem behaviors.

Murphy, D. A., Marelich, W. D., Herbeck, D. M., & Payne, D. L. (2009). Family routines and parental monitoring as protective factors among early and middle adolescents affected by maternal HIV/AIDS. *Child Development, 80*(6), 1676-1691.

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This study assessed the efficacy of selected variables from the Parents and Children Coping Together (PACT) model, which was designed to predict maternal HIV effects on child/adolescent outcomes. Data from two longitudinal studies applying PACT measures were utilized, encompassing a 7-year assessment time span for HIV-infected mothers and their children. Both maternal and child-based measures were evaluated, and a sequential longitudinal design was adopted. Structural equation modeling using full information maximum likelihood was performed to assess the proposed model. Results show the PACT model was viable in predicting child/adolescent outcomes of self-concept and depression.

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Murphy, D. A., Marelich, W. D., & Amaro, H. (2009). Maternal HIV/AIDS and adolescent depression: A covariance structure analysis of the 'Parents and Children Coping Together' (PACT) Model. *Vulnerable Children and Youth Studies, 4:1*, 67-82,

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**UNITED STATES (cont.)**

The authors investigated the impact of maternal HIV and family variables on sexual behaviors of early and middle adolescents. Data were collected from 118 pairs of HIV-positive mothers and their uninfected early/middle adolescents across four time points. Descriptive analyses show the prevalence of sexual behaviors in this sample was significantly lower than rates in a comparable sample of adolescents who participated in the Youth Risk Behavior Surveillance System. Multivariate longitudinal analysis using generalized estimating equation logistic regression showed adolescent sexual behavior was more likely to occur with adolescent alcohol use, lack of parental monitoring, and poorer physical functioning of HIV-positive mothers.

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Murphy, D. A., Herbeck, D. M., Marelich, W. D., & Schuster, M. A. (2010) Predictors of Sexual Behavior Among Early and Middle Adolescents Affected by Maternal HIV. *International Journal of Sexual Health, 22:3*, 195-204,

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The authors examined the integration of an intensive, family-based intervention for mothers living with HIV (MLH) (n = 173) and their adolescent children (n = 116) with medical care. The authors conclude that the integration was problematic: despite the fact that nearly half of MLH were recruited at HIV/AIDS clinics, community centers and children's hospitals were the most popular and most successful sites for the delivery of the intervention. The authors provide recommendations for how to integrate intensive interventions into medical care, given the needs of MLH, their adolescents, and the organizations serving them.

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Rice, E., Lester, P., Flook, L., Green, S., Valladares, E. S., & Rotheram-Borus, M. J. (2009). Lessons learned from "integrating" intensive family-based interventions into medical care settings for mothers living with HIV/AIDS and their adolescent children. *AIDS and Behavior, 13(5)*, 1005.

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The authors conducted interviews with 57 MLH of late adolescent/early adult children. Empty nest worries included the following: (a) identity loss, (b) loss of social support, (c) financial insecurity, (d)

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Murphy, D. A., Roberts, K. J., & Herbeck, D. M. (2012). HIV-positive

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worsening of physical health, and (e) death/dying. Hopes included the following: (a) self-improvement, (b) change of life focus, (c) travel, (d) romantic partners, and (e) familial ties. Respondents' HIV/AIDS status colored their thoughts/feelings about the empty nest; some worries were specific to being HIV positive and would not occur for non-ill mothers. Midlife HIV-positive women need health care/social service resources as they navigate health and social-psychological challenges to successful aging.

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mothers with late adolescent/early adult children: "Empty nest" concerns. *Health Care for Women International*, 33(4), 387-402.

