The Evolution of the Intersection of HIV and Breastfeeding in Global Policy

Kristin M. Sinning

Wright State University - Main Campus

Follow this and additional works at: https://corescholar.libraries.wright.edu/mph

Part of the Public Health Commons

Repository Citation


This Master's Culminating Experience is brought to you for free and open access by the Master of Public Health Program at CORE Scholar. It has been accepted for inclusion in Master of Public Health Program Student Publications by an authorized administrator of CORE Scholar. For more information, please contact library-corescholar@wright.edu.
The Evolution of the Intersection of HIV and Breastfeeding in Global Policy

Kristin M. Sinning, MD, MPH

Wright State University
Acknowledgments

Thank you to all of my family, friends, mentors, and colleagues who have supported and inspired me along this journey. You all have been my cheerleaders and challenged me to be a better person every day.
## Table of Contents

Abstract ............................................................................................................................................ 4

Introduction ...................................................................................................................................... 5

Purpose Statement ............................................................................................................................ 8

Policy Analysis ................................................................................................................................ 8

A History of Policies Concerning Breastfeeding by Mothers with HIV ........................................ 8

Discussion ...................................................................................................................................... 37

Limitations ..................................................................................................................................... 41

Conclusions and Recommendations .............................................................................................. 41

References ...................................................................................................................................... 43

Appendix: List of Competencies Met in CE .................................................................................. 47
Abstract

Increasing breastfeeding rates and reducing HIV/AIDS are two important global health priorities, and their intersection has led to policies that meet mutual goals of supporting, protecting and promoting breastfeeding and reducing the risk of HIV/AIDS. The World Health Organization has developed and released recommendations, policies, and guidance on infant feeding and the risk of transmission through breastfeeding. This analysis provides a historical, chronological perspective on the global policies for infant feeding in the case of an HIV-positive mother, an analysis of changes, and recommendations for the future. The policies evaluated demonstrate the evolution in knowledge and recommendations for infant feeding practices in the setting of HIV. Over time, significant changes can be found in the policies regarding breastfeeding, mixed feeding, antiretroviral use, and the inclusion of evidence. In the beginning, women with HIV were advised not to breastfeed their infants, mixed feeding was not discussed, antiretrovirals had not been developed, and citations of evidence were not included. With the latest policies, breastfeeding was encouraged, mixed feeding was not advised due to evidence of an increased risk of harm to the infant, and research was both cited and discussed in terms of quality and strength. This evaluation of previous policies has demonstrated the need for continually clarifying terminology, descriptive criteria and practices, and increasing the evidence-base in order to create effective and accurate recommendations in the future.

*Keywords:* infant feeding, HIV/AIDS policy, HIV transmission
The Evolution of the Intersection of HIV and Breastfeeding in Global Policy

Human Immunodeficiency Virus (HIV) is a significant global public health issue. Since its discovery in 1981 (AIDS.gov, n.d.), it has caused more than 39 million deaths (World Health Organization [WHO], 2014b). Despite significant advances in treatment and survivability, it remains a global burden: in 2013, more than 2.1 million people were diagnosed with HIV (WHO, 2014b). HIV is a virus that targets and weakens the immune system, making the people infected more susceptible to infections and some cancers. Immune function is typically measured by the number of cluster of differentiation four cells (CD4 cell count), one of the immune system cells in the human body targeted by HIV (Centers for Disease Control and Prevention [CDC], 2015). The gradual immunodeficiency caused by the virus allows proliferation of infections and diseases, outcomes that would not occur in people with a healthy immune system (CDC, 2015). Acquired Immunodeficiency Syndrome (AIDS) is the most advanced stage of HIV infection. Without aggressive antiretroviral treatment, people with HIV can develop AIDS within two to 15 years. Certain cancers, infections, or other manifestations of the infection define AIDS and its ultimate outcome is death (WHO, 2014b).

HIV transmission occurs through exchange of bodily fluids from an infected individual, such as blood, breast milk, and genital secretions. Mother-to-child transmission can occur during pregnancy, labor, or breastfeeding (CDC, 2015). In the absence of interventions, the transmission rate for HIV from mother to child is between 15 and 45% for the sum of these routes (WHO, 2010; WHO, 2014a). Transmission can be significantly prevented or reduced through the use of antiretroviral medications (ARVs) (CDC, 2015). The current WHO recommendation (2014a) includes ARV provision to mothers and infants during pregnancy, delivery, breastfeeding, and life-long treatment for the mother. It was estimated in 2013 that 67% of the 1.4 million pregnant
women that had HIV and lived in low- to middle-income countries received ARVs (WHO, 2014b). This is a significant increase from 47% in 2009 (WHO, 2014b).

Breastfeeding imparts significant health benefits for children and is an important intervention to improve child mortality rates. However, there is also a risk of HIV transmission when an HIV-positive woman breastfeeds her child. There is a balance to be struck between the benefits and the risk of transmission of HIV by a woman with HIV. The risk of HIV-infection must be compared with the risk of morbidity and mortality from causes that are prevented by breastfeeding (UNICEF, 2005). Infants who are not breastfed are more than 14 times more likely to die of an infectious disease like diarrhea or respiratory infection than an infant who is exclusively breastfed for six months (UNICEF, 2005).

The World Health Organization recommends exclusive breastfeeding for six months and continuing with complementary feeding for up to two years (WHO, 2003). Breastfeeding has several proven and important benefits for the mother and infant. Breast milk provides food and improves the nascent immunity of an infant due to antibodies from the mother (WHO, 2003). In a meta-analysis on the other benefits and effects of breastfeeding, breastfeeding was associated with a reduction in a child’s risk of ear infections, stomach infections, asthma, obesity, eczema, lung infections, childhood leukemia and sudden infant death syndrome (SIDS) (Ip et al., 2007). Overall, six months of exclusive breastfeeding could result in a 13% reduction in childhood mortality under the age of 5, including reducing sudden infant death syndrome (SIDS), infections, and diarrhea (American Academy of Pediatrics, 2012; WHO, 2013).

The first recommendations for infant feeding when the mother is known to be infected with HIV were made in 1985 and said to avoid breastfeeding (CDC, 1985). Replacement feeding for an infant is necessary if a woman chooses not to breastfeed, and formula feeding is a
common practice for women in this case. There are obvious issues with formula feeding, including the need for resources like clean water and the lack of immune components present in breast milk. The widespread availability of ARVs has changed the recommendations so that exclusive breastfeeding is recommended for six months with the continuation of breastfeeding for at least 12 months while taking ARVs (WHO, 2010; WHO, 2014a).

Importantly, exclusive breastfeeding for the first six months of life is associated with a three to four-fold decrease in the risk of HIV transmission when compared to mixed feeding (UNICEF, 2005). Mixed feeding refers to giving the infant something other than only breast milk, including any other food, water, or formula before six months of age (UNICEF, 2005). Exclusive breastfeeding rates among children who are less than six months of age have been generally increasing since the 1980s (UNICEF, 2005). In sub-Saharan Africa where the some of most common causes of infant and child mortality are infectious diseases, increasing the rates of exclusive breastfeeding would help prevent many infant deaths from infectious diseases (UNICEF, 2005). The evidence now shows that HIV transmission can also be reduced if HIV-positive women exclusively breastfed for six months rather than practicing mixed feeding.

Public health has a major role in promoting, protecting, and supporting of breastfeeding globally (UNICEF, 2005). Global goals for breastfeeding have been established by the United Nations (2008) in the Millennium Development Goals, which were intended to be achieved by 2015. For HIV, these goals include decreasing under-five mortality, halting and reversing the spread of HIV/AIDS, and achieving universal access to treatment for HIV/AIDS (United Nations, 2008). Other countries have established goals for breastfeeding, including the Healthy People 2020 goals in the United States (United States Department of Health and Human Services [HHS], 2011). Although the prevalence of HIV in the United States is relatively low, increasing
breastfeeding rates is an important public health goal for all of the other important health
benefits. For example, the goal for the initiation of breastfeeding is an increase from the baseline
of 74.0 in 2009 to 81.9% (HHS, 2011).

