



## Lives Saved Tool Technical Note

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### **Assumptions regarding Kangaroo Mother Care (KMC), Full supportive care for premature babies (FSC) and Immediate KMC (iKMC).**

**KMC:** The assumption behind KMS assumes that the newborn child will spend at least 16 hours a day with full skin-to-skin contact with the mother. This intervention applies only to pre-term babies who are stable at birth. It assumes 51% efficacy in reducing deaths due to prematurity and has an affected fraction of 35.7% of preterm deaths. Coverage of this intervention is based on all premature babies being provided this when stable.

*Efficacy Source:* Lawn JE, Mwansa-Kambafwile J, Horta BL, et al. 'Kangaroo Mother Care' to prevent deaths due to preterm birth complications. International Journal of Epidemiology 2010; 39(Suppl 1): i44-i54.

*Affected Fraction Source:* We do not have percent of preterm babies that are stable at birth and can have KMC. The efficacy trials for KMC used babies who were alive and once stable. As our best approach to estimating this we have used the 1- percent of premature deaths that occur in the first three days after birth. Originally, we assumed 51% of preterm deaths occurred in the first 3 days after birth. A more recent data set and analysis came from 10 trials in 8 low- and middle-income countries (Bangladesh, Burkina Faso, Brazil, China, India, Malawi, Zambia) where gestation age was measured. In these trials there were 1575 deaths due to prematurity and of those deaths 64.3% occurred in the first 3 days following birth. Based on this we assume that the affected fraction for KMC will be 35.7% of all premature deaths. These data are as yet unpublished but were part of a project at Johns Hopkins funded by the Children's Investment Fund Foundation (CIFF) for the Lancet Small Vulnerable Newborn series which will appear in May, 2023.

**\*Full supportive care:** This intervention package includes feeding support/IV fluids, infection prevention and management, provision of oxygen, management of neonatal jaundice, nasal CPAP/ICCP, surfactant for respiratory distress syndrome and KMC when child is stable. The previous estimate of efficacy in LiST was based on a delphi approach that estimated efficacy in reducing deaths due to prematurity at 80% with IQR of 60% to 90%. Based on new data on the iKMC trial (see below) we now have our central estimate of efficacy of FSC at 71%. This fits within the earlier bounds of efficacy plus is based on the data from the iKMC trails. The affected fraction is now set at .96 of all premature deaths, correcting for premature deaths that occur in newborns who weighted less than 1000 grams at birth.

*Source of efficacy:* Bhutta ZA, Das JK, Bahl R, et al. Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost? Lancet 2014; 384(9940): 347-70. See notes below. WHO Immediate KMC Study Group. Immediate "Kangaroo Mother Care" and Survival of Infants with Low Birth Weight. New England Journal of Medicine 2021; 384(21):2028.

*Source of Affected fraction:* The iKMC trial provided full supportive care to all newborns with a birth weight between 1800 and 1000 grams. Again using the data from the CIFF funded meta-analysis of multiple trial data we found that approximately 4% of deaths due to prematurity were among newborns with birth weight below 1000 grams. WHO Immediate KMC Study Group. Immediate "Kangaroo Mother Care" and Survival of Infants with Low Birth Weight. New England Journal of Medicine 2021; 384(21):2028

**\*iKMC:** Provides all full-supportive care intervention along with immediate KMC for all babies, stable and unstable.

*Source of efficacy:* Here we would assume an efficacy value of .873 which is a 23% decrease in risk of premature deaths between FSC and iKMC as found in the iKMC trial. In addition, it would mean that given ptb with weights above 1000 grams we would expect 12.3% deaths very similar to the 12% deaths in the iKMC trial. WHO Immediate KMC Study Group. Immediate "Kangaroo Mother Care" and Survival of Infants with Low Birth Weight. New England Journal of Medicine 2021; 384(21):2028.

*Source of affected fraction:* Again, using the data from the CIFF funded meta-analysis of multiple trial data we found that approximately 4% of deaths due to prematurity were among newborns with birth weight below 1000 grams. As this was the cutoff value for the iKMC trial we have used 96% as the affected fraction for both FSC and iKMC. WHO Immediate KMC Study Group. Immediate "Kangaroo Mother Care" and Survival of Infants with Low Birth Weight. New England Journal of Medicine 2021; 384(21):2028

### **Notes on treatment for premature babies.**

There are several key issues for the efficacy inputs to LiST:

First, ideally, we would have a study or meta that compares the intervention to no intervention in terms of reducing deaths due to prematurity. This is a critical issue that needs to be resolved with the efficacy value for iKMC.

Second, because there are optional treatment regimens for premature babies, we want to ensure that we are not over-estimating efficacy but applying multiple regimens. To help control for this we have linked treatment regimens so that overall treatment coverage can be a combination of the different regimens but total coverage cannot exceed 100%. This allows us to capture effects where different levels of treatment are available at different types of birth facilities.

Third, for each intervention we need to define an affected fraction that pairs with the efficacy to determine the overall impact of the treatment regimen on reducing deaths due to prematurity.

Fourth, we need to come up with some assumptions regarding baseline coverage of these interventions. We assume that currently no (or very, very few) premature children will get iKMC in low- and middle-income countries. So, the baseline assumption for coverage of this intervention is set at zero for all countries. Both KMC and full supportive care are available in most LMIC's but the issue is where do you get coverage. This is not something that is measured in household surveys. To estimate coverage of KMC and full supportive care we used a linking approach that combines information from household surveys that say where births occurred (at home, level of facility) with data from facility surveys that provide an estimate of readiness to deliver kmc and full supportive care for different facility levels (e.g., health post, clinic hospital). More details on the linking approach we use are available elsewhere. (Need ref here)