Past research has shown that young children affected by maternal HIV present with elevated stress/anxiety and negative well-being. This pilot intervention for children age 7 – 14 affected by maternal HIV targeted improving positive child/mother communication, improving HIV/AIDS knowledge and reducing anxiety (especially related to transmission), and lessening feelings of stigma. Each of the three child intervention sessions included behavioral skills training and a themed craft exercise; mothers attended an open discussion group while the children attended their sessions. Study participants were 37 child/mother pairs. The study design was a randomized 2-group pretest-posttest experimental design. In addition, the intervention sessions were audiotaped for transcription. Results showed significant decreases in anxiety and worry for children in the intervention group, and increases in happiness and HIV/AIDS knowledge regarding transmission. Intervention group mothers reported greater social support. Qualitative findings for the intervention group children and mothers also support these findings. Early intervention reduces child stress, and may affect longer-term outcomes.

Murphy, D. A., Marelich, W. D., Graham, J., & Payne, D. L. (2015). Children affected by maternal HIV/AIDS: Feasibility and acceptability trial of the Children United with Buddies (CUB) intervention. *Clinical child psychology and psychiatry*, 20(1), 117-133.

## APPENDIX F: CAREGIVER MENTAL HEALTH AND CHILD OUTCOMES

COUNTRY	SUMMARY	REFERENCE
<b>GLOBAL (Review)</b>	<p>In this Series paper, we systematically review studies that focus on the epidemiology of perinatal depression (i.e., during antepartum and post-partum periods) among women residing in low-income and middle-income countries. The authors summarize evidence for the association of perinatal depression with infant and childhood outcomes. This review is intended to summarize findings from the existing literature, identify important knowledge gaps, and set the research agenda for creating new generalizable knowledge pertinent to increasing our understanding of the prevalence, determinants, and infant and childhood health outcomes associated with perinatal depression.</p>	<p>Gelaye, B., Rondon, M. B., Araya, R., &amp; Williams, M. A. (2016). Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. <i>The Lancet Psychiatry</i>, 3(10), 973-982.</p>
<b>EUROPE</b>	<p>A relationship between parental substance abuse and subsequent alcohol problems in their children has been documented extensively. Children of alcoholics (COAs) are considered to be at high risk because there is a greater likelihood that they will develop alcoholism compared with a randomly selected child from the same community. COAs and children of other drug-abusing parents are especially vulnerable to the risk for maladaptive behavior because they have combinations of many risk factors present in their lives. The single most potent risk factor is their parent's substance-abusing behavior. This single risk factor can place children of substance abusers at biologic, psychologic, and environmental risk. Since the turn of the century, many reports have described the deleterious influence of parental alcoholism on their children. A series of studies measured mortality, physiology, and general health in the offspring of alcoholic parents and concluded that when mothers stopped drinking during gestation, their children were healthier. Today, research on COAs can be classified into studies of fetal alcohol syndrome, the transmission of alcoholism, psychobiologic markers of vulnerability, and psychosocial characteristics. Each of these studies hypothesizes that differences between COAs and children of nonalcoholics influence maladaptive behaviors later</p>	<p>Johnson JL, Leff M. Children of substance abusers: Overview of research findings. <i>Pediatrics</i>. 1999;103(Supplement 2):1085-99.</p>

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in life, such as academic failure or alcoholism. This research supports the belief that COAs are at risk for a variety of problems that may include behavioral, psychologic, cognitive, or neuropsychologic deficits. The vast literature on COAs far outweighs the literature on children of other drug abusers. Relatively little is known about children of heroin addicts, cocaine abusers, or polydrug abusers. Nonetheless, many researchers suggest that the children of addicted parents are at greater risk for later dysfunctional behaviors and that they, too, deserve significant attention to prevent intergenerational transmission of drug abuse. Most research on children of other drug abusers examines fetal exposure to maternal drug abuse. The overview of the research on children of substance abusers points toward the need for better, longitudinal research in this area. Most studies on COAs or other drug abusers are not longitudinal; they examine behavior at one point in time. Given the studies reviewed in this article, it is unclear whether we see true deficits or developmental delay. Longitudinal studies will allow us to predict when early disorders and behavioral deviations will be transient or when they will be precursors to more severe types of maladaptive behavior. Longitudinal research also will enable us to explain specific childhood outcomes. Differences in outcome could be studied simultaneously to understand whether antecedents discovered for one are specific to it or are general antecedents leading to a broad variety of outcomes.