**Purpose Statement**

Increasing breastfeeding rates and reducing HIV/AIDS are two important global health
priorities, and the intersection of these two has led to the development of policies and guidelines
for infant feeding. The World Health Organization has released many documents since the
discovery of HIV to provide recommendations and guidance on infant feeding and the risk of
transmission through breastfeeding. This analysis explores the intersection of HIV and infant
feeding policies. It provides a historical, chronological perspective on the global policies for
infant feeding in the case of an HIV-positive mother, an analysis of changes, and
recommendations for the future.

**Policy Analysis**

**A History of Policies Concerning Breastfeeding by Mothers with HIV**

Each of the major WHO policies for infant feeding in the setting of HIV are evaluated in
chronological order (Figure 1) and are followed by a summary, changes, and importance of the
policies.

![Timeline of policies](image)

*Figure 1: Timeline of policies; each time point on this timeline indicates a new policy or revision
by the World Health Organization.*
1981: First reports of the condition that will become HIV/AIDS and WHO’s enactment of the International Code of Marketing of Breast Milk Substitutes.

The Morbidity Mortality Weekly Report (CDC, 1981) published a report that was later recognized as the first scientific publication on HIV. There was also an article published in the New York Times (Altman, 1981) addressing cancer found in homosexual men, then thought to be the only group affected. At the time, the name for HIV had not been established, and very little was known about the disease beyond the case reports.

Meanwhile, breastfeeding was being promoted and protected in an unprecedented way through international health policy framework in the WHO’s International Code of Marketing of Breast-Milk Substitutes ratified in 1981. This policy recommended healthcare workers encourage and support breastfeeding and restricted formula marketing to ensure that mothers were not discouraged from breastfeeding (WHO, 1981).

Importance. This was the start of the HIV/AIDS epidemic and the onset of the fight against the global spread of HIV. Breastfeeding was also emerging as a public health priority, and the International Code was the first broad attempt to address the ethical issues in promoting milk substitutes in competition with human milk (WHO, 1981). It remains an important tool in protecting the health of mothers and babies worldwide. The intersection of HIV and breastfeeding was not yet established.

1985: First report on HIV transmission risk from breast milk.

The first article to discuss suspected HIV transmission through breast milk was released in a Morbidity Mortality Weekly Report in 1985 (CDC, 1985). The summary of case reports and research established the belief that HIV could be transmitted to a fetus (see Figure 2). There was, however, no discussion of the potential mechanism for transmission, although women infected
with HIV were advised against breastfeeding (CDC, 1985). HIV counseling and testing was encouraged in populations thought to have a higher prevalence of HIV/AIDS, including: women who had used intravenous drugs; were born in a country with high heterosexual transmission; had engaged in prostitution; had partners who abused intravenous drugs; were bisexual; had hemophilia; or had the virus (CDC, 1985). Furthermore, counseling and testing was recommended only for these groups, not for pregnant women (CDC, 1985).

It is believed that [HIV] is transmitted from infected women to their fetuses or offspring during pregnancy, during labor and delivery, or perhaps shortly after birth... breastfeeding is [a] possible mode of transmission. (p. 722)

[HIV]-infected women should be advised against breastfeeding to avoid postnatal transmission to a child who may not yet be infected (p. 725)

Figure 2: Language from the Morbidity Mortality Weekly Report published in 1985 that first established a potential risk of HIV transmission through breast milk.

Source: CDC, 1985

Importance. This appears to be the first entry in the literature that included information on mother-to-child transmission. It is a vague description without specific recommendations, but it is the first published summary of knowledge to date linking HIV and breastfeeding.

1987: The first global recommendation on HIV and breastfeeding.

The first global policy from the World Health Organization (WHO) was published in 1987. Figure 3 states the policy’s uncertainty about breastfeeding and the risk of HIV transmission (WHO, 1987). The policy emphasized that breast milk should continue to be promoted in all health and nutrition policies for its benefits in improving overall health of mother and child. Pasteurization of pooled milk was recommended, and the screening of donors was to
be considered (WHO, 1987). When a mother was known to have HIV, the WHO stated, “the
known and potential benefits of breastfeeding should be compared to the theoretical, but
apparently small, incremental risk to the infant of becoming infected through breastfeeding”
(WHO, 1987, p. 2). Alternatives for infant feeding were recommended to be considered given
the woman’s socioeconomic status and available resources in the environment (WHO 1987).

At present, the risk of HIV transmission from mothers to infants through breast-feeding
has not been defined, but available information suggest that if such transmission occurs,
the relative contribution of this route is probably small, compared with in utero and

In many circumstances and, particularly, where the safe and effective use of alternatives
is not possible, breastfeeding by the biological mother should continue to be the feeding
method of choice, irrespective of her HIV infection status. (WHO, 1987, p.2)

Figure 3: Text taken verbatim from the 1987 WHO policy that illustrates the uncertainty about
HIV transmission via breastmilk.

Changes. The major change was the creation of a global policy released by the WHO and
the magnitude of HIV transmission risk through breast milk was stated to be smaller than that or
in utero or postpartum transmission. There were no citations of published research that were used
for the foundation of the policy, although the policy states: “the possibility that HIV could be
transmitted through breastfeeding/breast milk is supported by a report that HIV can be cultured
from breast milk from mothers who are themselves infected” (WHO, 1987, p.1).

From a public health perspective, it is important to note that there is no definition given
for “safe” or “effective” for the use of milk alternatives
Importance. This policy discusses the transmission of HIV through breast milk as well as the balance of importance of breastfeeding versus the risk of transmission. This debate continues throughout all future policies.


The next recommendations from the WHO were provided in a consensus statement released in 1992. At the time of this document, approximately one-third of infants born to HIV-infected women were infected, the majority of which were infected during pregnancy and birth (WHO, 1992). HIV transmission through breastfeeding was viewed as most prevalent in women who became infected post-partum and lower in women that were already infected at the time of labor and delivery (WHO, 1992).

There was uncertainty about the magnitude of risk; however, breastfeeding continued to be acknowledged as providing notable nutritional, immunological, psychosocial, and maternal benefits (see Figure 4) (WHO, 1992). The WHO also promoted the creation of individual country guidelines and assessment individual women’s circumstances to create those tailored guidelines (WHO, 1992).
Recommendations:

1. In all populations, irrespective of HIV infection rates, breastfeeding should continue to be protected, promoted and supported.

2. Where the primary causes of infant deaths are infectious diseases and malnutrition, infants who are not breastfed run a particularly high risk of dying from these conditions. In these settings, breastfeeding should remain the standard advice to pregnant women, including those who are known to be HIV-infected, because their baby’s risk of becoming infected through breast milk is likely to be lower than its risk of dying of other causes is deprived of breastfeeding...

3. In settings where infectious diseases are not the primary cause of death during infancy, pregnant women known to be infected with HIV should be advised not to breastfeed but to use a safe feeding alternative for their babies...

4. When a baby is to be artificially fed, the choice of substitute feeding method and product should not be influenced by commercial pressures...

5. HIV-infected women and men have broad concerns, including maintaining their own health and well-being, managing their economic affairs, and making future provision for their children, and therefore require counseling and guidance on a number of important issues...

6. In all countries, the first and overriding priority in preventing HIV transmission from mother to infant is to prevent women of childbearing age from becoming infected with HIV in the first place... (p.1-2)

Figure 4: Text excerpted from the WHO consensus statement published in 1992.

The 1992 WHO consensus statement included statements that breastfeeding should be “protected, promoted, and supported” regardless of HIV infection rates. In countries where infant
deaths were primarily caused by infectious diseases, breastfeeding was to be promoted as the standard. Breastfeeding was asserted to be protective against infectious diseases and other common causes of infant mortality. In settings where infectious diseases were not the most common cause of death in infants, HIV-infected women were advised against breastfeeding.

Changes. This statement was more specific regarding transmission and recommendations than the 1987 policy. Definitions for “safe feeding alternatives” were still not included (WHO, 1987, p.2). In an expansion of the previous recommendations, women with unknown HIV status were encouraged to breastfeed. Prevention of women becoming infected with HIV was the superseding priority in this policy.

