Using IMRs to inform policy decisions on infant feeding and HIV

Summary of published research

A recently published paper presents an analysis of the impact of WHO infant feeding recommendations in different settings characterised by infant mortality rate (IMR). The findings inform HIV-related infant feeding policy decisions and are not intended for individual counselling of HIV-positive mothers.

Using mathematical simulation modelling, the effects of three intervention scenarios on HIV-free survival (HFS) of children aged up to 24 months of age were considered:

1. Replacement feeding (RF) from birth by HIV-positive mothers (RF24)
2. Exclusive breastfeeding (EBF) up to 6 months followed by early BF cessation (EBF6)
3. No postnatal intervention (BF24) (default scenario). This group included early, predominant and mixed breastfeeding, and breastfeeding to 2 years of age and beyond.

Method

The modelling estimated rates of HIV transmission and non-HIV related deaths in seven age intervals in children under the age of 2 years. For every 1000 live births, the model calculated the number of infant HIV infections and non-HIV-related deaths occurring during each interval.

To illustrate the comparisons, data were used from Ethiopia from both rural (IMR 115/1000 live births, 85% of the population) and urban (IMR 97/1000 live births) areas. Antenatal HIV prevalence was 3.7% in rural areas and 13.2% in urban areas. Ethiopia was selected due to its rapidly expanding Mother to Child Transmission (MTCT) prevention programmes, rural/urban differences, and IMRs which have not increased due to the HIV pandemic.

Critical IMRs were estimated to identify populations, characterised by the IMR, where the optimal postnatal intervention strategies would vary, in order to inform policy discussions. The sensitivity of the values were examined by rerunning the model simulations using the lower and upper limits of the 95% confidence intervals for estimates of the age-specific risks for each of the interventions.

Main findings
In Ethiopia, EBF6 produced the best HFS per 1000 live births in HIV-positive women in both rural and urban areas. In urban areas, RF24 produced a similar outcome to no postnatal intervention. The findings from Ethiopia suggest that RF should not be generally promoted as an infant feeding strategy to reduce MTCT. In both settings, exclusive breastfeeding for six months with early breastfeeding cessation is the best strategy.

Critical IMR2 values identified were as follows:

1. IMR is <25/1000 live births, RF24 results in the greatest HFS to 24 mo.
2. IMR > 25/1000 live births, EBF6 produces the best outcome. (This applies to most low-income countries).
3. IMR 101/1000, RF24 results in lower HFS than no postnatal intervention (BF24).

Sensitivity analysis found that:

1. For no breastfeeding, the critical IMR values for choosing between EBF26 and RF24 was 43/1000 live births (using the lower bounds of the 95% CI) and 15/1000 live births (using higher bounds).
2. Where IMR>93-112/1000 live births, no intervention at all is better than RF24.
3. At the level of postnatal transmission risk used in the model and using the point estimate of no breastfeeding, where IMR>56/1000 live births, six months of breastfeeding produces a better outcome than no breastfeeding from birth (RF24).

**Limitations of the study**

Conservatively high estimates of the risk of HIV transmission in the first weeks of life were made, since this cannot be identified using current testing methods.

The estimate for postnatal transmission rates for EBF is based on one observational study from Zimbabwe where early EBF was associated with a reduced risk of HIV transmission3.

The age-specific risk of death from artificial feeding is based on studies where mothers chose to feed artificially for reasons unrelated to HIV. The authors suggest that the relative risk of mortality due to no BF is likely to be greater where BF is avoided due to maternal HIV or related illness. Population-based data on HIV associated artificial feeding are urgently needed.

IMR is used in this modelling as it reflects the burden of infectious disease, poor hygiene and sanitation and limited access to quality healthcare, which are the same conditions that increase the risk of RF in infants. While most deaths associated with HIV occur after infancy, the authors advise caution applying these findings to settings where the IMR is highly influenced by the HIV pandemic. They recommend policy makers use IMRs estimates prior to the epidemic circulation, or draw conclusions with caution.
The analysis assumes full compliance of HIV-positive mothers with the WHO-recommended advice. Imperfect compliance will influence outcomes. For example, lower compliance with EBF6 (i.e. non-exclusive breastfeeding) will increase postnatal transmission.

IMR may vary substantially among different sub-populations within countries. Thus population-based analysis is not a substitute for individual counselling and informed choice with individual risk assessment.

Mathematical simulations simplify the difficult choices facing policy makers and families affected by HIV/AIDS. Introducing breastmilk substitutes into health programmes has been problematic and controversial. Tools are needed to evaluate whether such procurement is appropriate or whether efforts and resources should be directed elsewhere, e.g. on supporting EBF with early BF cessation and nutrition support for young children.

**Conclusions**

IMR-based analyses can help to guide government policy decisions about which infant feeding strategies to invest in and emphasise for HIV-positive mothers in different settings.

The authors conclude that findings from new research on making BF safer for HIV-positive mothers, through extended ARV prophylaxis, prevention and treatment of breast infections, and EBF must urgently be put into practice.

**WHO recommendations**

Mother-to-child transmission of HIV occurs during pregnancy, at the time of delivery, and through breastfeeding (BF). WHO recommends avoidance of all BF when replacement feeding (RF) is affordable, feasible, acceptable, sustainable, and safe. Otherwise, exclusive breastfeeding (EBF) followed by early BF cessation is recommended.

New guidelines by WHO on the use of antiretroviral drugs to prevent infant HIV infection in resource limited settings recommend single, dual and triple therapy options that would reduce the risk of the infant being born with
HIV to 5-14%.


2A critical value is the value for which the number of HIV-free survivors is the same for the two intervention scenarios being compared, holding all other values constant.

3See research summary in Field Exchange 26.

Taken from Field Exchange 27

www.ennonline.net/fex/27/imr

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