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Offspring of individuals with alcohol use disorders have been shown to have elevated risk for mental health problems. To examine the association between maternal problem drinking and child mental health as assessed by three informants in three European countries. Data were drawn from the School Child Mental Health in Europe study. Maternal alcohol use was assessed using the alcohol use disorders identification test. Child mental health was assessed using the mother and teacher versions of the strengths and difficulties questionnaire, and the child self-reported Dominic interactive. Analyses were performed on 2,678 individuals, 6–11 year olds. Adjusting for variables associated with maternal drinking, among children eight years old or younger, excessive drinking was not significantly associated with mental

Husky MM, Keyes K, Hamilton A, Stragalinou A, Pez O, Kuijpers R, et al. Maternal Problem Drinking and Child Mental Health. *Substance Use & Misuse*. 2017:1-9.

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health problems, whether reported by the mother, teacher or by the child. However, among girls eight years old and above, problem drinking was associated with conduct problems as reported by the mother (OR = 4.19), teacher reported total difficulties (OR = 4.69), and peer relationship problems (OR = 8.86). It was also associated with the presence of any child-reported disorder (OR = 3.88), externalizing (OR = 5.55) and internalizing disorders (OR = 4.42). Adjusting for sociodemographic variables and for psychological distress, maternal problem drinking was not significantly associated with child mental health problems in boys or in girls ages six to eight. The association was only present among girls ages 8–11. Examining relationships between mothers and their daughters in the peripubertal period may be a critical window for the development of effective intervention strategies.

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**UNITED  
KINGDOM**

Depression in fathers in the postnatal period is associated with an increased risk of behavioral problems in their offspring, particularly for boys. The aim of this study was to examine for differential effects of depression in fathers on children's subsequent psychological functioning via a natural experiment comparing prenatal and postnatal exposure. In a longitudinal population cohort study (the Avon Longitudinal Study of Parents and Children (ALSPAC)) we examined the associations between depression in fathers measured in the prenatal and postnatal period (measured using the Edinburgh Postnatal Depression Scale), and later behavioral/emotional and psychiatric problems in their children, assessed at ages 3½ and 7 years. Children whose fathers were depressed in both the prenatal and postnatal periods had the highest risks of subsequent psychopathology, measured by total problems at age 3½ years (Odds Ratio 3.55; 95% confidence interval 2.07, 6.08) and psychiatric diagnosis at age 7 years (OR 2.54; 1.19, 5.41). Few differences emerged when prenatal and postnatal depression exposure were directly compared, but when compared to fathers who were not depressed, boys whose fathers had postnatal depression only had higher rates of conduct problems aged 3½ years (OR 2.14; 1.22, 3.72) whereas sons of the prenatal group did not (OR 1.41; .75, 2.65).

Ramchandani, P., & the ALSPAC Study Team. (2005). Paternal Depression in the Postnatal Period and Child Development: A Prospective Population Study. *Lancet* 365:2201-2205.

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These associations changed little when controlling for maternal depression and other potential confounding factors. The findings of this study suggest that the increased risk of later conduct problems, seen particularly in the sons of depressed fathers, maybe partly mediated through environmental means. In addition, children whose fathers are more chronically depressed appear to be at a higher risk of emotional and behavioral problems. Efforts to identify the precise mechanisms by which transmission of risk may occur should be encouraged to enable the development of focused interventions to mitigate risks for young children.