Importance. This appears to be the first WHO statement to specifically address women with an unknown HIV status. It was also unique in its separation of countries with high infant mortality risk from infectious sources from those without. There is a continued acknowledgement of the need for balance between the risk of HIV transmission to the infant and the benefits of breastfeeding.


The next policy from the WHO and the Joint United Nations Program on HIV/AIDS was in 1998. In a summary of data, the overall risk of HIV transmission during pregnancy, delivery and breastfeeding was identified as 25 to 45%, which estimated the additional risk of transmission from breastfeeding of at least 15%. This policy identified HIV as being transmitted through breast milk, citing multiple published scientific studies (Joint United Nations Program on HIV/AIDS [JUNPOHA], 1998, p.7). Factors thought to be responsible for the variation in rates, including maternal nutrition, high viral load, and low CD4 count, were also included.
(JUNPOHA, 1998). There was reported evidence for a gradual and cumulative increase in transmission of HIV throughout the duration of nursing. It introduced the idea that mixed feeding could confer a higher risk than exclusive breastfeeding supported by three published scientific studies (JUNPOHA, 1998, p.12). There was an inclusion of identified barriers to replacement feeding included: stigma, affordability, increased risk of infection, and increased risk of malnutrition.

Strategies to reduce breast milk transmission included primary prevention of HIV, replacement feeding, early cessation of breastfeeding, treatment of breast milk, wet-nursing by a HIV-negative women, and antiretroviral therapy (see Figure 5). If “adequate” replacement feeding was not possible, three other strategies were suggested. The term “adequate” was not defined. The first strategy was exclusive breastfeeding followed by “early cessation” of breastfeeding (JUNPOHA, 1998, p.14). Cessation was described as the discontinuation of breastfeeding with a transition to replacement feeding, either formula or food depending on the age of the infant (JUNPOHA, 1998, p. 14). There was no definition for the timing of when this “early cessation” should begin or how long the transition should take. It was thought that early cessation would limit exposure to HIV through breast milk and therefore transmission risk.
Where adequate replacement feeding is not possible, mothers may choose among three other strategies to reduce the risk of breast milk transmission:

- Exclusive breastfeeding followed by early cessation of breastfeeding. Early cessation of breastfeeding may reduce exposure and hence the risk of breast milk transmission, while not eliminating the risk entirely, as the infant remains exposed for the first few months.
- Health treatment of expressed breast milk.

Figure 5: Text excerpted from the 1998 policy describing the strategies to reduce HIV transmission through breast milk.

The second strategy called for heat treatment of expressed breast milk because pasteurization has been demonstrated to reduce the quantity of HIV (JUNPOHA, 1998, p. 14-15). A concern with this process was the difficulty sustaining the process of expressing breast milk. It was suggested to be a viable option as a temporary solution during periods of increased HIV transmission risk, including in the case of cracked nipples, mastitis or abscess (JUNPOHA, 1998). Heat treatment and HIV screening was recommended for all milk banks. The third option was for a confirmed HIV-negative woman to serve as a wet nurse.

Antiretroviral therapy (ART) was discussed for the first time in this policy. Multiple studies cited had demonstrated the reduction of mother-to-child transmission through the use of maternal ART. However, it had not yet been studied in breastfed infants and clinical trials were being conducted.

Changes. This document’s superseding goal was a continuation of the previous policies, specifically the protection and promotion of breastfeeding. This was the first time risk factors
associated with an increased mother-to-child transmission of HIV were discussed in the framework of “strong evidence” and “limited evidence” (WHO, 1998, p. 11).

Overall, research evidence was more prominent and cited for the first time. There was increased identification of the gaps in knowledge and research. It is notable that there was still no definition of adequate replacement feeding provided. There was also no definition or guideline for early cessation of breastfeeding, and no optimal time for the length of breastfeeding or cessation of breastfeeding was identified.

In addition, this is the first time that ARVs were mentioned in the policies related to breastfeeding. ARVs were introduced in 1995-1996, and their availability was a significant advancement for HIV treatment and prevention (Palella et al., 1998). At the time of this policy, ARVs were being investigated for their use in the context of breastfeeding, and there was not enough conclusive evidence to form recommendations at the time (see Figure 6).

> “Since many HIV-infected mothers may face obstacles to replacement feeding— for example, stigma, affordability, risk to the mothers/or breastfed infants, with and without a postnatal treatment component, the effectiveness of antiretroviral treatment of breastfeeding mothers/or breastfed infants, with and without a postnatal treatment component, is an important research question” (p. 15).

*Figure 6:* Text taken verbatim from the 1998 policy highlighting the need for research on the use of ARVs in breastfeeding mother-infant dyads.

**Importance.** For the first time, there was an inclusion of cited evidence. There was a discussion of current evidence, gaps in knowledge, and further research questions. In addition, ARVs were an important new tool in the fight against global HIV. Although there was no
recommendation for the use of ARVs in the setting of infant feeding or breastfeeding, they were an important inclusion and prequel to the next policy.


In 2000, there was a release of another document from the WHO and other United Nations partners (Inter-Agency Task Team on Mother-to-Child Transmission of HIV [IATT], 2000). The risk of HIV transmission via breast milk was quantified with a citation of three studies. “In untreated women who continue breastfeeding after the first year, the absolute risk of transmission through breastfeeding is 10-20%” (IATT, 2000, p.11). Breastfeeding furthermore carried a significant risk of HIV transmission that varied based on several factors, possibly including the pattern and duration of breastfeeding. ARVs were recommended as a prophylactic regimen for pregnant women for the first time, but there were still no guidelines for use in the context of breastfeeding.

Recommendations (see Figure 7) included milk replacement feeding (i.e. formula) when it is “acceptable, feasible, affordable, sustainable, and safe” (IATT, 2000, p.12), which is commonly referred to by the acronym AFASS. It was further recommended if these conditions could be met, avoidance of all breastfeeding by HIV-positive mothers was recommended. Breastfeeding cessation was recommended to stop as soon as the AFASS criteria could be met (Figure 6). In addition, periods of mixed feeding were recommended to be kept as short as possible to limit the increased risk of transmission that occurs due to mixed feeding.
Recommendations:

Implementation of any of the antiretroviral prophylaxis regimens shown to be effective in randomized clinical trials... can be recommended for general implementation (p. 9).

When replacement feeding is acceptable, feasible, affordable, sustainable, and safe, avoidance of all breastfeeding by HIV-infected mothers is recommended.

Otherwise, exclusive breastfeeding is recommended during the first months of life.

To minimize HIV transmission risk, breastfeeding should be discontinued as soon as feasible, taking into account local circumstance, the individual woman’s situation and the risks of replacement feeding (including infectious other than HIV and malnutrition).

When HIV-infected mothers choose not to breastfeed from birth or to stop breastfeeding later, they should be provided with specific guidance and support for at least the first 2 year of the child’s life to ensure adequate replacement feeding. Programs should strive to improve conditions that will make replacement feeding safer for HIV-infected mothers and families (p. 12).

Figure 7: Recommendations cited verbatim from the 2000 IATT policy recommendations.

The recommendation for the timeline of cessation was still unspecified, but this policy stated that the timing could vary depending on various factors, including age of the infant and the preferences of the mother and infant. Women with HIV were to be provided professional guidance and support while discontinuing breastfeeding to minimize negative nutritional, psychological, and breast health consequences for the mother and/or infant. All HIV-positive mothers were to be counseled with general information on the risks and benefits of all feeding options, including specific guidance in selection of the best option based on their situation (see Figure 8). The woman’s choice was emphasized as the priority for support. AFASS options were
encouraged to be evaluated at the local level based on various circumstances and considerations prior to the provision of counseling.

**Figure 8:** Text excerpted from the 2000 IATT policy on the recommendation for counseling HIV-positive mothers.

*Changes.* Breastfeeding was again asserted as a source of complete nutrition for infants and should be protected, promoted and supported. Notably, the WHO asserted that standards in developed countries may not be safe or practical in developing countries. This was the first time that the AFASS criteria were identified as a group, although definitions were vague. Mixed feeding was discouraged based on cited evidence of increased risk for the first time; previous policies asserted this without evidence (IATT, 2000, p.11). The counseling recommendation changed slightly to include “specific guidance” of the option that was most likely to work for the individual (IATT, 2000, p.12), rather than a presentation of all the options and allowing the mother to choose. In addition, the prophylactic use of ARVs was recommended for the first time.

*Importance.* The use of ARVs in a prophylactic regimen for pregnant women was introduced in this document. The policy was also the first to describe the risks of feeding milk replacement products instead of breast milk. However, by using the AFASS acronym, this policy implied that milk substitutes could be made “safe” by some unstated standard. The AFASS criteria were an advance in the recommendations for the consideration of replacement feeding, but it was inadequate and did not provide specific definitions. In addition, the shift in counseling
to allow for specific recommendations created a reliance on the local level estimation of relative risks, and it introduced the potential for bias in counseling toward one feeding method over another.


In 2004, the WHO issued a review of the HIV transmission through breastfeeding. This document was consistent with previous policies and clearly stated the risk/benefit balance consideration at hand: “The main current public-health research question is whether breastfeeding by HIV-infected mothers can be made safer as to transmission risk, given the possible adverse effects of refraining from breastfeeding” (WHO, 2004, p. 2). Exclusive breastfeeding was recommended for the first six months of infant life followed by a transition to replacement feeding as soon as it could be made AFASS (see Figure 9). The HIV transmission risk before or during birth (without interventions) was stated to be 15 to 25%; breastfeeding was said to increase the risk of transmission to the infant by 5 to 20% (WHO, 2004, p.1).

“The best means of preventing HIV infection in infants and young children, including transmission through breast milk, is to prevent HIV infection of female adolescents and women of childbearing age”

“... infants should be exclusively breastfed for the first six month of life to achieve optimal growth, development and health. After six months, they should receive nutritionally adequate and safe complementary foods while breastfeeding continues up to 24 months of beyond” (WHO, 2004, p.16)

Figure 9: Text excerpted from the 2004 WHO review of available evidence.

ARVs were still being investigated for the safety and efficacy for the breastfed infant. Risk of HIV transmission was reported to be reduced through the use of Caesarean deliveries and
ARVs during pregnancy and delivery. ARVs were becoming more prominent with more research available and being conducted. This was also the first time Caesarean deliveries were mentioned specifically in the prevention of HIV transmission.

Breastfeeding was recommended unless an alternative met the AFASS criteria, yet specific definitions for AFASS criteria continued to be vague. Mothers were advised to stop breastfeeding after the infant reached six months of age or as soon as replacement feeding was AFASS (Figure 9).

Changes. Although the use of ARVs was introduced in the 2001 policy, there were still no recommendations for ARV use in breastfeeding mothers and infants in the 2007 update. Overall, this policy served as an update of available evidence and cited an increasing amount of research.

Importance. This document primarily served as an evidence update for the previous policy. However, there are still no recommendations for ARVs for breastfeeding mothers and infants in this 2004 document. The ongoing trials were noted, but no definitive conclusions were yet possible. The focus on HIV prevention in women in their reproductive years is an important part of this public health document, providing a basis for prevention policy.

2007: Guidance on global scale-up of the prevention of mother-to-child transmission of HIV.

In 2007, the Interagency task team (IATT) on the prevention of mother-to-child transmission of HIV released a document intended for organizations and the international community addressing the factors that affect prevention of mother-to-child transmission (PMTCT) of HIV, including weak health systems, political will, and mobilization of resources (see Figure 10). The IATT stressed that access to and use of quality antenatal, delivery and
postpartum care was imperative for successful PMTCT. By the end of 2004, only 16 countries had established national coverage PMTCT programs, and the goal of this document was the increasing the global availability for programs to prevent mother-to-child transmission of HIV.

<table>
<thead>
<tr>
<th>Recommended Priority Strategies and Actions at Country Level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrated government leadership, commitment and accountability to deliver on the goal of universal access to PMTCT and HIV care for children...</td>
</tr>
<tr>
<td>2. District-driven delivery of a standard package of comprehensive services...</td>
</tr>
<tr>
<td>3. Institutionalizing provider-initiated HIV testing and counseling in maternal, newborn and child health settings...</td>
</tr>
<tr>
<td>4. Institutionalizing longitudinal HIV care management in maternal, newborn and child health settings</td>
</tr>
<tr>
<td>5. Increasing access to antiretroviral therapy for pregnant women, mothers, and their children and families in the context of PMTCT...</td>
</tr>
<tr>
<td>6. Strengthening infant feeding and nutrition advice, counseling and support for women and their children and families in the context of PMTCT and HIV care for children...</td>
</tr>
<tr>
<td>7. Operationalizing the link between the delivery of PMTCT and of sexual and reproductive health care...</td>
</tr>
<tr>
<td>8. Empowering and linking with communities...</td>
</tr>
</tbody>
</table>

Figure 10: Text cited verbatim from the 2007 IATT guidelines outlining recommended priority strategies and actions.

Changes. This document included specific goals and outcomes to guide the global effort for PMTCT. Although previous global goals existed (e.g. the Millennium Development Goals), these goals were specifically related to mother-to-child transmission of HIV. There was an
increased recognition of the need of operationalization of the guidelines and the integration of health care services, a key point that served as a call to improved implementation.

*Importance.* This document provided specific numerical and programmatic goals related to the prevention of mother-to-child transmission for the first time. This document contained recommendations for and enumerated specific goals to be achieved by the various stakeholders. This clarity and specificity provided standard goals for the global community to strive toward.


In 2007, the WHO updated its policy again, emphasizing the “pressing public health dilemma” of reducing HIV transmission (WHO, 2007, p.1). The policy stated estimated HIV transmission rate of 5-10% from breastfeeding between birth and six months and 15 to 20% between birth and 18 to 24 months (WHO, 2007). Overall, the risk of postnatal HIV transmission was estimated to be 1% per month of breastfeeding, and it was now described as remaining constant from one month to 18 months of age (WHO, 2007).

The 2007 recommendations assert that the most appropriate feeding method chosen by the mother should depend on her circumstances, including health, environment, and resources. There is an emphasis on informed choice and appropriate counseling that includes all options “based on local assessments and guidance in selecting the most suitable option for their own situation” (WHO, 2007, p.2). Early cessation of breastfeeding was no longer recommended based on several studies that report that early cessation was associated with an increase in infant morbidity (WHO, 2007). Other stated possibilities to prevent transmission through infant feeding included maternal ART and post-exposure prophylaxis for the infant, although these protocols
were newly emerging treatments still under study and not included in the current guidelines (WHO, 2007).

These guidelines demonstrated a continued increase in the evidence cited and used for recommendations. They continued to assert the need for a balance of risks and benefits between breastfeeding and replacement feeding (see Figure 11). To aid in this balance, individual countries were recommended to establish national feeding policies that consider the risks of transmission of HIV in the HIV population while protecting, promoting, and supporting breastfeeding in the general population. Furthermore, there was a goal to ensure that pregnant women receive HIV prevention services. At the time of the recommendations, less than 10% of women with HIV had access to appropriate care (WHO, 2007, p.4).

- While breastfeeding carries the risk of HIV transmission, not breastfeeding carries other significant health risks to infants and young children, such as an increased risk of diarrhea and pneumonia morbidity and mortality (WHO, 2007, p.4).

- In considering replacement feeding, the following conditions are critical: sustainable access to clean water; regular postnatal follow-up (with repeated growth monitoring); nutritional counseling; and drugs and supplies at no cost or at a subsidized price, and with a controlled distribution (WHO, 2007, p. 43).

- These restrictive and selective conditions serve to remind that formula feeding could be an option to replace breastfeeding but is far from being applicable in all settings; thus, the need for more studies on alternative strategies for breastfeeding (e.g. antiretroviral prophylaxis) (WHO, 2007, p. 33).

Figure 11: Important excerpts from the 2007 WHO policy highlighting the updated risk/benefit considerations for breastfeeding by HIV-positive mothers.
There are further recommendations for exclusive breastfeeding for six months unless replacement feeding could meet the AFASS criteria. When these conditions existed, breastfeeding was to be avoided, and consideration of the AFASS criteria was critical when terminating breastfeeding or when the mother or infant’s situation changes.