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**UNITED STATES**

Focus group discussions were conducted with inner-city ethnic minority families with regard to current life concerns, mother/child communication of concerns, and the influence of maternal HIV on both of those issues. Participants included early adolescents who were HIV-negative and their mothers (one-half were HIV-positive and one-half HIV-negative). Early adolescents were most concerned about sexual activity, pregnancy, safety and violence, and drugs. Early adolescents whose mothers were HIV-positive were concerned additionally with their mothers' sickness and death, adult responsibilities, stigma and ostracism, and an even greater uncertainty about their futures. Mothers' concerns for their children included safety and violence, sexual activity, drugs, and parenting. Mothers who were HIV-positive were also concerned about their own HIV-related issues of stigma, disclosure, becoming ill, and children assuming adult roles.

Brackis-Cott, E., Mellins, C. A., & Block, M. (2003). Current life concerns of early adolescents and their mothers: Influence of maternal HIV. *The Journal of Early Adolescence, 23(1)*, 51-77.

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The authors examined rates of mental health problems in mothers and children in families affected by maternal HIV as compared to those not affected by maternal HIV but living in similar inner-city, low-SES, primarily ethnic-minority neighborhoods. Correspondence between mother and child mental health was explored. Overall, mothers with HIV exhibited more depressive symptomatology than uninfected mothers. There were no significant differences, however, in depressive symptomatology between children of mothers who were HIV-positive and children of mothers who were HIV-negative. Among families directly affected by HIV, mothers who disclosed their status to their children endorsed greater depressive symptomatology than those who did not disclose and children who had been disclosed to were more likely to score in the clinically depressed range on the Child Depression Inventory than those who did not know.

Brackis-Cott, E., Mellins, C. A., Dolezal, C., & Spiegel, D. (2007). The mental health risk of mothers and children: The role of maternal HIV infection. *The Journal of Early Adolescence, 27(1)*, 67-89.

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**UNITED STATES (cont.)**

Data from 49 HIV/AIDS-infected mothers with 132 school-age children were used in this study to examine the interplay between seropositive mothers' depression and their children's behavioral crises in school during the past academic school year in North Carolina. Seropositive mothers' depression increased ( $B = .13, p = .004$ ) the likelihood of a behavioral crisis. Externalizing problems were the likely precipitators of behavioral crises for both the perinatally HIV/AIDS-infected and seronegative children. These latter children were likely to initiate fistfights or throw objects with the intent to physically harm their classmates or teachers. The author found in a bivariate analysis that seropositive mothers' depression was positively ( $r = .32, p = .02$ ) related to their children's externalizing problems in school.

Ellis, W. L. (2011). The Interplay Between HIV/AIDS-Infected Mothers' Depression and Their Children's Behavioral Crises in School. *Social Work in Mental Health, 9(5)*, 379-394.

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This study sought to identify children dually affected by their parents' HIV and drug use, and examine parent support network factors as correlates of children's externalizing problem behaviors. Externalizing behavior was positively associated with parents' physical limitations and proportion of illicit drug users in the parents' support networks.

Knowlton, A., Buchanan, A., Wissow, L., Pilowsky, D. J., & Latkin, C. (2008). Externalizing behaviors among children of HIV seropositive former and current drug users: Parent support network factors as social ecological risks. *Journal of Urban Health, 85(1)*, 62-76.

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**SOUTH  
AFRICA**

A high rate of maternal depression and associated disturbance in the mother-infant relationship has been found in an indigent peri-urban South African community, Khayelitsha. The question arises whether a community-based intervention could be beneficial. To train community workers to deliver an intervention to mothers and infants in Khayelitsha, and to compare mothers and infants receiving this intervention with a sample receiving no such intervention. Four Khayelitsha women were trained in a mother-infant intervention, which they delivered to 32 women recruited in late pregnancy. At 6 months post-partum, maternal mood, the mother-infant relationship and infant growth were assessed. The findings were compared with a matched group of 32 mothers and infants. There was no reliable impact of the intervention on maternal mood. However, compared with the comparison sample, the quality of mother-infant engagement was significantly more positive for those who had received the intervention. The pilot study produced preliminary evidence of a benefit of a community-based mother-infant intervention delivered by trained, but otherwise unqualified, community workers, sufficient to warrant a formal controlled evaluation of this treatment.