*Changes.* Overall, the 2007 policy provided greater evaluation of current studies, consideration of confounding factors, and specific directions needed for further research. Recommendations for the feeding of HIV-positive infants were included for the first time. Global practices were also discussed, including the fact that nearly all infants in developing countries were at least partially breastfed. Non-exclusive breastfeeding was found to be common, which added a challenge to the promotion and recommendation of exclusive breastfeeding for infant health.

The heat-treatment of expressed milk was now considered to be an *interim* option. In 2000, the heat-treatment of breast milk was considered a *main* option for preventing the transmission of HIV to infants through breast milk. By 2006, it was no longer considered main option. It was instead considered to be an option while transitioning from breast milk to replacement feeding.

Recommended strategies included in the document emphasized the continued need for primary prevention and prevention of postnatal transmission. Women were recommended to be given all the relevant information needed to make informed decisions about safely feeding their infant. Settings vary in the acceptance of breastfeeding or formula feeding, and interventions need to be based on evaluations of local health services and individual circumstances (WHO, 2007, p. 43). It was also acknowledged that replacement feeding requires resources, including adequate fuel, access to a refrigerator, clean water, and financial means.
The framework included descriptions and definitions for the first time on safety, acceptability, and effectiveness, elements of the AFASS criteria. There was also the statement that policy must be considered in terms of the intended effect on the population as well as social acceptability and the potential effect on the general population. Effectiveness requires documentation, and it is important to evaluate the success of an intervention in meeting its objectives. HIV-survival was introduced as a defined term that refers to children who are both alive and HIV-free at a given age, usually 18 months. This was described as a valuable index to evaluate interventions and the most reliable and easy way to determine long-term success of an intervention.

ART was again discussed as a future subject of policy. There were increasing amounts of evidence, but it was still not possible to make a specific recommendation for antiretroviral medication given to women or infants for the prevention of HIV transmission during breastfeeding.

Importance. This policy’s introduction of HIV-survival as a defined term and a measurable outcome was a distinct improvement over previous policies’ vague discussions of balancing risks and benefits. While the onus for decision-making remained on the local healthcare providers and the mother, this policy gave more specific information on what should be part of that local evaluation. The definitions for AFASS, introduced in 2001, were more clearly defined.


The 2010 WHO guidelines brought another important shift in policy. The majority of recommendations in this document are consistent with previous recommendations, but a new
evidence-based recommendation for ART said it should be provided to either the breastfeeding mother or infant. National authorities were encouraged to determine which infant feeding practice would be promoted and protected, rather than presenting neutral information for the mother to then make the choice based on individual counseling with all the options (WHO, 2010). The options were either to breastfeed while the mother or infant received ARVs or to avoid all breastfeeding. The AFASS criteria for replacement feeding were further clarified with more common language and more explicit definitions.

The 2010 WHO guidelines included nine key principles which were intended to provide context for the provision of care to infants and HIV-positive mothers (see Figure 12). These principles enumerated the various considerations for the prevention of mother-to-child transmission of HIV and the protection of infants.
Key Principle 1: **Balancing HIV prevention with protection from other causes of child mortality.** Infant feeding practices recommended to mothers known to be HIV-infected should support the greatest likelihood of HIV-free survival in their children and not harm the health of mothers. To achieve this, prioritization of prevention of HIV transmission needs to be balanced with meeting the nutritional requirements and protection of infants against non-HIV morbidity and mortality.

Key Principle 2: **Integrating HIV interventions into maternal and child health services.** National authorities should aim to integrate HIV testing, care and treatment interventions for all women into maternal and child health services. Such interventions should include access to CD4 count testing and appropriate antiretroviral therapy or prophylaxis for the woman’s health and to prevent mother-to-child transmission of HIV.

Key Principle 3: **Setting national or sub-national recommendations for infant feeding in the context of HIV.** National or sub-national health authorities should decide whether health services will principally counsel and support mothers known to be HIV-infected to either breastfeed and receive ARV interventions or avoid all breastfeeding. This decision should be based on international recommendations and consideration of the: socio-economic and cultural contexts...; availability and quality of health services; local epidemiology including HIV prevalence among pregnant women; main causes of maternal and child undernutrition; main causes of infant and child mortality.

Key Principle 4: **When antiretroviral drugs are not (immediately) available, breastfeeding may still provide infants born to HIV-infected mothers with a greater chance of HIV-free survival.** Every effort should be made to accelerate access to ARVs for both maternal health and also prevention of HIV transmission to infants. While ARV interventions are being scaled up, national authorities should not be deterred from recommending that HIV-infected mothers breastfeed as the most appropriate infant feeding practice in their setting. When a national authority has decided to promote and support breastfeeding and ARVs, but ARVs are not yet available, mothers should be counseled to exclusively breastfeed in the first six months of life and continue breastfeeding thereafter unless environmental and social circumstances are safe for, and supportive of, replacement feeding. In circumstances were ARVs are unlikely to be available, such as acute emergencies, breastfeeding of HIV-exposed infants is also recommended to increase survival.

Key Principle 5: **Informing mothers known to be HIV-infected about infant feeding alternatives.** Pregnant women and mothers known to be HIV-infected should be informed of the infant feeding practice recommended by the national or sub-national authority to improve HIV-free survival of HIV-exposed infants and the health of HIV-infected mothers, and informed that there are alternatives that the mother might wish to adopt.

Key Principle 6: **Providing services to specifically support mothers to appropriately feed their infants.** Skilled counseling and support in appropriate infant feeding practices and ARV interventions to promote HIV-free survival of the infants should be available to all pregnant women and mothers.

Key Principle 7: **Avoiding harm to infant feeding practices in the general population.** Counseling and support to mothers known to be HIV-infected, and health messaging to the general populations, should be carefully delivered so as not to undermine optimal breastfeeding practices among the general population.

Key Principle 8: **Advising mothers who are HIV uninfected or whose HIV status is unknown.** Mothers who are known to be HIV uninfected or whose HIV status is unknown should be counseled to exclusively breastfeed their infants or the first six months of life and then introduce complementary foods while continuing breastfeeding for 24 months and beyond.

Key Principle 9: **Investing in improvement in infant feeding practices in the context of HIV.** Governments, other stakeholders and donors should greatly increase their commitment and resources... (WHO, 2010, p. 16-28)

Figure 12: The nine key principles of infant feeding in the context of HIV.

Note: Taken verbatim from WHO, 2010.

**Changes.** While the 2010 guidelines are generally consistent with previous guidance, there are both minor and major changes. Minor changes include more specific recommendations...
for providing integrated services for testing, care and treatment into health services for women and children and the recommendation for breastfeeding in the setting of acute emergencies. There was an acknowledgment that women need health care services to remain HIV-free. The 2010 guidelines consider heat treatment of breast milk to be an option for when a mother is temporarily unable to breastfeed or as an option as she is transitioning away from breastfeeding. This policy contained more specific options and guidelines for mothers.

Major changes include the fact that Governments and stakeholders were addressed directly and explicitly advised to provide services and interventions for the prevention and treatment of HIV (Key Principle 9, Figure 12). This was included to “remind national and international agencies of their responsibilities to all mothers and infants, irrespective of their HIV status and the convergence between global health agendas” (WHO, 2010, p. 28). This policy attempted to remind the global health community of the necessity to coordinate the various goals that have been established locally and internationally.

The major changes introduced in this policy include the recommendations regarding counseling, ARV use, and the duration of breastfeeding. Previous guidelines provided general information on all risks and benefits to each HIV-positive pregnant and postpartum woman. Despite an emphasis on individual rights, there was a clear endorsement in this policy for national recommendations that principally counsel and support a single standard recommendation. There appears to be less emphasis on individual choice and recommendations for individual circumstances. One key reason for the decision for one primary recommendation was stated as, “If there is a medical consensus in favor of a particular option, the reasonable patient would prefer a recommendation rather than simply a neutral presentation of options, as was recommended in previous WHO guidance” (WHO, 2010, p.19). However, despite the
assertion for the recommendation of a single national option as the new standard of care, no single approach was considered to be appropriate for all settings. The clear message was to provide standard recommendations and counsel individuals on how those might be adapted to individual circumstances.

The recommendation for ARV provision to the mother or child during breastfeeding was another significant addition to the guidelines. Although ARVs had a fifteen-year history, no previous policy provided recommendations for antiretroviral use while breastfeeding. In settings where infectious diseases and malnutrition were major causes of infant mortality, ARVs in combination with breastfeeding were recommended. ARVs were recommended in this policy to be provided as lifelong therapy to the mother.

Several new specifications concerning the duration and timeframe of breastfeeding were established in this policy. Cessation was recommended to be conducted gradually within a month when mothers decide to stop at any time, which is a definite timeline for the first time. ARV prophylaxis to the mother or infant was to continue for one week after breastfeeding fully stopped. There was no previous recommendation on ARV prophylaxis during cessation. There were also specific recommendations for alternatives to breast milk. The AFASS criteria for replacement feeding were substituted with more common language and more explicit definitions as well (see Figure 13).
Figure 13: Verbatim text from the 2010 WHO policy describing standards for AFASS criteria.

“Mothers known to be HIV-infected should only give commercial infant formula milk as a replacement feed to their HIV-uninfected infants or infants who are of unknown HIV status, when specific conditions are met:

a. Safe water and sanitation are assured at the household level and in the community, and; b. the mother, or other caregiver can reliably provide sufficient infant formula milk to support natural growth and development of the infant; and,

c. The mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhea and malnutrition; and

d. The mother or caregiver can, in the first six months, exclusively give infant formula milk; and,

e. The family is supportive of this practice; and

f. The mother or caregiver can access health care that offers comprehensive child health services” (p.7-8).

... It was considered that such language would better guide health workers regarding what to assess, and to communicate this to mothers who were considering if their home conditions would support safe replacement feeding” (p. 37).

The guidelines were changed to recommend breastfeeding exclusively for six months followed by the addition of appropriate complementary foods and the continuation of breastfeeding for the first 12 months of life (see Figure 14). The recommendation for the continuation for 12 months is a distinct change from the previous recommendations for cessation as soon as the AFASS criteria could be met or after achieving 6 months of exclusive breastfeeding. The 12-month recommendation was based on evidence that “twelve months
represent the time in which breastfeeding provides the maximum benefit in terms of survival...
this combination [with ARVs] would offer the best balance of protection from morbidity and mortality versus the risk of HIV transmission” (WHO, 2010, p. 32).

“Mothers known to be HIV-infected (and whose infants are HIV uninfected or of unknown HIV status) should exclusively breastfeed their infants for the first six months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life. Breastfeeding should then only stop once a nutritionally adequate and safe diet without breast milk can be provided.” (p.31).

Figure 14: Verbatim text from the WHO 2010 policy text describing the recommended length of breastfeeding for HIV-positive mothers.

Another significant change was the inclusion of the level of quality of evidence (e.g. high or very low) and the strength of recommendation (e.g. strong and weak). Citations of research were included in the WHO publications on HIV and infant feeding starting in 1998, but this publication was the first time the quality of evidence, strength of evidence, and extensive remarks about recommendations were included in the WHO document.

Importance. The principles and recommendations in this document were a continuation of the greater inclusion of evidence. Importantly, the level of recommendation and quality of evidence were included for the first time. This improves stakeholders’ evaluation of the recommendations and provides more information for the decision-making process. The inclusion of ARVs for breastfeeding mothers and infants was a significant and long-awaited change in recommendations. Lastly, there was a paradigm shift in the guidance on counseling HIV-positive women and the feeding options for their infant. Although individual rights were emphasized, national authorities were encouraged to promote and support a single recommendation as a
“starting place” for counseling mothers with HIV. This was a significant shift from the previous recommendations for individual counseling based on individual circumstances.

**2012: WHO guidelines on HIV and infant feeding 2010 - an updated framework for priority action.**

The last major update in WHO policy 2012 and provides simpler guidance by specifying two distinct paths for avoiding maternal-child HIV transmission via breastfeeding. Citing estimates by the Joint United Nations Program on HIV/AIDS (UNAIDS), exclusive breastfeeding with the addition of ARVs for the mother or the infant would decrease the risk of transmission of HIV to about 2% for six months of exclusive breastfeeding and a risk of 4% for 12 months (WHO, 2012, p.3). The policy states that without ARV treatment, between 14 and 17-17% of breastfed infants of HIV-positive mothers would have HIV by 18 months of age (WHO, 2012, p.3).

The WHO (2012) explicitly stated that health authorities should endorse one of two options when counseling new mothers with HIV: 1) breastfeeding while receiving ARVs (to the mother or infant) or 2) avoidance of breastfeeding entirely (see Figure 15). The WHO advised governments to include relevant stakeholders and the guidelines included “priority actions for governments” (WHO, 2012, p.5). There are specific “actions required” listed in their “priority of government action” sections (WHO, 2012, p. 5-7), including developing evidence-based national policies and communication strategies to promote the infant feeding practice in their policy. The roles of the United Nations Agencies are also illuminated along with challenges.
"The operational objectives of this Strategy include: ensuring that exclusive breastfeeding for six months is protected, promoted and supported, with continued breastfeeding up to two years or beyond; promoting timely, adequate, safe and appropriate complementary feeding; and providing guidance on feeding infants and young children in exceptionally difficult circumstances, including for infants of HIV-positive women" (p.1).

"National health authorities are encouraged to recommend one infant feeding practice for HIV-positive mothers to be promoted and supported by maternal, newborn, and child health services...

WHO recommends that women who breastfeed and receive ARVs (or whose infants are receiving ARVs) should exclusively breastfeed for 6 months and continue breastfeeding until 12 months of age and only then consider stopping...

The way in which national authorities implement these recommendations should depend on a careful assessment taking into account major factors including HIV prevalence, background infant and child mortality rates, current infant and young child feeding practices and nutritional status of infants, availability of clean water and sanitation, socio-economic status of the population and quality health services, including provision of interventions for PMTCT” (p. 4)

Figure 15: Verbatim text from the WHO 2012 policy explaining the new breastfeeding recommendations for mothers with HIV.

Changes. This document is consistent with the previous 2010 Guidelines but provided additional updated evidence. There are a number of guidelines for policy-makers and governments, and there is a greater definition of roles for the governments and organizations involved.
Importance. There is an explicit shift toward addressing policy-makers, governments and other stakeholders. There was also an emphasis on improving overall health care and the implementation of these guidelines at the system level, and specific actionable items for governments were given. The inclusion of challenges encourages innovative solutions and interventions to improve the prevention of mother-to-child transmission of HIV. Lastly, there were very clear, simple binary recommendations for counseling new mothers with HIV which simplified the counseling process.

2014: WHO consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations.

The most recent update of guidelines was released in 2014 (WHO, 2014a). These consolidated guidelines recommended simultaneous treatment with three ARVs to all pregnant and breastfeeding women (see Figure 16).

- All pregnant and breastfeeding women living with HIV should initiate triple antiretrovirals (ARVs), which should be maintained at least for the duration of risk of mother-to-child transmission. Women meeting treatment eligibility criteria should continue ART for life (CD4<500 cells/mm3) (strong recommendation, moderate quality of evidence (WHO, 2014, p. 64).

- For programmatic and operational reasons, particularly in generalized epidemics, all pregnant and breastfeeding women living with HIV should initiate ART and maintain it as lifelong treatment (option B+) (conditional recommendation, low quality of evidence) (WHO, 2014, p. 64).

Figure 16: Verbatim text from the 2014 WHO policy concerning maternal ARV treatment.
Changes. This document provided specific recommendations on the provision of triple therapy (therapy consisting of three ARVs), as well as the recommendation for the provision of this therapy to women for life.

Importance. This document recognized the necessity of treatment of all pregnant and breastfeeding women for life, particularly in high prevalence settings. It continued to update the available evidence. This 2014 policy referred to the 2012 policy for complete recommendations and only provided an update on ARV treatment of pregnant women or infants.