Cooper PJ, Landman M, Tomlinson M, Molteno C, Swartz L, Murray L. Impact of a mother-infant intervention in an indigent peri-urban South African context: pilot study. *Br J Psychiatry* 2002; 180: 76-81  
<http://dx.doi.org/10.1192/bjp.180.1.76> pmid: 11772856

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Post-partum depression in the developing world has received little research attention, and its association with disturbances in the mother-infant relationship is unknown. To determine the prevalence of post-partum depression and associated disturbances in the mother-infant relationship in Khayelitsha, a South African peri-urban settlement. The mental state of 147 women who had delivered two months previously was assessed, and the quality of their engagement with their infants was determined. The point prevalence of DSM-IV major depression was found to be 34.7%. Maternal depression was associated with poor emotional and practical support from the partner. It was also associated with insensitive engagement with the infants. The rate of post-partum depression in Khayelitsha was around three times that found in British post-partum samples, and these depressions were strongly associated with disturbances in the mother-infant relationship.

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Cooper PJ, Tomlinson M, Swartz L, Woolgar M, Murray L, Molteno C. Post-partum depression and the mother-infant relationship in a South African peri-urban settlement. *The British journal of psychiatry : the journal of mental science*. 1999;175:554-8. PubMed PMID: 10789353.

In high-income countries, maternal postnatal depression is associated with adverse outcomes in the child. However, few studies have investigated this relation in countries of low and middle income. Furthermore, to our knowledge, no studies have followed up cohorts into later childhood. We aimed to investigate whether maternal depression 6 months after birth is associated with psychological difficulties in a socioeconomically disadvantaged South African cohort of children at age 10 years. Birth to Twenty is a prospective, longitudinal, birth-cohort study based in the Soweto area of Johannesburg, South Africa. Mothers and children in this cohort have been followed up at timepoints ranging from before birth to age 10 years. Maternal mood was measured at 6 months with the Pitt depression inventory and at 10 years with the Centre for Epidemiologic Studies depression scale (CES-D). Child psychological functioning was assessed at 10 years with the South African child assessment schedule (SACAS). Our primary outcome was psychological development of children at age 10 years, measured by total score on the SACAS. Secondary outcomes were scores on externalising and internalising subscales of the SACAS. We used t tests to compare psychological outcomes between children whose mother had postnatal depression at 6 months and those whose mother did not have

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Verkuijl NE, Richter L, Norris SA, Stein A, Avan B, Ramchandani PG. Postnatal depressive symptoms and child psychological development at 10 years: a prospective study of longitudinal data from the South African Birth to Twenty cohort. *Lancet Psychiatry* 2014; 1: 454–60.

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postnatal depression. We examined associations between maternal postnatal depression and child psychological outcomes by multivariate linear-regression analysis, adjusting for socioeconomic status and maternal depression at 10 years, and we used logistic regression to provide odds ratios for associations identified by linear regression. 1866 mothers completed the Pitt depression inventory 6 months after the birth of their child; of these, 453 (24%) had symptoms of postnatal depression. At the 10-year assessment, 1012 mothers completed the CES-D questionnaire, of whom 747 (74%) were judged to have depression. Sociodemographic characteristics did not differ between mothers with and without depression at both 6 months and 10 years. After adjusting for socioeconomic status and maternal depression at 10 years, children whose mothers had postnatal depression at 6 months were more than twice as likely to have significant psychological difficulties 10 years later compared with children whose mothers did not have postnatal depression at 6 months (adjusted odds ratio 2.26, 95% CI 1.23-4.16). Maternal postnatal depression is associated with adverse psychological outcomes in children up to 10 years later in countries of low and middle income. In view of the increased prevalence of postnatal depression in these settings, this finding has important implications for policy and interventions for children and their mothers.