Discussion

Since 1987, the WHO has attempted to provide guidelines that were both appropriate and feasible for infant feeding in the setting of HIV. Table 1 summarizes the evolution of these policies and their major tenants.

Table 1: Evolution of WHO Guidelines for Infant Feeding in the Setting of HIV

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate of Transmission</th>
<th>Evidence</th>
<th>Breastfeeding (BF) Recommendations</th>
<th>Counseling Methods</th>
<th>ARVs</th>
<th>Mixed Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>25 to 50% for all offspring; unknown for breastfeeding (BF)</td>
<td>Research starting not cited</td>
<td>Breastfeeding not recommended</td>
<td>Counsel high risk women</td>
<td>Do not exist</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>1992</td>
<td>Not mentioned</td>
<td>Research mentioned, not cited</td>
<td>Breastfeeding when no other alternatives, or where primary cause of death is infectious diseases</td>
<td>Counsel high risk women</td>
<td>Do not exist</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>1998</td>
<td>25-45%, 15% from BF</td>
<td>Increasing research, citations included</td>
<td>Breastfeeding with early cessation</td>
<td>Counseling not discussed specifically</td>
<td>Available, no recommendations in setting of breastfeeding</td>
<td>Not mentioned</td>
</tr>
</tbody>
</table>
Table 1: *Evolution of WHO Guidelines for Infant Feeding in the Setting of HIV* (cont’d)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate of Transmission</th>
<th>Evidence</th>
<th>Breastfeeding (BF) Recommendations</th>
<th>Counseling Methods</th>
<th>ARVs</th>
<th>Mixed Feeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>10-20% risk from BF</td>
<td>More research, citations included</td>
<td>Cessation recommended as soon as AFASS</td>
<td>Counsel general public, also counsel HIV-positive women with all options, choice emphasized</td>
<td>ARVs mentioned, being investigated in BF</td>
<td>Mixed feeding cited as increasing risk for first time, discouraged</td>
</tr>
<tr>
<td>2004</td>
<td>5-20% risk from BF</td>
<td>More research, citations included</td>
<td>Exclusive bf for 6 months</td>
<td>Counsel with all choices</td>
<td>ARVs recommend ed as prophylaxis, no recommendations for BF</td>
<td>Mixed feeding cited as increasing risk, discouraged</td>
</tr>
<tr>
<td>2007</td>
<td>5-20%, 1% per month from BF</td>
<td>More research, citations included</td>
<td>Exclusive bf for 6 months</td>
<td>Counsel with one primary recommendation</td>
<td>ARVs recommend ed for prophylaxis, no recommendations for BF</td>
<td>Mixed feeding cited as increasing risk, discouraged</td>
</tr>
<tr>
<td>2010</td>
<td>5-20%, 1% per month from BF</td>
<td>More research, citations included, grading of evidence included</td>
<td>Exclusive bf for 6 months, continue for minimum of 12 months with ARVs to mother or infant</td>
<td>Counsel with one primary recommendation</td>
<td>ARVs recommend ed for prevention of transmission while BF</td>
<td>Mixed feeding cited as increasing risk, discouraged</td>
</tr>
<tr>
<td>2014</td>
<td>Not mentioned</td>
<td>More research, citations included</td>
<td>No recommendation for duration of breastfeeding, reference to prior guidelines</td>
<td>General recommendations for care and adherence support</td>
<td>Recommendation for triple ARVs for at least the duration of breastfeeding</td>
<td>Not mentioned, reference to prior guidelines</td>
</tr>
</tbody>
</table>

From the first to the most recent policy, the WHO has stated clear support for “protecting and promoting breastfeeding”. This was largely due to the excellent work of breastfeeding experts, advocates and researchers that made documents like the 1981 International Code possible.

Over time there was an increase in the evidence-base for specific recommendations. More research was progressively included, with the most recent policy being the most evidence-
based. There was also an increasing evaluation of current studies, confounding factors, and areas highlighted for further research. Citations and references began to be included in 1998, permitting independent evaluation of the evidence used for decision-making. It is notable that in 2010, with the inclusion of grading of evidence and the strength of a recommendation, there are still “strong recommendations” with “low evidence.” Evidence has increased dramatically since the start of the HIV epidemic, but there are still areas for ongoing research as long term ARV treatment becomes the norm and HIV becomes a chronic condition.

Global practices were also given increasing attention over time. This acknowledged the role of cultural norms and allowed a more realistic situational evaluation prior to planning interventions. Non-exclusive breastfeeding was reported in the research to be common in certain areas, and this practice adds a challenge to the promotion of exclusive breastfeeding. The acceptability of infant feeding options began to be included in 2000, but an explicit and clear discussion was not included until 2007.

One important further consideration is the shift toward the promotion of a single recommendation for infant feeding in the setting of HIV after 2010. This recommendation was provided based on the assumption that women would prefer to be given specific guidance instead of a presentation of all options without indication of expert endorsement. The presentation of the standard with a discussion of how the standard may or may not fit an individual mother’s situation is imperative to ensure the mother’s informed consent. It may aid in decision-making to be given specific guidance on what has been decided to be the best option; however, recommendations are not one size-fits-all, and women should be provided with the options and their risks/benefits.
Furthermore, it becomes evident through reading these policies that there is a need for all terms to be defined. For example, in the 1998 policy, breastfeeding was to be discontinued when “adequate” replacement feeding became available. There was no definition of adequate. This is also true for the AFASS criteria. The creation of those criteria illuminated some of the necessary considerations for infant feeding, but it was another six years before the criteria were described in detail. Definitions and descriptions of terminology are vital to guidelines and their successful implantation.

Importantly, there was a fifteen-year delay between the introduction of ARV therapy and policies for their use in the setting of HIV and breastfeeding. The policies following ARV introduction stated a lack of sufficient scientific evidence in order to create such a policy. It is unclear from these documents why there was such an extended delay in policy. An improved understanding of the delay could help future life-saving protocols be better prioritized and disseminated on a global scale.

WHO policies are an important component of international health care, and changes to these policies alter practices and national policies. It is important to note that these changes do not occur in a vacuum, and previous experience and knowledge of health care workers and the people affected may create some resistance to implementation of new recommendations (Desclaux, 2012). Women with HIV may have several children, and the recommendations may change over the course of her reproductive life (Desclaux, 2012). It is imperative that this confusion is minimized. Global policies may be difficult to implement in places with insufficient health care infrastructure, particularly at the margins of a population.
Limitations

There are several limitations in this document. Due to its limited scope, there was no in-depth discussion of the International Code of Marketing of Breast Milk Substitutes nor the infant formula industry’s response/impact on HIV and replacement feeding. There was also no discussion of the impact of HIV on worldwide donor milk banking. This document contains all the WHO documents on HIV and infant feeding that were found, but there may be others that were not found and therefore omitted.

Conclusions and Recommendations

The balancing of preventing HIV transmission through breastfeeding and the importance of breastfeeding has been a challenge for more than 30 years. It is irrefutable that breastfeeding should continue to be promoted, supported and protected as the optimal feeding method for most infants while also preventing the transmission of HIV from mother-to-child. There is no single strategy that is applicable everywhere, varying based on the population, resources, and the environment. Policies should include as much evidence as possible, as many stakeholders as possible, and an attempt to close the gap between policy and practice. Policies must also recognize the previous knowledge and experience of mothers and health care workers impacts the implementation of policy (see Figure 16).

This is not simply a matter of a structural insufficiency of human resources in African health services; rather, this expresses the fact that health policies still too often consider persons targeted by such programs to be ‘empty receptacles’ who will adopt medical recommendations on the spot without interpreting them, as if they had no experience, no other source of information of framework for interpretation, and no memory (Desclaux, 2013, p. 42).