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#### **PAKISTAN**

The treatment of perinatal depression is a public-health priority because of its high prevalence and association with disability and poor infant development. We integrated a cognitive behavior therapy-based intervention into the routine work of community-based primary health workers in rural Pakistan and assessed the effect of this intervention on maternal depression and infant outcomes. We randomly assigned 40 Union Council clusters in rural Rawalpindi, Pakistan, in equal numbers to intervention or control. Married women (aged 16-45 years) in their third trimester of pregnancy with perinatal depression were eligible to participate. In the intervention group, primary health workers were trained to deliver the psychological intervention, whereas in the control group untrained health workers made an equal

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Rahman A, Malik A, Sikander S, Roberts C, Creed F. Cognitive behaviour therapy-based intervention by community health workers for mothers with depression and their infants in rural Pakistan: a cluster-randomised controlled trial. *Lancet* 2008; 372: 902-9 [http://dx.doi.org/10.1016/S0140-6736\(08\)61400-2](http://dx.doi.org/10.1016/S0140-6736(08)61400-2) PMID: 18790313.

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number of visits to the depressed mothers. The primary outcomes were infant weight and height at 6 months and 12 months, and secondary outcome was maternal depression. The interviewers were unaware of what group the participants were assigned to. Analysis was by intention to treat. The study is registered as ISRCTN65316374. The number of clusters per group was 20, with 463 mothers in the intervention group and 440 in the control group. At 6 months, 97 (23%) of 418 and 211 (53%) of 400 mothers in the intervention and control groups, respectively, met the criteria for major depression (adjusted odds ratio (OR) 0.22, 95% CI 0.14 to 0.36,  $p < 0.0001$ ). These effects were sustained at 12 months (111/412 [27%] vs 226/386 [59%], adjusted OR 0.23, 95% CI 0.15 to 0.36,  $p < 0.0001$ ). The differences in weight-for-age and height-for-age Z scores for infants in the two groups were not significant at 6 months (-0.83 vs -0.86,  $p = 0.7$  and -2.03 vs -2.16,  $p = 0.3$ , respectively) or 12 months (-0.64 vs -0.8,  $p = 0.3$  and -1.10 vs -1.36,  $p = 0.07$ , respectively). This psychological intervention delivered by community-based primary health workers has the potential to be integrated into health systems in resource-poor settings.

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## INDIA

Postnatal depression is a recognised cause of delayed cognitive development in infants in developed countries. Being underweight is common in South Asia. To determine whether postnatal depression contributes to poor growth and development outcomes in Goa, India. Cohort study for growth outcomes with nested case-control study for developmental outcomes. A total of 171 babies were weighed and measured at 6–8 weeks following birth. The following measures were used: Edinburgh Postnatal Depression Scale for maternal mood, and sociodemographic and infant health variables. Outcome measures were: weight (<5th centile), length (<5th centile), and Developmental Assessment Scale for Indian Infants scores at six months. Postnatal depression was a strong, and independent, predictor of low weight and length and was significantly associated with adverse mental development quotient scores. This study provides evidence for the first time that postnatal depression, a potentially treatable disorder, is a cause of poor growth and development in South Asia.

Patel, V., DeSouza, N., & Rodrigues, M. (2003). Postnatal depression and infant growth and development in low income countries: a cohort study from Goa, India. *Archives of disease in childhood*, 88(1), 34-37.

Coordinating Comprehensive Care for Children (4Children) is a five-year (2014-2019), USAID-funded project to improve health and well-being outcomes for Orphans and Vulnerable Children (OVC) affected by HIV and AIDS and other adversities. The project aims to assist OVC by building technical and organizational capacity, strengthening essential components of the social service system, and improving linkages with health and other sectors. The project is implemented through a consortium led by Catholic Relief Services (CRS) with partners IntraHealth International, Pact, Plan International USA, Maestral International and Westat.