Figure 16: Text verbatim from Desclaux 2013 on the gap between practice and policy.
The policies evaluated demonstrate the evolution in knowledge and recommendations for infant feeding practices in the setting of HIV. There is a continued challenge for policymakers, women, and health care workers to interpret the incomplete information to provide the best recommendations for infant feeding in the setting of HIV. The most recent updates (WHO 2012, WHO 2014) suggest that policy may be stabilizing considering the lack of significant changes from 2012 to 2014 beyond the ARV protocol. However, this evaluation of previous policies has demonstrated the need for continually clarifying terminology, descriptive criteria and practices, and increasing the evidence-base in order to create effective and accurate recommendations in the future.
References


Appendix: List of Competencies Met in CE

### Tier 1 Core Public Health Competencies

#### Domain #1: Analytic/Assessment Skills

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies quantitative and qualitative data and information</td>
<td>Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community</td>
</tr>
<tr>
<td>Applies ethical principles in accessing, collecting, analyzing, using,</td>
<td>Applies ethical principles in accessing, collecting, analyzing, using, maintaining, and disseminating data and information</td>
</tr>
<tr>
<td>maintaining, and disseminating data and information</td>
<td></td>
</tr>
<tr>
<td>Uses information technology in accessing, collecting, analyzing, using,</td>
<td>Uses information technology in accessing, collecting, analyzing, using, maintaining, and disseminating data and information</td>
</tr>
<tr>
<td>maintaining, and disseminating data and information</td>
<td></td>
</tr>
<tr>
<td>Selects valid and reliable data</td>
<td>Selects valid and reliable data</td>
</tr>
<tr>
<td>Selects comparable data (e.g., data being age-adjusted to the same year,</td>
<td>Selects comparable data (e.g., data being age-adjusted to the same year, data variables across datasets having similar definitions)</td>
</tr>
<tr>
<td>data variables across datasets having similar definitions</td>
<td></td>
</tr>
<tr>
<td>Identifies gaps in data</td>
<td>Identifies gaps in data</td>
</tr>
<tr>
<td>Describes public health applications of quantitative and qualitative data</td>
<td>Describes public health applications of quantitative and qualitative data</td>
</tr>
<tr>
<td>Uses quantitative and qualitative data</td>
<td>Uses quantitative and qualitative data</td>
</tr>
<tr>
<td>Contributes to assessments of community health status and factors</td>
<td>Contributes to assessments of community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)</td>
</tr>
<tr>
<td>influencing health in a community</td>
<td>Describes how evidence (e.g., data, findings reported in peer-reviewed literature) is used in decision making</td>
</tr>
</tbody>
</table>

#### Domain #2: Policy Development/Program Planning Skills

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributes to development of program goals and objectives</td>
<td>contributes to development of program goals and objectives</td>
</tr>
<tr>
<td>Describes organizational strategic plan</td>
<td>Describes organizational strategic plan (e.g., includes measurable objectives and targets; relationship to community health improvement plan, workforce development plan, quality improvement plan, and other plans)</td>
</tr>
<tr>
<td>Identifies current trends</td>
<td>Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community</td>
</tr>
<tr>
<td>Describes implications of policies, programs, and services</td>
<td>Describes implications of policies, programs, and services</td>
</tr>
<tr>
<td>Explains the importance of evaluations for improving policies, programs, and services</td>
<td>Explains the importance of evaluations for improving policies, programs, and services</td>
</tr>
<tr>
<td>Describes how public health informatics is used in developing, implementing, evaluating, and improving policies, programs, and services (e.g., integrated data systems, electronic reporting, knowledge management systems, geographic information systems)</td>
<td>Describes how public health informatics is used in developing, implementing, evaluating, and improving policies, programs, and services (e.g., integrated data systems, electronic reporting, knowledge management systems, geographic information systems)</td>
</tr>
</tbody>
</table>

#### Domain #3: Communication Skills

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)</td>
<td>Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)</td>
</tr>
<tr>
<td>Conveys data and information to professionals and the public using a variety of approaches (e.g., reports, presentations, email, letters)</td>
<td>Conveys data and information to professionals and the public using a variety of approaches (e.g., reports, presentations, email, letters)</td>
</tr>
<tr>
<td>Describes the roles of governmental public health, health care, and other partners in improving the health of a community</td>
<td>Describes the roles of governmental public health, health care, and other partners in improving the health of a community</td>
</tr>
</tbody>
</table>

#### Domain #4: Cultural Competency Skills

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes the concept of diversity as it applies to individuals and populations (e.g., language, culture, values, socioeconomic status, geography, education, race, gender, age, ethnicity, sexual orientation, profession, religious affiliation, mental and physical abilities, historical experiences)</td>
<td>Describes the concept of diversity as it applies to individuals and populations (e.g., language, culture, values, socioeconomic status, geography, education, race, gender, age, ethnicity, sexual orientation, profession, religious affiliation, mental and physical abilities, historical experiences)</td>
</tr>
<tr>
<td>Describes the diversity of individuals and populations in a community</td>
<td>Describes the diversity of individuals and populations in a community</td>
</tr>
<tr>
<td>Describes the ways diversity may influence policies, programs, services, and the health of a community</td>
<td>Describes the ways diversity may influence policies, programs, services, and the health of a community</td>
</tr>
<tr>
<td>Recognizes the contribution of diverse perspectives in developing, implementing, and evaluating policies, programs, and services that affect the health of a community</td>
<td>Recognizes the contribution of diverse perspectives in developing, implementing, and evaluating policies, programs, and services that affect the health of a community</td>
</tr>
<tr>
<td>Addresses the diversity of individuals and populations when implementing policies, programs, and services that affect the health of a community</td>
<td>Addresses the diversity of individuals and populations when implementing policies, programs, and services that affect the health of a community</td>
</tr>
<tr>
<td>Describes the effects of policies, programs, and services on different populations in a community</td>
<td>Describes the effects of policies, programs, and services on different populations in a community</td>
</tr>
<tr>
<td>Describes the value of a diverse public health workforce</td>
<td>Describes the value of a diverse public health workforce</td>
</tr>
</tbody>
</table>

#### Domain #5: Community Dimensions of Practice Skills

<table>
<thead>
<tr>
<th>Competency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)</td>
<td>Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)</td>
</tr>
<tr>
<td>Provides input for developing, implementing, evaluating, and improving policies, programs, and services</td>
<td>Provides input for developing, implementing, evaluating, and improving policies, programs, and services</td>
</tr>
<tr>
<td>Informs the public about policies, programs, and resources that improve health in a community</td>
<td>Informs the public about policies, programs, and resources that improve health in a community</td>
</tr>
</tbody>
</table>
Domain #6: Public Health Sciences Skills

- Identifies prominent events in the history of public health (e.g., smallpox eradication, development of vaccinations, infectious disease control, safe drinking water, emphasis on hygiene and hand washing, access to health care for people with disabilities)
- Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
- Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)
- Describes evidence used in developing, implementing, evaluating, and improving policies, programs, and services
- Describes the laws, regulations, policies, and procedures for the ethical conduct of research (e.g., patient confidentiality, protection of human subjects, Americans with Disabilities Act)
- Contributes to the public health evidence base (e.g., participating in Public Health Practice-Based Research Networks, community-based participatory research, and academic health departments; authoring articles; making data available to researchers)
- Suggests partnerships that may increase use of evidence in public health practice (e.g., between practice and academic organizations, with health sciences libraries)

Domain #7: Financial Planning and Management Skills

- Describes the structures, functions, and authorizations of governmental public health programs and organizations

Domain #8: Leadership and Systems Thinking Skills

- Describes public health as part of a larger interrelated system of organizations that influence the health of populations at local, national, and global levels
- Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community
- Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)
- Identifies internal and external facilitators and barriers that may affect the delivery of the 10 Essential Public Health Services (e.g., using root cause analysis and other quality improvement methods and tools, problem solving)
- Describes the impact of changes (e.g., social, political, economic, scientific) on organizational practices

Concentration Specific Competencies

**Global Health**

- Exhibit interpersonal skills that demonstrate willingness to collaborate, trust building abilities, and respect for other perspectives
- Identify and respond with integrity and professionalism to ethical issues in diverse economic, political, and cultural contexts
- Apply the health equity and social justice framework for the analysis of strategies to address health disparities across different populations
- Conduct evaluation and research related to global health
- Enhance socio-cultural and political awareness
- Apply systems thinking to analyze a diverse range of complex and interrelated factors shaping health at local, national, and international levels